

Copyright is owned by the Author of the thesis. Permission is given for a copy to be downloaded by an individual for the purpose of research and private study only. The thesis may not be reproduced elsewhere without the permission of the Author.

Project uncertainty, project risk and project leadership: A policy capturing study of New Zealand project managers.

A thesis presented in partial fulfillment of the requirements for the degree
of Master of Arts in Psychology
at Massey University, Wellington,
New Zealand.

Brendon Mercer

2016

Abstract:

Cooperation between project practice and project research could help reduce failure rates for projects in New Zealand and globally. The current research used a “policy capturing” method - systematically varying sources of project uncertainty (policy cues) to explore project leadership responses. A contingency model proposed that project uncertainty (low path-goal clarity, low team cohesion, and high technical complexity) would lead to greater perceptions of project risk (scope/quality, budget, schedule, and project team satisfaction) that would negatively predict the (rated) effectiveness of transactional leadership style and positively predict ratings for transformational style. In total, $n=131$ experienced project managers rated the effectiveness of leadership styles from ‘not effective’ to ‘extremely effective’. Greater uncertainty produced higher perceived risks that reduced the rated effectiveness of transactional leadership. Path-goal clarity was of particular importance as a policy cue, directly predicting transactional leadership ratings ($R=-0.189$). These results are consistent with the task-orientation of traditional project management. However, the results for transformational style were unexpected - only team cohesion predicted transformational leadership ratings (negatively) ($R= -0.119$) and no link between risk and transformational leadership was found. Possible reasons for the ‘disconnect between transformational leadership, uncertainty and risk are discussed and further research suggested.

Acknowledgements:

My profound gratitude and respect goes to Professor Stuart C. Carr - a true humanitarian, a true scholar and a fine transformational leader. And of course kudos to Scott Ballantyne for achieving what we couldn't... ;)

My thanks to Garry Miller, Director of Research, PMINZ, and all PMINZ members who took the time to complete the questionnaire.

My appreciation to Massey University, and Harvey Jones, in particular, for Qualtrix-ing and advice.

Thanks Amanda for your support.

Eternal love and hugs to Amelia and Juliette – my everything. Thanks to you (and Barry the fox terrier) for your patience. One day you will explore your very own piece of the puzzle!

Love and songs,

B.

Table of contents

Abstract:	iii
Acknowledgements:	iv
Table of contents	v
List of tables:	ix
List of figures:	xii
Chapter 1: The research model and literature review.	13
1.1 The need for project research.	14
1.2 Systems theory	19
1.3 Success, risk and uncertainty	21
1.31 What is project success?.....	21
1.32 What is (perceived) project risk?	23
1.33 What is un/certainty?	24
1.34 Complexity?	25
1.4 Sources of un/certainty	26
1.41 Path-goal clarity (output).....	27
1.42 Technological complexity (tasks)	27
1.43 Project team cohesion (inputs).....	28
1.45 Research Propositions 1 (A-B).....	29
1.5 Project leadership	30
1.51 Contingency theories of leadership.....	31
1.52 Transactional and transformational leadership	32
1.53 Transactional and transformational project leadership	34

1.54 Research Propositions 2 (A-C, B-C and A-B-C)	35
1.6 Leadership style and the project team	36
1.61 Commitment	37
1.62 Cooperation.....	38
1.63 Capability	39
1.64 Research Propositions 3	41
1.7 Personality and leadership	42
1.71 Political skill	43
1.8 Project leadership experience.....	44
1.81 Projects are unique	45
1.82 Projects are temporary	45
1.83 Projects are goal-directed	46
1.84 Research Propositions 4	47
Chapter 2: Method.....	48
2.1 Participants.....	48
2.2 Measures	49
2.21 Demographic information.....	50
2.22 Policy-capturing measure	50
2.23 Additional questions.....	53
2.24 Political Skills Inventory	53
2.3 Procedure	54
Chapter 3: Results.....	57
3.1 Data analysis.....	57
3.2 Data Reduction	58

3.2.1 Principal Components Analysis protocol.....	58
3.2.2 Exploratory factor analysis 1 – Perceived risk factors	59
3.2.3 Exploratory factor analysis 2 - Political skill inventory.....	61
3.3 Multivariate analysis.....	65
3.3.1 Multiple regression model.....	65
3.3.2 Regression analysis protocol	66
3.3.3 ANCOVA model	67
3.3.4 ANCOVA protocol.....	68
3.4 Hypotheses concerning A-B linkages	68
3.4.1 Regression of perceived risk (B) on project uncertainty (A)	69
3.4.2 ANOVA: project uncertainty (A) and perceived risk (B).....	70
3.5 Hypotheses concerning A-C links.....	75
3.5.1 Project uncertainty and <i>transactional</i> leadership (TX)	75
3.5.2 Project uncertainty and <i>transformational</i> leadership (TF)	80
3.6 Hypotheses concerning B-C linkages	85
3.6.1 Perceived risk and <i>transactional</i> leadership (TX).....	86
3.6.2 Perceived risk and <i>transformational</i> leadership (TF)	89
3.7 Mini-summary of meta-analyses and ANCOVA	91
3.8 Perceived risk as a Mediator.....	92
3.8.1 Baron and Kenny model.....	92
3.8.2 Mediating <i>transactional</i> leadership ratings.....	94
3.8.3 Mediating <i>transformational</i> leadership ratings	96
3.9 Exploring team attributes (Figure 1).....	97
Discussion.....	99

Transactional leadership, risk and uncertainty.....	99
Transformational leadership, risk and uncertainty.	100
The mediation of uncertainty and leadership by risk.	100
Links to theory	104
Strengths and limitations of This research:.....	105
Policy capturing.....	105
Research and practice.....	107
Political skills.....	108
Suggestions for further research:.....	109
Conclusions	109
References.....	113
Appendix A: Mapping Project and Project Management Research Perspectives.....	134
Appendix B: The research questionnaire.....	135
Appendix C: SME correspondence (1).....	155
Appendix D: The research invitation	156

List of tables:

Table 1:	Principal Components factor analysis of Perceived Risk variables showing factor loadings, communalities, eigenvalues, % variance explained, Cronbach's alpha, and descriptive statistics (n=1048)	61
Table 2:	Principal components analysis of Political Skills Inventory items (with Direct Oblimin rotation) showing factor loadings, communalities, eigenvalues, % variance explained, Cronbach's alpha, and descriptive statistics (n=131).	64
Table 3:	Meta-analysis results for the regressions of perceived risk to project success (DV) on project uncertainty (three IVs) (n=130).	70
Table 4:	Means and standard deviations of perceived risk to project success (DV)* in high and low (binary) conditions for path-goal clarity, team cohesion and technical complexity (three IVs) (n=1048).	72
Table 5:	Three-way univariate Analysis of Variance results and effect sizes of sources of project uncertainty (IVs) on perceived of risk to project success (DV)(n=1048).	74
Table 6:	Meta-analysis results for the regression of SME ratings of transactional leadership effectiveness (DV) on sources of project uncertainty (three IVs) (n=127).	76
Table 7:	Means and standard deviation of SME ratings of transactional leadership effectiveness (DV)* in high and low (binary) conditions for path-goal clarity, team cohesion and technical complexity (three IVs) (n=1048).	77
Table 8:	Three-way univariate Analysis of Variance results and effect size of project uncertainty (three IVs) on SME ratings of transactional leadership effectiveness (DV) (controlled for covariates) (n=1048).	79

Table 9:	Meta-analysis results for the regression of SME ratings of transformational leadership effectiveness (DV) on sources of project uncertainty (three IVs)(n=126)	81
Table 10:	Means and standard deviations of SME ratings of transformational leadership effectiveness (DV)* in high and low (binary) conditions for path-goal clarity and team cohesion and technical complexity (three IVs) (n=1048).	82
Table 11:	Three-way univariate Analysis of Covariance results and effect size of team cohesion (IV) and covariates (CVs) on SME ratings of transformational leadership effectiveness (DV)(n=1048).	84
Table 12:	Estimated marginal means and standard error of SME ratings of transformational leadership effectiveness (DV)* in high and low (binary) conditions for team cohesion (IV) (controlled for covariates)(n=1048).	84
Table 13:	Meta-analysis results for the regression of SME ratings of transactional leadership effectiveness (DV) on perceived risk to project success (IV)(n=127).	87
Table 14:	Means and standard deviations of SME ratings of transactional leadership effectiveness (DV) as a function of level of perceived risk to project success (binary variable) (IV)(n=992).	88
Table 15:	One-way univariate Analysis of Variance results and effect size for level of perceived risk to project success (binary IV) for SME ratings of transactional leadership effectiveness (DV) (n=992).	88
Table 16:	Meta-analysis results for the regression of SME ratings of transformational leadership effectiveness (DV) on perceived risk to project success (IV) (controlled for covariates) (n=126).	89

Table 17:	Mean and standard deviation of SME ratings of transformational leadership effectiveness (DV) as a function of level of perceived risk to project success (binary IV) (n=992).	90
Table 18:	One-way univariate Analysis of Co-variance results and effect size of apparent sincerity (CV) for SME ratings of transformational leadership effectiveness (DV) (n=992).	91
Table 19:	Regression coefficients for SME ratings of transactional leadership effectiveness (DV) on sources of project uncertainty (IV) (and with levels of perceived risk entered as an additional independent variable) (n=1016)	95
Table 20:	Observed frequencies (percentages) and test statistics for chi-squared goodness of fit for project team attributes least affected by path-goal clarity, team cohesion and technical complexity (n=131)*.	97

List of figures:

Figure 1.0:	The research model: project uncertainty (A), project risk (B) and project leadership (C).	13
Figure 1.1:	The project system	19
Figure 1.2:	Project management success	21
Figure 1.3:	Sources of project uncertainty	26
Figure 1.4:	Project leadership	30
Figure 1.5:	Transformational leadership	37
Figure 3.1:	The two-way interaction effect of path-goal clarity and team cohesion on mean SME ratings for perceived risk (SPSS).	73
Figure 4.1:	Significant linkages for the research model (brackets indicate a partial (mediated) effect).	99
Figure 4.2:	Mean effectiveness ratings for transactional (TX) and transformational (TF) leadership in policy capturing scenarios of increasing uncertainty (Scenarios B to F).	101

Chapter 1: The research model and literature review.

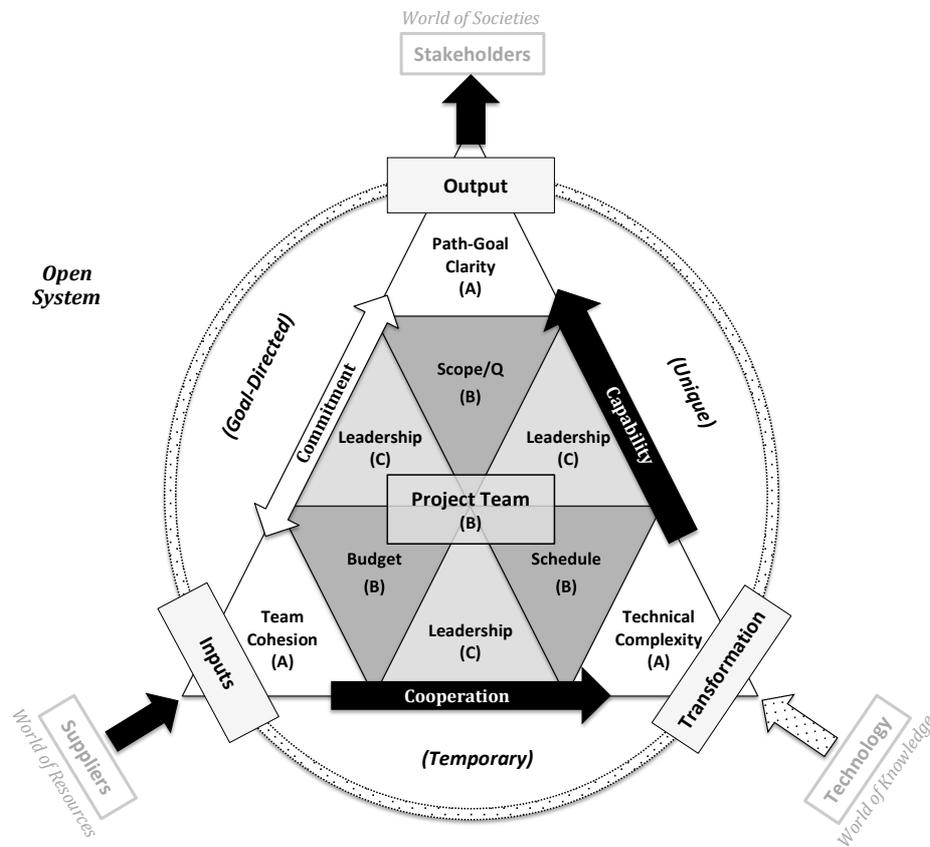


Figure 1.0: The research model: project uncertainty (A), project risk (B) and project leadership (C).

Figure 1 adapts a systems model to explore the leadership of projects. Project systems input resources (from the external environment) and transform them into outputs (into the external environment). Each of this tripartite system has measures of success (shown as 'B' in figure 1), and each measure of success is potentially threatened by sources of uncertainty ('A') that are peculiar to any given project. The role of the project leader ('C') is to intervene by managing risk, and also by developing the resilience and resources of the project team.

1.1 The need for project research.

The use of projects (temporary organisations) as a form of work organisation is increasing worldwide. Over 20% of global Gross Domestic Product may be project based, and even more in India (>30%) and China (>40%) (Bredillet 2010; Anbari, Bredillet & Turner 2008). Yet projects famously fail frequently. The American 'Standish Reports' (cited: Andersen, 2010) suggest that around half of all projects come in over budget or schedule, or fail to meet specifications – and around a quarter do not come in at all. In a New Zealand survey, 70% of organisations reported a project failure in the previous year (KMPG, 2010). Only 36% reported consistently met schedule, 48% budget, and 59% scope. In 2013, organisations reported increasing 'projectisation' yet schedule (29%), budget (33%) and on specification (35%) performances were all down on 2010 figures (KPMG, 2013). Hence, the broad picture (in New Zealand) is of more projects and of more project failures. Project failure rate is an impetus for this study because project success is demonstrably uncertain – apparently less than 'chance' in some cases – and responding appropriately to uncertainty is likely to be an important success factor in project.

One problem for project research is that project applications are (increasingly) atypical (Soderlund, 2002). This is because the term 'project' has become applied far beyond its origins in large construction, aerospace and engineering contexts (Bourne & Walker, 2005). Yet,

project management is regarded as a distinct profession regardless of project type or industry. Project leadership differs from traditional management because projects present special challenges not encountered in the same way by permanent organizations as a result of uncertainty (Shenhar & Dvir, 2004; Pines, Dvir & Sadeh, 2009). Of particular challenge is the urgency and innovation required of projects while still needing to be efficient and effective organisations, that is, projects operate under uncertainty but are still expected to be successful.

Project research has adopted various lenses. Different schools of project research range from universal theories of the project, to categorical project contingencies (Anbari, Bredillet and Turner, 2008) (Appendix A). Project management approaches may also be discerned as 'hard' and 'soft' (Rolstadas, Tommelein, Schlieflöe & Ballard, 2014). 'Soft' factors such as human interactions and organizational behaviors are represented in the 'behavioural' school focusing on leadership and team effectiveness (Soderlund, 2002). Hard approaches such as the optimization school view the projects as a 'machine' with a clear purpose and the role of the project manager is to drive the machine. The notion of controlling a project is grounded in ontological and epistemological assumptions (Bredillet 2010; Saynisch, 2010; Whitty & Schultz, 2007). Positivism assumes an enduring and objective reality and supports the managerial ethos of measurable and linear effects. Managerialism has its roots in the industrial revolution when recently urbanised workers 'required managing' (Bull, 2010). Hard project

methodologies and standards such as the Project Management Body of Knowledge (PMBOK) (PMI, 2008) 'deconstruct' tasks into sequenced components (Turner, 2006c) and "substitute for the routines, processes and structures of permanent organizations" (Tyssen, Wald and Spieth, 2014).

However, a 'hard' task orientation may only be appropriate in the simplest of project contexts because the uncertainty that comes with highly innovative or complicated goals makes deviations from plans likely (Crawford & Pollack, 2004; Yeo, 1999; Soderlund, 2004b; Geraldi & Lechter, 2012). Traditionally, 'predictable' projects such as construction and military applications controlled for 'knowns' and anticipated 'known unknowns' (risk management) (Bourne & Walker 2005; Pich et al., 2002). Attempts to command and control "dynamic project environments" (Collyer & Warren, 2009) with 'unknown unknowns' carry the risk of further unpredictable outcomes (Bourne & Walker 2005). Soft project management approaches such as AGILE software development methods emphasise iterative problem solving, shared responsibility and team capability (Chow & Cao 2008). Responding to complexity and uncertainty implies that 'sense-making' of an unfolding situation will be required rather than simply implementing 'front-end' planning (Perminova, Gustafsson & Wikstrom, 2008).

This research utilises a contingency approach positing that project success is contingent upon the project context. For project owners,

successful projects align capability with strategy (Crawford, Hobbs & Turner, 2006; Howell, Windahl & Seidel, 2010). This requires that project characteristics (including project methodology and leadership style) 'fit' the project environment (contingency). For example, Besner and Hobbs (2012a) studied projects by industry finding distinct clusters of contextual variables and project toolsets for each. Other typologies have considered project life-cycle stage, strategic importance, cultural environment (domestic or expatriate), and contract types (Muller & Turner, 2007). 'Megaprojects' have emphasized project size (scale) and 'technical complexity' (Bosch-Rekvelde, Jongkind, Mooi, Bakker & Verbraeck, 2011; He, Luo, Hu & Chan, 2015; Lu, Luo, Wang, Le & Shi, 2015). Uncertainty contingencies enable the comparison of different project types (Zika-Viktorsson, Hovmark & Nordqvist, 2003; Muller, Geraldi & Turner, 2012). Shenhar and Dvir (1996, 2001) modeled projects by technological uncertainty and system scope and distinguish between radical (uncertain) and incremental change projects. Howell et al. (2010) suggested that uncertainty and criticality (consequences) determine organizational structure and project processes. Crawford and Pollack (2007) classified 'hard' or 'soft' projects along seven dimensions.

This study proposes that projects may be contextualised based on sources of uncertainty allowing comparison of projects regardless of type and industry. Hence, 'fitting' a task focused leadership style to stable and planned projects, and relationship focused leadership style to innovative,

complex and uncertain projects is likely to be a significant factor in project success.

A criticism of project research is that it lacks empiricism and is overwhelmingly reliant on large sample surveys (i.e. self-reports) (Clarke, 2012a; Packendorff, 1995; Shenhar & Dvir, 1996). Cicmil, Williams, Thomas and Hodgson (2006) argue that the field needs more research focused on the '*actuality*' of project managers' experiences. One alternative to self-report surveys is the policy capturing method. Policy capturing enables researchers to analyse how information and cues are used by policy makers (subject matter experts) by eliciting *likely* responses to a survey questionnaire rather than actual responses to field data (Karren & Barringer, 2002). This method enables an experimental design (i.e. the manipulation of independent variables and controlling of confounding variables) and avoids some of the pitfalls of using self-report data (Aiman-Smith, Scullen & Barr, 2002). Self-reports have been shown to differ from actual behavior (Karren & Barringer, 2002). Because policy capturing assesses the importance of predictor variables indirectly it may avoid bias due to 'social desirability' (the desire to be socially correct). However, the idiographic nature of policy capturing requires a considerable contribution from participants (i.e. policy capturing produces a sample of individual studies rather than one aggregated sample) and is therefore prone to fatigue effects requiring a balance between limiting the amount of cues (requiring fewer scenarios) and realism (the inclusion of relevant cues and the number of possible

decisions). Ultimately, the generalizability of policy capturing studies relies on a balance between adequate sampling and adequate modeling.

1.2 Systems theory

"Systems theory is not really a theory as much as it is a way of thinking"

(Landy & Conte, 2007, p.581).

Projects transform resources into products within a wider project environment. Katz and Kahn (1966) equated organisations with biological systems that are dependent on their environment. Open systems transact energies with the environment in order to survive and adapt (p.67). In particular, the feedback of information and resources (from the environment) is crucial to the

organism's maintenance (the white arrow in Figure 1.1). According to a systems perspective human resources not only provide direct energetic input for the productive (sub)system but also carry information back to the organization about environmental conditions

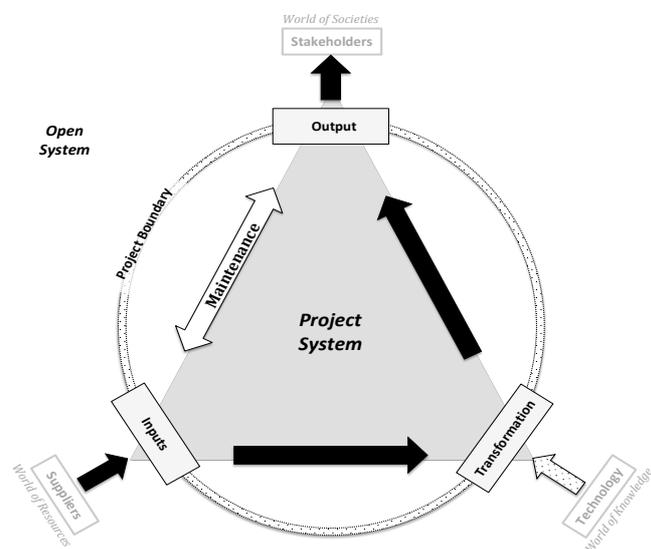


Figure 1.1: The project system

and organisational performance (p.457). In effect, a model of the external environment is constructed by the (social) system itself and expressed through planning and management (Piperca & Floricel, 2012).

This study focuses on the internal project system (Figure 1.1) but this does not imply that projects are closed, controllable systems (as managerialism does) – indeed, Katz and Kahn's open systems model emphasizes the uncertainty of external factors on project success. Thompson (1967) suggested that some aspects of an organization may be partly 'closed' and therefore managed - but that environment and technology represented potential sources of uncertainty that required boundary-spanning relationships. The project manager maintains relationships with a wide range of internal and external stakeholders at input, transformation and output stages negotiating uncertainty around (for example) the availability of resources and knowledge, client and stakeholder expectations, and the laws and culture of society. The role of project leader is arguably cultural - achieving "internal integration and external adaptation" (Schein, 1983). For the present purposes the (closed) system boundary serves to distinguish the project organisation from the wider environment (Piperca & Floricel, 2012).

The importance of the project team is supported by a systems view. Social systems are distinguished from the structural system (Valentinov, 2014). "The cement which holds (systems) together is essentially psychological rather than biological"(Katz and Kahn, 1966, p.33). To

avoid being chaotic, social systems restrict “human variability” through organizational values, norms (of performance) and organisational roles (p.38). An important (systemic) role for the project leader is to ‘maintain’ the structural and social dimensions of the project system.

1.3 Success, risk and uncertainty

The first proposal of the research model (figure 1.0) is that each element of the project system (input, transformation and output) introduces sources of uncertainty (A) that present risks to project success (B). Several aspects of this theory require clarification: what is project success, what is risk, and what is uncertainty?

1.31 What is project success?

Project performance is measured against budget, schedule, and scope/ quality targets (the “iron triangle”). ‘Performance’ reflects the efficiency and effectiveness with which a project is managed (PMI, 2008). These criteria are

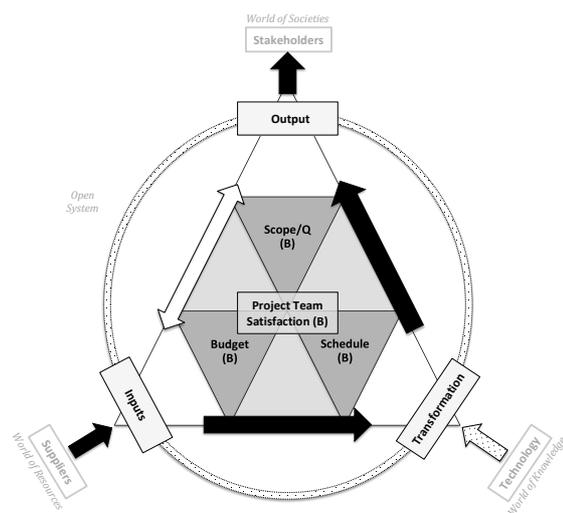


Figure 1.2: Project management success

obliquely related because a change to one will almost certainly impact on at least one other. Because inputs (resources) attract a cost they are measured by budget. The performance of the project tasks ('transformation') requires time and is measurable by a project schedule. Lastly, the output (deliverables) of the project is measured in terms of

scope and quality specifications (figure 1.2). Atkinson (1999) cautioned against such a limited set of success criteria pointing out that cost and scheduling criteria are decided when the least is known about a project (initiation phase) and that quality is ultimately subjective. Serrador and Turner (2015) also observe that quality is “subject to variation in perception”.

An important distinction lies between ‘project management success’ and ‘project success’. Project efficiency does not necessarily indicate project success, e.g. meeting the planning objectives may not meet end-user requirements or commercial returns (Dvir, Raz, and Shenhar, 2003; Ika, 2009). The reverse also applies - inefficient projects can prove highly successful e.g. Concorde or the Sydney opera house (Baccarini, 1999). ‘Project success’ reflects the ‘product’ of the project that survives beyond the project lifecycle. However, and not surprisingly, Serrador and Turner (2015) did find a correlation of 60% between project efficiency and project success. Hence, project management success is an important aspect of project success and has been the focus of much project research (Jugdev and Muller, 2005).

The success of *projects* ultimately depends on the differing expectations of stakeholders both within the project’s parent organisation and also the external project environment (e.g. client, end-users and society) (Westerveld, 2003). Hence, project success incorporates a vertical dimension of success at project, business and strategic levels (Shenhar,

Levy and Dvir, 1997; Baccarini, 1999) and also a lateral dimension beyond the project boundary (i.e. stakeholders within the environment). An important internal stakeholder group is the project team (figure 1.0). Gray (2001) argues that the wellbeing and happiness of individual employees should be key success criteria. He suggests that a “low-threat, secure and stable environment in which individual contribution is maximised within a distinctive team culture, offers the optimum environment for successful project outcomes”. This study includes team satisfaction as a fourth measure of project management (and project) success.

Success also has a temporal dimension. Success criteria (the iron triangle of cost, time and scope) measured prior to project delivery become predictors of success and are the basis for monitoring and control methods such as ‘earned value management’ and risk management (PMI, 2008).

1.32 What is (perceived) project risk?

A primary function of project management is to remove or mitigate uncertainty (Turner and Muller, 2003). Uncertainty is usefully expressed via its potential effects on project performance, i.e. *risk*. Risk is a quantifiable expression of the likelihood and critical effects of an uncertain event (Howell, Windahl & Siedel, 2010):

$$[\text{Risk} = \text{probability} \times \text{criticality}]$$

The impacts of uncertain events (in dollars, days and defects) are likely to interact because they are all metrics of the same activity. For example,

the risk of having to make planning changes or perform rework is observable in the additional cost and/or time, and/or the loss (or addition) of scope/ quality specifications. Team satisfaction is likely to stem from the overall performance of the project – e.g. extra work resulting from changes, shortages or mismanagement is likely to affect team satisfaction, i.e. the project team ‘hold a stake’ in effective project performance. The ultimate risk for a project team is that unplanned events result in premature project termination.

The emergence of uncertainty occurs especially in project implementation (Soderholm, 2007) imposing risk (or potentially opportunity) for project objectives. Traditional *risk management* is a process of predicting and identifying risk factors that will trigger planned responses (Thamhain, 2013). This research suggests that identifying sources (and levels) of uncertainty and potential risks enables the project leader to adopt suitable strategies to remove, mitigate or respond to risks as they occur.

1.33 What is un/certainty?

Uncertainty describes events that are to some degree known and foreseeable. (Atkinson, Crawford & Ward, 2006) propose that uncertainty results from inadequate information or ambiguous (inconsistent) information. Project managers inevitably work to a partial concept of the project (Daniel, 1990) and it is this gap between the ‘real’ and perceived project that introduces uncertainty (“known unknowns”) (Pich, Loch and

De Meyer, 2002). Project managers therefore rely on the “careful discrimination of relevant information” (Kutsch & Hall, 2010). Crawford and Pollack's (2004) hard and soft project taxonomy describes uncertain (soft) project attributes as changeable, abstract, qualitative, subjective or emergent. In contrast, hard attributes (assumed in traditional project management approaches) reflect surety: measurability, tangibility and quantity. “Projects are inherently uncertain” (Turner, 2006b) and the research model suggests that projects are defined by the sources of uncertainty.

A large body of previous research has identified sources of un/certainty: preconditions for success called critical success factors (CSF). Taxonomies of project CSF abounded from the 1980's around project type or project processes (Pinto and Slevin, 1987; Jugdev and Muller, 2005; Fortune and White, 2006). Critics of CSF lists claimed they were overly specific, too numerous, didn't consider interrelationships between CSF dimensions, and assumed a constancy throughout the project lifecycle (Muller and Jugdev, 2012; Belassi and Tukel, 1996; Fortune and White, 2006).

1.34 Complexity?

Offentimes there is inconsistent use of terminology within project literature relating to uncertainty and complexity (Xia and Chan, 2012). Complexity is a source of uncertainty yet it is distinct in nature because complexity is randomly observed – the effects of ‘unknown unknowns’ rather than

'known unknowns' (uncertainty) (Pich et al., 2002). Lu et al. (2015) note that "Complexity is a term that is difficult to define and even more difficult to quantify precisely". Complexity is by definition unpredictable and 'emerges' in exceptions such as rework rates. Unexpected events can result directly from decisions or indirectly as outcomes from decision themselves produce unforeseen consequences - a chain effect that Vidal and Marle (2008) call "propagation". Interestingly, Piperca and Floricel (2012) found in their study that the majority of 'unexpected events' were in fact underestimations rather than true 'unknowns', i.e. poor prediction rather than un-predictability. From a complexity theory perspective the project is a complex adaptive (social) system – able to learn, innovate, transform and respond in more than one way to its environment. Social systems rely on communication and human relationships effected through "complex responsive processes of relating" (Cooke-Davies, 2007).

1.4 Sources of un/certainty.

As depicted in figure 1.3, the present research restricted CSF to three (internal) project attributes (path-goal clarity, technological complexity, and team cohesion) corresponding with the output,

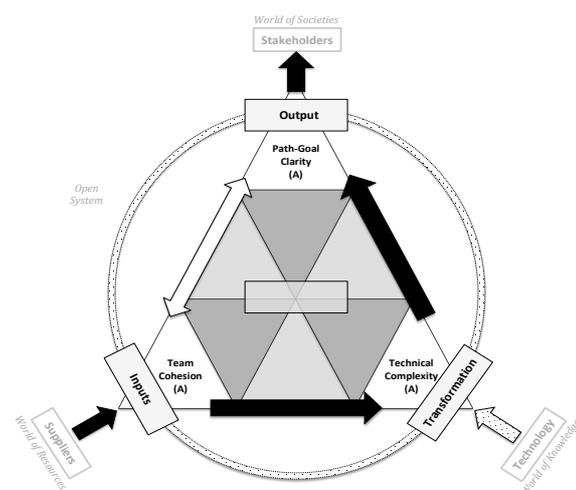


Figure 1.3: Sources of project uncertainty

transformation and inputs of the project system (Geraldi and Adlbrecht (2007) similarly proposed 'complexities' of "faith, fact and interaction" – of goals, tasks and of people). The general nature of these sources of uncertainty means that they can be the result of any project configuration – regardless of project type, industry, or parent organisation (e.g. a functional versus matrix organisation).

1.41 Path-goal clarity (output).

"Goal clarity has been widely associated with project success" (Pollack 2007). A traditional approach to project management tends to assume that the objectives of a project, and the methods of achieving them, are well understood throughout the project. These 'hard' projects have a "one best" solution but where multiple solutions are possible or allowed, soft methods are appropriate (Crawford and Pollack, 2004). Path-goal clarity is especially influential during project initiation and execution phases (Dvir, Raz and Shenhar, 2003; Turner and Cochrane, 1993). For high goals/high methods certainty ("earth projects") project managers help to define the resources, skills and tasks required and implement the project according to milestones. At the other extreme (low goals/low methods certainty or "air projects") innovation and negotiation are required to define the goals, methods and deliverables at 'control points'.

1.42 Technological complexity (tasks)

More than simply allocating time as a resource, the project schedule

represents the actual 'work breakdown' (tasks) of a project (Figure 1.0). defines Technical complexity describes the differentiation and interdependency of tasks (Baccharini, 1996). However, complexity may be a misnomer. In order to be 'complex' a project must be affected by uncertainty – until then it may be more accurate to describe it as 'complicated' (Whitty and Maylor, 2009). Whether complex or complicated, a greater number and variety of tasks poses a greater number and variety of potential deviations from plans. Tasks are scheduled (sequenced) in linear, pooled (differentiated) or reciprocal interrelationships (where the output of each element becomes the input for the other). Ultimately, changes in scope or budget or deadlines have a corresponding effect on these interrelationships (Williams, 1999). This in turn, creates the need for more complicated patterns of relating (organizational complexity) further increasing the chances of unforeseen outcomes (Cooke-Davies, 2007).

1.43 Project team cohesion (inputs)

Teams “cooperate to fully utilize their knowledge and experience” (Ibrahim, Costello & Wilkinson, 2013). Cohesion reflects the 'attractiveness' of the group or task for individuals (Chang & Bordia, 2001). Zander (1979) notes that cohesive groups are prepared to exert effort on its behalf and accept the group's goals and values. Without these 'norms' heterogeneous groups present uncertainty for the project manager (Tyssen, Wald & Heidenreich, 2014).

However, it should be acknowledged that (enforced) group norms may not lead to success (Beal, Cohen, Burke and McLendon, 2003) especially if the norms themselves are for low performance (Spector, 2006; p.305). 'Knowledge project' team members may also be located over geographical distance in virtual groups. Webster and Wong (2008) found that cohesion was stronger among local members than for remote members of a semi-virtual project group - creating an in-group bias. Another dysfunction of cohesion, groupthink, occurs when group membership is prioritized over robust decision-making (Spector, 2006 p.313). The integration of project teams has been discussed variously as social capital (Di Vincenzo and Mascia, 2012, social networks (Tansley & Newell, 2007), human capital (Suhonen & Paarsivaal, 2011), project culture (Henrie & Sousa-Poza, 2005), project spirit (Aronson, Shenhar & Reilly, 2010), knowledge sharing (bridging and bonding) (Newell, Tansley & Huangw, 2004), team climate (Sudhakar, Farooq & Patnaik, 2011) and trust (Davis & Walker, 2009).

1.45 Research Propositions 1 (A-B)

The research model (Figure 1.0) proposes that the systemic project elements (inputs, transformation and output) contain inherent uncertainties (A) and that these uncertainties present possible risks to respective project success criteria (B). It is also proposed that risk to team satisfaction will be predicted by all three sources of uncertainty.

Therefore hypothesis 1 and 2 state:

(H1). That low path-goal clarity, high technical complexity (reverse coded) and low team cohesion (A) will predict higher perceived risk to project budget, project schedule, project scope/ quality, and project team satisfaction (B).

(H2). That path-goal clarity, technical complexity and team cohesion (A) will interact when predicting perceived risk to project budget, project schedule, project scope/ quality and project team satisfaction (B).

1.5 Project leadership

The terms 'project management' and 'project leadership' are used interchangeably in project research yet should be differentiated. "Management is about tasks: planning, budgeting, organizing and problem solving... Leadership is about seeing where the team needs to go and guiding them there" (Bull, 2010). The basic position of the present research is that different styles of leadership (or management) are best suited to particular levels of uncertainty. The project team is instrumental in the leadership response to risk factors and comprises the social system linking inputs, transformations and outputs (Figure 1.4).

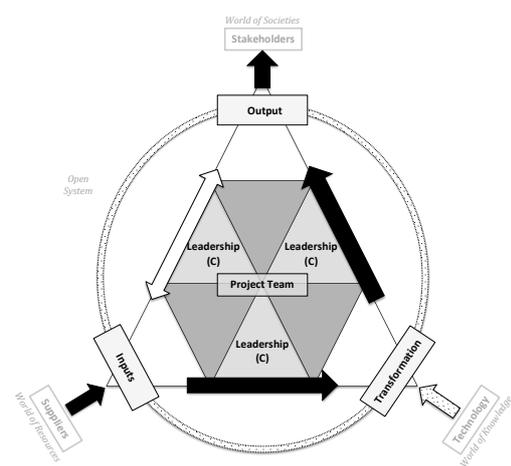


Figure 1.4: Project leadership

1.51 Contingency theories of leadership

The research model is an example of a contingency approach to project management. Contingency theories of leadership emphasise the interaction of contextual features. In this way, multiple features of the project environment may combine to moderate (or substitute) for leadership effectiveness (Jermier & Kerr, 1978; 1997). This research model (Figure 1.0) proposes that contingent features (un/certainties) sourcing from the project team, task, and goal interact to produce risk to project success (B) informing leadership responses (C). Several classic contingency theories illustrated the interaction of team, task and goal features:

Path-goal theory

Goal clarity and team cohesion are explored in path-goal theory (House, 1971; 1996). House posited that leaders motivate and improve follower performance by clarifying or providing the path to achieving valued goals, or making (shared) goals more desirable. House proposed a range of moderating effects that included features of the task and followers disposition (House, 1996).

Fiedler's contingency theory

Technical uncertainty and team cohesion are suggested by Fiedler's contingency theory (1978). Fiedler predicts that task-oriented leadership is most effective for very uncertain and highly certain combinations of leader authority, follower loyalty, and task definition (cited; Spector, 2006

p.334). The curvilinear relationship between contextual features and leadership effectiveness implies an interaction effect between Fiedler's contextual variables.

Situational leadership

Team cohesion is strongly implicated by Hersey and Blanchard's Situational Leadership (1977) model that suggests a directive (task-oriented) leadership style as default unless or until the 'maturity' of the follower group allows a relationship-oriented approach (cited in Yukl, 2013 p.165). Leader-member exchange theory also emphasizes the dynamic nature of the leader-follower paradigm (Dansereau, Graen & Haga, 1975).

1.52 Transactional and transformational leadership

This study proposes that the relationship between project leader and project team should 'fit' the requirements of the project context, i.e. leadership performance is contingent on project risk (Figure 1.0). Transformational leadership is suggested for situations of high uncertainty and 'transformational' change. Here leaders broaden and elevate the interests of their employees... beyond their own self-interest for the good of the group" (Bass, 1990). Transactional (contingent reward) leadership establishes the performance and reward expectations for both leader and follower and may be more suitable for stable (certain) leadership contexts (Bass et al., 2003; Bass 1990). Bass considered transactional and transformational styles to be orthogonal yet both imply a valent

exchange between leader and follower - albeit of a different nature. While transactional relationships define a basic exchange of performance for reward, transformational leaders appeal to intrinsic motivators (higher order needs). Rather than being contrary styles, transformational behaviours have been shown to augment transactional in appropriate contexts (Lowe, Kroeck & Sivasubramaniam, 1996; Judge & Piccolo, 2004; Rowold & Heinitz, 2007).

Bass' (1997) transformational style comprises four factors:

1. *Idealised influence* (charisma) – leaders earn respect and trust, and model important values and standards of conduct.
2. *Inspirational motivation* – leaders articulate an appealing vision of the future, and encourage and challenge followers.
3. *Individualised consideration* – leaders show interest and concern for the needs and development of individual team members.
4. *Intellectual stimulation* – leaders question assumptions and methods and encourage new ideas and perspectives.

Transactional leadership comprises three factors (Judge & Picolo, 2004):

1. *Contingent reward* - leaders provide rewards to followers for the achievement of agreed performance goals
2. *Active management by exception* – leaders monitor performance and intervene to correct for deviations from plans
3. *Passive management by exception* - leaders wait until problems become apparent and take corrective action

Laissez-faire, an avoidant leadership style was included by Bass to contrast the other styles (Hartog, Muijen & Koopman, 1997). The Multifactor Leadership Questionnaire has been widely reported in leadership literature predicting a range of organizational performance measures (Judge & Piccolo, 2004; Lowe et al., 1996; Bass, 2003; Yukl, 2012; Hartog et al., 1997).

1.53 Transactional and transformational project leadership

This research proposes the effectiveness of transformational leadership style within uncertain project contexts and the adequacy of a transactional style in simple projects. Bass (1990) asserts that transactional behaviours are inadequate for rapidly changing or uncertain contexts. Muller and Turner (2010) assert that “a concern for process, is more important on relatively simple projects, but transformational leadership, and concern for people, is necessary on more-demanding projects”. Tyssen, Wald and Spieth (2014) offer “testable propositions” for transactional and transformational leadership in projects. Firstly, transactional leadership is appropriate for (simpler) projects with high goal clarity, defined team roles and shorter duration. Transformational behaviours are preferred where hierarchies are ambiguous or missing, for novel projects, projects of longer duration and for heterogeneous teams. Third, both transactional and transformational styles enhance affective commitment in followers but are more suited for low and high task novelty, respectively. Finally, follower perceptions of uncertainty will

positively predict the effects of transformational leadership.

1.54 Research Propositions 2 (A-C, B-C and A-B-C)

The research model (Figure 1.0) proposes that the systemic un/certainties (A) will predict ratings of leadership effectiveness (C). It is proposed that higher uncertainty will predict *lower* ratings for transactional leadership and *higher* ratings for transformational leadership. Therefore hypotheses 3, and 4 state:

(H3). That low path-goal clarity, low team cohesion and high technical complexity (A) will correlate negatively with transactional leadership effectiveness ratings (C).

(H4). That low path-goal clarity, low team cohesion and high technical complexity (A) will correlate positively with transformational leadership effectiveness ratings (C).

In addition, the research model (Figure 1.0) proposed that perceived risks to project success (B) affect leadership decisions over and above sources of uncertainty, i.e. that project leaders manage the *risks* to project success posed by uncertainty ('known unknowns'). For this reason the direct relationships between perceived risks (B) and ratings of leadership effectiveness (C) are of interest. It is proposed that higher perceptions of risk will predict lower ratings for transactional leadership effectiveness and predict higher ratings for transformational leadership effectiveness. Therefore hypotheses 5 and 6 state:

(H5). That perceived risks (B) to project scope/quality, schedule, budget and team satisfaction will correlate negatively with transactional leadership effectiveness ratings (C) (i.e. correlate negatively).

(H6). That perceived risks (B) to project scope/quality, schedule, budget and team satisfaction will correlate positively with transformational leadership effectiveness ratings (C) (i.e. correlate positively).

The research model proposes that the effect of project uncertainty on SME leadership ratings will be partially or wholly mediated by SME perceptions of risk to project success. Therefore, hypotheses 7 and 8 state:

(H7). That the effect of low path-goal clarity, low team cohesion and high technological complexity (A) on SME ratings of transactional leadership effectiveness (C) will be mediated by SME perceptions of risk to project success (B).

(H8). That the effect of low path-goal clarity, low team cohesion and high technological complexity (A) on SME ratings of transformational leadership effectiveness (C) will be mediated by SME perceptions of risk to project success (B).

1.6 Leadership style and the project team

The final part of the research model is team attributes (Figure 1.5). Commitment to project goals, coordination (cooperation) of project participants and effective team performance have been suggested as critical factors for project success (Jha & Iyer, 2007; Thamhain, 2004;

Lundin and Soderholm 1995; Sivasubramaniam, Liebowitz & Lackman, 2012; Wang, Ying, Jiang & Klein, 2006). Developing clear project vision, and building cooperation and technical proficiency are suggested as key skills for project managers (El-Sabaa, 2001).

1.61 Commitment

The research model (Figure 1.5) suggests that the project team (input) is committed to

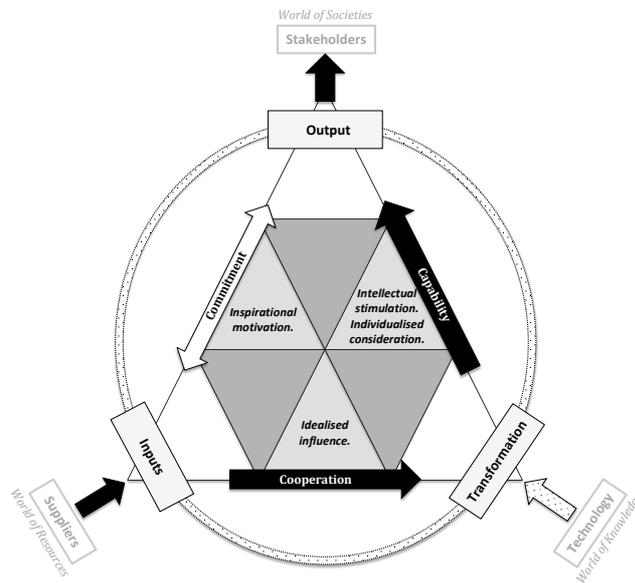


Figure 1.5: Transformational leadership

project goals (output) and that low team cohesion or low path-goal clarity could jeopardise team commitment. Conversely, leaders can mitigate risks to project budget and scope/Q by building team commitment through inspirational motivation (a transformational behaviour). Increased commitment has been found to improve project team performance (Leban & Zulauf, 2004) and team commitment especially in uncertain projects (Christenson & Walker, 2008). There is also evidence across project types and levels of project complexity that *both* transactional and (especially) transformational leadership increase commitment and project success (Tyssen, Wald & Heidenreich 2014; Limsila & Ogunlana, 2008). However, Ryoma and Tapanainen (2010) suggest the duration of leader-follower relationships can restrict the

leader's opportunities to build trust and commitment. Hence, short projects may restrict transformational leadership outcomes that are time-dependent. This could explain why Keegan and Den Hartog (2004) found a positive relationship between transformational leadership, follower motivation, commitment and stress levels for permanent managers but *not* so for project managers.

1.62 Cooperation

The mere availability of human capability is insufficient unless social capital is developed and 'exploited' through the sharing of skill and knowledge (Tansley & Newell, 2007). The research model (Figure 1.5) suggests that the project team (input) *cooperates* to perform the project tasks (transformation) and that low team cohesion or high technical complexity could reduce cooperation. Conversely, leaders can mitigate risks to project budget or schedule by building cooperation and knowledge sharing through idealized influence (a transformational behaviour). Knowledge sharing and social networks are especially important for 'knowledge' projects such as IT systems development (Han & Hovav, 2013; Yuan, Zhang, Chen, Vogel & Chu, 2009; Hsu, Shih, Chiang & Liu, 2012), projects on electronic platforms (Heinz, Baga, Gebert and Kearney, 2006), open source software development (Chou & He, 2011) and creative projects such as product development (Kratzer, Leenders and van Engelen, 2010). While the coordination of knowledge and skill are also important in tangible (hard) projects such as construction and

engineering (Jha & Iyer, 2006), Di Vincenzo and Mascia (2012) demonstrated that low and high levels of interaction (integration) had adverse effects on efficiency and quality through unnecessary delays and inefficiencies. Baiden and Price (2011) also found that higher team integration was not related to construction project success.

Leadership has been found to increase project team cooperation. Yang, Huang and Wu (2011) found in a survey of different types of projects that higher levels of both transactional and transformational leadership led to higher levels of cooperation (and cohesion) which led to project success measured by quality, cost, time and stakeholder satisfaction. Wang, Chou and Jiang (2005) also found a positive effect of charismatic (transformational) leadership on cohesion and subsequent performance in enterprise resource planning projects that are typically uncertain.

1.63 Capability

The research model (Figure 1.5) suggests project tasks (transformation) require team *capabilities* to meet project goals (output) and that risks associated with high technical complexity and low path-goal may call for different skills and abilities. Conversely, leaders can mitigate risks to project schedule and scope/Quality by building and empowering team capability through idealized influence and individualized consideration (transformational behaviours). Keller (1992) suggests that transformational leaders appeal to employees in transformational projects by inspiring innovation and intellectually stimulating the group to acquire new

information. In contrast, leaders may be more task-focused (transactional) in incremental change contexts since technical information is already largely possessed. Keller (1992; 2006) found transformational leadership was a stronger predictor of success factors in research projects, and that a transformational style (initiating structure) was a stronger predictor in development projects where the technology and design are largely established. Both styles predicted project success for both research and development contexts in these longitudinal studies.

Developing capability also includes empowerment through delegating authority or power sharing (Liu & Fang, 2006). Empowerment is "...the process of enhancing feelings of self-efficacy among organizational members" (Conger & Kanungo, 1988). Seibert, Wang and Courtright (2011) meta-analysed studies of psychological empowerment and showed that empowerment has positive outcomes at individual and group level. Empowerment has shown significant effects on team performance, job satisfaction, individual performance and commitment (Yang & Choi, 2009; Seibert et al., 2011). Transformational leadership emphasizes empowerment in uncertain contexts (Dulewicz and Higgs, 2003; 2005) and has been found to increase project members' sense of empowerment leading to improved team effectiveness across project types (Ozaralli, 2003). However, Tuuli, Rowlinson, Fellows and Liu (2012) found the effect of leadership style on empowerment is contingent on project context: person-oriented leadership (transformational) correlated

with higher individual empowerment in relations-based projects and task-oriented leadership (transactional) correlated with higher empowerment in task-focused projects. Jung and Sosik (2002) demonstrated that transformational leadership predicted group empowerment, which in turn predicted group efficacy.

1.64 Research Propositions 3

The research model (Figure 1.5) proposes that elements of the structural project system (inputs, transformation and output) are linked by team attributes (social system). Uncertainty within the systemic elements (low team cohesion, high technical complexity, and low path-goal clarity) may affect team attributes or, conversely, be affected by them. Specifically, inputs (project team) and transformations (tasks) are related by cooperation, transformations (tasks) and output (deliverables) are related by capability, and that output (deliverables) and inputs (project team) are related by commitment. Therefore hypotheses 9, 10 and 11 state:

(H9). That cooperation will be judged least affected by path-goal clarity.

(H10). That team cohesion will be judged least affected by capability.

(H11). That technical complexity will be judged least affected by commitment.

1.7 Personality and leadership

An important aspect of this study is to consider the effect of leader disposition on preferred leadership style. While contingency theories emphasise the role of the leadership context on leadership behavior other research suggests that leadership style is at least partly dispositional. Much of the literature on transformational leadership seems to imply emotional abilities (Higgs and Rowland, 2001; Higgs, 2003). The awareness of one's own and others' emotional states enables leaders to use this understanding when influencing others' behavior and attitudes – important aspects of transformational leadership (Dulewicz and Higgs, 2003; Bratton et al., 2010). Emotional awareness may be a key factor in establishing emotional norms within teams (Koman & Wolff, 2008), and developing human capital and inter-personal relationships within projects (Suhonen & Paasivaara, 2011; Clarke, 2010). Social intelligence has been a focus of research since Thorndike (1920; cited, Weis & Suss, 2007). Social and personal intelligences inform schema pertaining to the internal worlds of both self and others, and interpret social phenomenon such as group membership, dynamics, status and power (Mayer, Caruso, Panter & Salovey, 2012). Socio-analytic theory states that humans are motivated to 'get along', 'get ahead', and 'find meaning' – all of which are pursued in a social context and therefore involve social exchanges (Hogan & Shelton, 1998). The inability to achieve desired goals through social exchanges is one cause of leadership failure or derailment (Hogan,

Curphy & Hogan, 1996). Broadly, the ability to navigate social contingencies has been described as social effectiveness. Because project managers perform an inherently political role of balancing a range of 'stakeholders' (boundary spanning) and tapping into "power lines" (Lovell, 1993; Pinto, 2000; Bourne & Walker, 2004) this study included Political Skill (a social effectiveness construct) as a covariate of leadership preferences.

1.71 Political skill

The Political Skill Inventory (PSI) was developed specifically to consider interpersonal interactions within permanent organizations (Ferris, Perrewe, Antony & Gilmore, 2000). PSI incorporates dispositional and developmental aspects (tacit knowledge and learnable skills) and measures one higher- and four lower-order factors: social astuteness; Interpersonal influence; networking ability; and apparent sincerity. Ferris and colleagues have supported their model with cross-sectional and longitudinal studies showing goodness of fit for the four-factor model, discriminant validity against general intelligence measures, convergent validity against a range of personality and experiential factors, and predictive validity for income, position and satisfaction outcomes for managers (Ferris et al., 2005, 2008). Semadar, Robins and Ferris (2006) compared four social effectiveness constructs: self-monitoring, leadership self-efficacy, emotional intelligence (ability), and political skill finding that

political skill predicted (unique) managerial job performance over and above the other constructs.

Political skill creates political capital (e.g. reputation) that enhances a leader's influence (Ferris et al., 2000; Harvey and Novicevic, 2004; Laird, Zboja & Ferris, 2012). Politically skilled people are conscientious and outward-focused, yet also self-aware and self-monitoring (Ferris et al., 2005). They are able to "read and understand people", have the ability to "act on social cues", "adapt behavior to meet situational demands", convey "a sense of personal security and calm self-confidence", and "appear to others as possessing high levels of integrity, authenticity, sincerity, and genuineness." (Semadar et al., 2006; Ferris et al., 2005). Political skill may mediate the relationship between personality factors and role effectiveness (Gentry et al, 2013; Shi, Chen & Zhou, 2011). Goffee and Jones (2000) note "the qualities ... necessary for inspirational leadership... cannot be used mechanically. They must become or must already be part of an executive's personality" - "the challenge facing prospective leaders is for them to be themselves, but with more skill".

1.8 Project leadership experience.

Experience may also help account for leadership style. Uniqueness, temporariness and goal-directedness differentiate project organisations from permanent organisations. These characteristics define all aspects of the project system (Figure 1.0). In particular, these characteristics introduce uncertainty and impose restrictions on leadership choices. The

uniqueness of inputted resources (e.g. project team members), the temporariness (urgency) of project activities, and the goal-directedness (output focus) of projects impose competing demands upon project leaders. These conditions become normalized and would therefore inform SME policies such as leadership decisions.

1.81 Projects are unique

Projects are used by organisations as strategic tools and are therefore about transformational change rather than *optimization* of organizational processes. The inherent uniqueness of change brings uncertainty and risks for achieving project objectives (Turner, 2006a). One reason is that uncertainty makes deviations from plans more probable because “plans are formulated for contingencies that have no precedent” (Kapsali, 2011). Applying a standardized toolset or a ‘body of knowledge’ across ‘unique’ contexts is the obvious paradox of project management. Experienced project leaders will be familiar with uniqueness, and accept uncertainty and ambiguity as normal features of their work (Hagen and Park, 2013).

1.82 Projects are temporary

Project organisations are groups designed to bring about change and to then disband. Therefore projects are characterized by temporariness and often, urgency. Temporariness limits the influence of project managers (project managers) who are restricted to distributing short-term tasks rather than distributing rewards or supporting career development as

can a line manager (Ryoma & Tapanainen, 2010; Keegan and Den Hartog, 2004). For project teams, urgency restricts interaction and opportunities for within-project planning and generating alternative solutions (Turner & Muller, 2003; Bakker et al., 2013). For managers, temporariness restricts leader-follower relationships (Ryoma & Tapanainen, 2010) and team development which impacts on team cohesion, culture and commitment (Tyssen, Wals & Spieth, 2014; Zwikael & Unger-Aviram, 2010). Experienced project leaders will be accustomed to short tenures, new groups, diverse networks, combined with the urgency of project timelines.

1.83 Projects are goal-directed

Organisations and sponsors typically initiate projects for a single strategic purpose. Project literature tends to assume the existence of shared, clear and stable goals (Pollack, 2007). However, goals are not always unanimously shared among the various stakeholders (Daniel, 1990). Uncertainty is particularly salient during 'front end' decision-making when information is least certain (Anderson & Merna, 2003). The effects of urgency and goal directedness combine to create pressure to achieve 'clarity' by the early simplification of goals that could discard legitimate options (Pollack 2007). In many cases goals are initially neither clear nor stable but emerge through iterative planning processes of "negotiation and consensus building" (Atkinson, Crawford and Ward, 2006). Ultimately,

the poor alignment of goals and strategy can result in underestimations of costs and overestimations of benefits (Williams & Samset, 2010).

1.84 Research Propositions 4

The research model proposes that the political skill (personality) and experience of SME will correlate with ratings of leadership style in response to risk (to project success) and (sources of) uncertainty (These hypotheses will be tested in conjunction H1-8). Therefore hypotheses 12 and 13 state:

(H12). That the political skill of SME will correlate with ratings of transactional and transformational leadership effectiveness.

(H13). That the experience levels (in years) of will correlate with ratings of transactional and transformational leadership effectiveness.

Chapter 2: Method

2.1 Participants.

This research was undertaken with the support of the Project Management Institute of New Zealand (PMINZ). PMINZ is an affiliated chapter of PMI, a North American-based organisation that administers project management accreditation (e.g. Project Management Professional (PMP) certification) and professional development. PMI publishes the Project Management Body of Knowledge (PMBOK), a project management standard that establishes "guidelines for project management processes, tools, and techniques" (PMI, 2008). PMINZ has three branches located throughout New Zealand with sub-branches outside of the main centers. Members of PMINZ were invited to access the online research questionnaire via the PMINZ sub-branch conveners and the PMINZ website. In addition, paper and pencil versions of the questionnaire were distributed via PMINZ sub-branch conveners. Between November 2015 and February 2016, $n=131$ complete responses were received out of a total of 225 responses to the questionnaire. PMINZ has around 1700 members and so the total response rate for this study is around 6.5% for the national organisation.

Participants ($n=131$, *mean* age = 50, *SD*= 10 years) consisted of $n=96$ males ($m= 51$ years old, *SD*= 9.35 years) and $n=35$ females ($m= 46$ years old, *SD*= 10.75 years). Years of project management experience were more for men (59% had over 15 years, 80% had over 10 years and 90%

had over five years experience) than for women (37% had over 15 years, 60% had over 10 years and 86% had over five years experience). Forty-two percent of participants stated information technology as their primary industry, 37% engineering and construction, eight percent organisational change and 14% 'other'. The ethnicity of participants was overwhelmingly European/ New Zealander (79%). Nine percent of the sample claimed Asian ethnicity, three percent Middle Eastern/ Latin American/ African ethnicity, and eight percent 'other'. A striking feature of the sample is the total absence of any Maori or Pasifika participants.

The study questionnaire was hosted online on the Qualtrix platform. PMI members were sent a *URL* code to access the questionnaire directly. No inducement was offered for participation except that the results of the study will be made available to PMINZ and members may have access to it (The research questionnaire is attached in Appendix B). As part of the questionnaire, participants provided their informed consent to participate in the research. No personal identifiers were collected by the questionnaire and all data being is kept securely by Massey University and the researcher under strictly confidentiality.

2.2 Measures

The questionnaire for this research comprised four sections: participant data, project scenarios task (policy capturing study), three additional leadership questions, and the 18-item political skills inventory. In addition, two practice items preceded the policy capturing measure.

2.21 Demographic information

The first section of the questionnaire collected subject matter experts' age, gender, experience in years of project management (less than five years, between five and ten years, between ten and fifteen years and over fifteen years), and primary project type (engineering and construction, information technology, organisational change, and 'other'). An open-ended question was included to capture 'other' project types. Lastly, participants were asked to nominate their ethnic identity as European New Zealander, Maori/Tangata whenua, Asian, Pacific peoples, Middle Eastern/ Latin American/ African, and 'other'. Ethnic categories were taken from the 2013 New Zealand census (Statistics New Zealand, 2013).

2.22 Policy-capturing measure

The second part of the questionnaire employed a policy capturing experimental design. Policy capturing is a regression-based technique that asks participants to respond to a set of decision or problem solving scenarios. The design enables the exposition of factors used by decision makers even if they may not be able to articulate the 'policy' they use (Adams & Richards, 1985). This offers the benefit of measuring effects indirectly while avoiding social desirability that undermines self-report studies (Karren & Barringer, 2002). Policy capturing also has the advantage of being able to repeatedly manipulate variables while controlling for 'confounding' variables (i.e. eliminating alternative

explanations for the results) (Aiman-Smith, Scullen & Barr, 2002). However, these advantages also contribute to policy capturing's weakness: a lack of realism where the same decisions are repeated in a short space of time with hypothetical "paper people" (Aiman-Smith et al., 2002). Other critical design factors are the representativeness of the study variables for real-life situations and the number of variables and scenarios. Because policy-capturing studies are normally 'idiographic' (concerned with individuals) the number of scenarios (per respondent) is more important than the overall sample (Aiman-Smith et al., 2002). The number of scenarios has to balance the opposing demands of statistical power (i.e. sufficient repetition of the variables) and respondent fatigue. Karren and Barringer (2002) suggest a minimum ratio of 5:1 scenarios to independent variables. In the present study $n=8$ for each SME study – a ratio of 8:3.

The policy capturing measure was entitled "Project Scenarios Task" and comprised two practice and eight measured scenarios featuring varying project conditions. Three sources of project uncertainty were fully factorized (varied as 'high' or 'low') resulting in eight ($2 \times 2 \times 2$) unique variable combinations for project scenarios. Task instructions, definitions for project conditions, project outcomes and leadership style, and practice scenarios were included before the scenarios task. Each scenario was presented individually on a separate page. Participants (as subject matter experts - SME) were asked to imagine the scenarios in the context of their own experience as project managers. Project conditions were described by either high or low on 'Project team cohesion',

Technical complexity' and 'Path-goal clarity' factors. These factors represent un/certainty in the project's input, transformation and output subsystems discussed in chapter one. Technical complexity was reverse coded, i.e. higher complexity is more uncertain. A graphical representation of each scenario was presented along with descriptions for each factor (policy cue).

Two sets of dependent variables were presented to measure the effect of the uncertainty variables. Firstly, SME's were asked to estimate the risk that project conditions (un/certainty) posed for project outcomes. Four project outcomes were presented: Scope/ Quality, Budget, Schedule, and Team cohesion. Each of the four risks was rated on a five-point Likert scale (very low-, low-, moderate-, high-, and extreme- risk). Secondly, SME's were asked to rate the likely effectiveness of leadership style in response to the risks. Two leadership styles were presented: transactional and transformational. Each leadership style was rated on a five-point Likert scale (not-, slightly-, moderately-, very-, and extremely effective). Definitions for the two leadership styles were included at the bottom of each scenario page. The laissez-faire leadership style of Bass' (1990) full range theory was omitted because 'non-leadership' was considered a highly unlikely strategy for a project manager and would add further items to the questionnaire.

2.23 Additional questions

A third section of the questionnaire ('Additional questions') comprised three explorative items regarding project team linkages between project subsystems (inputs, tasks, and output) and sources of un/certainty that might be usefully investigated in future research. Capability, cooperation and commitment are team attributes typically enhanced by transformational leadership that reduce uncertainty or increase adaptability. Hence, these assets represent the three connecting sides of the triangular research model. Three questions asked for the (one) team attribute *least* affected by each of team cohesion, technical uncertainty, and path-goal clarity. The implication of this is that the remaining two connect each vector of the triangle.

2.24 Political Skills Inventory

'Section 4' of the questionnaire was named 'Communication Questionnaire'. The Political Skills Inventory (PSI) was renamed for this study to avoid social desirability bias by 'neutralising' the title. This instrument is authorized for use in non-commercial research and education without the need for written permission (Ferris et al., 2005). The measure comprises 18-items and measures four subscales that have showed high reliability: Interpersonal influence (four items: $\alpha = .78$); networking ability (six items: $\alpha = .87$); social astuteness dimension (five items: $\alpha = .79$); and apparent sincerity (three items: $\alpha = .81$) (Ferris et al., 2005).

Responses to the test are recorded on a seven-point Likert scale labeled from “strongly disagree” (=1) to “strongly agree” (=7). Each item takes the form of a statement e.g. “I spend a lot of time at work developing connections at work” and respondents agree, disagree or rate the statement as “neutral” (=4). Each sub-scale or dimension has varying numbers of items and so is averaged to derive subscale scores.

2.3 Procedure

After surveying the research literature on project management, an initial policy-capturing study was developed. Because the study involved human subjects the questionnaire was submitted for ethical approval from Massey University Human Ethics Committee. After the ethics approval was granted the initial questionnaire was piloted.

Various versions of the questionnaire were presented to a pilot group of around six project managers and policy analysts on several occasions. An important aspect of policy capturing is that the experimental conditions are realistic. Karren and Barringer (2002) have emphasised the value of piloting studies on subject matter experts as part of developing realistic and valid scenarios (stimuli). The feedback from the piloted questionnaires was that the scenarios were confusing. This suggested that the cognitive load of (initially) interpreting four independent variables (creating 16 scenarios) was too high and might risk poor completion rates for the questionnaire through fatigue. The decision was made to reduce

the independent variables to three. This meant a significant reworking of the initial model based on internal and external project culture (2 internal factors x 2 external factors). Because three variables would mean an uneven split between these factors an alternative model was conceived. This model was developed from a systems perspective using three variables comprising sources of uncertainty at input, transformation and output stages of the project. More piloting was required and in total five versions of the questionnaire was trialed before this model was adopted as final.

The policy capturing study featured a fully factorized model meaning that all predictor (independent) variables were crossed covering all eight possible combinations of the three binary variables (Karren & Barringer, 2002). Some power was sacrificed in reducing the scenario factors (predictor variables) from four to three. This meant that the scenario to (predictor) variable ratio fell from 4:1 (16 scenarios and four variables) to 8:3 (a ratio of less than 3:1). The recommended ratio is 5:1 (Karren & Barringer, 2002). This ratio represents a loss of power – however, the tradeoff is less participant fatigue increasing the likelihood of complete responses (i.e. a bigger sample size) and, importantly, less unreliable responses (through boredom or fatigue). Two other design features were employed to reduce response bias: practice scenarios and randomization. Two practice scenarios preceded the main task to reduce 'start-up' effects (Aiman-Smith et.al.). The scenarios for the practice tasks were repeated in the main task and represented the

extremes of predictor combinations (i.e. coded as 1:1:1 and 2:2:2 where 1=low uncertainty and 2= high uncertainty). The policy capturing scenarios were automatically randomized by Qualtrix to avoid ordering effects.

After the questionnaire was revised and finalized data collection began. SME participants were recruited over a three-month period through direct contact with PMI sub-chapter conveners who disseminated paper and pen questionnaires and/or invitations to participate online to PMINZ members. In addition the PMINZ e-newsletter featured an invitation to participate. The researcher also attended a PMINZ meeting in Auckland and invited members to complete a paper and pencil questionnaire. Paper and pencil responses were entered into the online questionnaire by the researcher and the questionnaire booklets destroyed. Both paper and pencil and online versions featured randomized scenario ordering and two practice items. After entering demographic data, participants were asked to consider eight scenarios in light of their own project management experience. In each scenario three binary variables (cues) were presented. These variables were sources of project uncertainty each varied low and high making eight scenarios. A third section asked the SME to choose the team attribute from three options that are least affected by the sources of uncertainty (commitment, cooperation or capability). Lastly, the SME participants were asked to complete the 18-item Political Skills Inventory. 225 on-line responses were received including 18 paper and pencil responses.

Chapter 3: Results

3.1 Data analysis

The data analysis for the policy capturing study comprised three phases: 1. data reduction, 2. regression analyses and 3. univariate analyses of covariance (ANCOVA). Exploratory factor analysis (EFA) was used for data reduction to reduce the set of variables by eliminating irrelevant and/or unreliable variables. Two factor analyses were performed. Firstly, the measures of perceived risk to project success (scope/quality, budget, schedule, and team satisfaction) were factor analysed to see if subject matter experts (SME) differentiated between them. A second factor analysis was run for the 18-item Political Skills Inventory questionnaire to confirm that the SME responses reflected the four-factor structure proposed by Ferris et al. (2005) and was therefore appropriate for this study.

Policy capturing is a within-subjects methodology that explores the effect of predictor variables on dependent variables for SME. This indicates how information is inferred and used by SME to make policies (decisions). Regression analyses were used to measure the effect of project uncertainty on perceived risk to project success, and the effect of project uncertainty on effectiveness ratings of different leadership styles. Between-subjects effects were analysed by ANCOVA. The research model proposes that SME political skill and experience may correlate with the effect of project uncertainty (A) on perceived risks to project success

(B), and the effect of project uncertainty (A) on perceived effectiveness of leadership (C). A (within-subjects) mediation (regression) model was also tested which posited that perceived risks (B) would mediate the effects of project uncertainty (A) on the rated effectiveness of transactional and transformational leadership style (C).

3.2 Data Reduction

3.2.1 Principal Components Analysis protocol

Firstly, the data was tested to see if it is suitable for factorization. Two measures were considered: the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (to account for measurement error); and Bartlett's test of Sphericity (construct validity). KMO considers the relational structure of the data and its tendency towards unifactoriality (where each item loads on only one component) (Spicer, 2005, p.186; Kaiser, 1974). KMO scores above .70 are considered reliable (Kaiser, 1974; Pallant, 2011). Sphericity describes the degree to which factors are uncorrelated (Spicer, 2005, p.176). Bartlett's test of sphericity should be significant ($p < .05$) for the factor analysis to be considered.

Secondly, EFA extracts the factors from the data. Principal components analysis (PCA) was used for extracting the components. PCA differs from other extraction methods (e.g. principle axis factoring analysis) in that it retains the sampling error in its calculations (Spicer, 2005). Because the current study was empirical and explorative, some sampling error was expected. Hence, PCA was appropriate for the current study. The default

setting in SPSS meant that only components with eigenvalues greater than one were accepted (Kaiser's criterion) (Pallant, 2011). Eigenvalues indicate how much variance within the dataset that a particular component accounted for. After the components were extracted they required further interpretation. Direct oblimin rotation was chosen because the components were expected to be partially correlated: project success criteria (particularly budget and schedule) are performance technical measures of the same project activity (refer p.21); and political skill dimensions are aspects of social effectiveness (refer p.42-44).

Rotated items with a loading value of [<0.40] were suppressed from the analysis. Items that loaded on the wrong factor or that cross-loaded equally on two or more factors were removed and the analysis rerun. When a factorized solution was achieved, Cronbach's alpha was calculated to test the internal reliability of each component. Lastly, descriptive statistics (mean factor score and standard deviation) were calculated from the dataset for each EFA solution (i.e. 'perceived risks' and 'political skill dimensions').

3.2.2 Exploratory factor analysis 1 – Perceived risk factors

This study hypothesized that the independent variables would result in varying perceptions of risk on four measures of project success (success criteria): project scope/quality, project budget, project schedule and project team satisfaction. The factorability of these risk variables was indicated by $KMO = .803$ and Bartlett's test of sphericity ($p < .001$). With the

factorability adequately supported the scree plot was examined to see a graphic representation of the variable factors. In this case the score items were clearly loaded on only one construct (unifactorial). CPA extraction (without the need for rotation) produced one factor and explained 78% of the variance in scores (see Table 1). The new composite variable was named 'Perceived Risk'. The factor loading of the independent variables on perceived risk were all satisfactory and had an average communality of [.783] which indicated that the items fitted well together in this factor. The sample of scores is $n=1048$ as each of the 131 subject matter experts rated perceived risk to project success in each of eight project task scenarios. The reliability estimate for the scores (Cronbach's alpha) was calculated for the single factor ($\alpha= 0.904$) and indicated excellent consistency and well above the recommended level ($\alpha= 0.70$) (Pallant, 2011).

The new single factor (perceived risk) appeared to represent perceived risk to project success. Values for the perceived risk variable were calculated as the mean per item score with higher values indicating a greater perception of risk. Table 1 shows the average score on $n=1048$ items was $m=3.005$ ($SD= 1.115$). Hence, the mean is very close to the median (on a five-point scale: 1 to 5). Around two-thirds of scores lay between two and four. This suggests that the (normal) distribution of the predictor variables between low and high corresponds to high and low perceived risk scores.

Table 1:

Principal Components factor analysis of Perceived Risk variables showing factor loadings, communalities, eigenvalues, % variance explained, Cronbach's alpha, and descriptive statistics (n=1048)

Item	Factor 1 (Perceived Risk)	Communality
Perceived risk to scope/ quality	.883	.780
Perceived risk to budget	.943	.890
Perceived risk to schedule	.930	.865
Perceived risk to team satisfaction	.773	.597
Eigenvalue	3.132	
Percent of variance explained	78.312	
Cronbach's Alpha	.904	
Mean item score (n=1048)	3.005	
Standard deviation (SD)	1.115	

3.2.3 Exploratory factor analysis 2 - Political skill inventory.

This study proposed that the subject matter expert's own political skill would at least partly determine the leadership style ratings in response to risk factors. The political skills inventory (PSI) was constructed to measure leadership skills in a permanent organisation (Ferris et al., 2005). One feature of project management is that managers often move between organisations and create new social networks. PSI has not previously been used in project research to our knowledge. The four factors of the model

are networking ability, social astuteness, Interpersonal influence, and apparent sincerity.

The factorability of the 18-item PSI (networking ability, social astuteness, Interpersonal influence, and apparent sincerity) was indicated by KMO= 0.861 (meritorious) and Bartlett's test of sphericity ($p < .001$). PCA extraction with *oblimin rotation* was run and the scree plot was examined to see a graphic representation of the variable factors. In this case the scores were clearly factored on four constructs, which is consistent with the four-factor structure proposed by Ferris et al. (2005): social astuteness; Interpersonal influence; apparent sincerity; and, networking ability. In total, the factor solution for political skill explained 63% of the variance in scores (see Table 2) and had an average communality of [.630]. The loading of the political skills items on four factors were satisfactory and no cross loadings were observed having suppressed for loadings of less than [0.4]. The average communality of .649 indicates that items load quite strongly on each factor. The reliability estimates for the factor scores (Cronbach's alpha) were calculated for factor one ($\alpha = 0.851$), factor two ($\alpha = 0.810$), and factor four ($\alpha = 0.795$) indicating excellent consistency well above the recommended ($\alpha = 0.70$) level (Pallant, 2011). However, factor three ($\alpha = 0.688$) (apparent sincerity) returned a reliability score that is "marginally" low (Kaiser, 1974). This may have been the result of the low number of items (three) (Murphy & Davidshofer, 2005). However, Ferris et al. (2005) found good reliability for the same factor structure and factor three

(apparent sincerity) was retained in the study. The four-factor model suggested that the political skills inventory was a suitable instrument to be used in this study and shows a similar factorial structure to the original measure developed by Ferris et al. (2005). Higher scores indicate greater ability in the corresponding dimension of political skill. The mean factor scores (shown in Table 2) indicate high (self-) ratings for all dimensions of political skill.

Table 2: overleaf

Principal components analysis of Political Skills Inventory items (with Direct Oblimin rotation) showing factor loadings, communalities, eigenvalues, % variance explained, Cronbach's alpha, and descriptive statistics (n=131).

Item #	Factor 1 Social Astuteness	Factor 2 Interpersonal influence	Factor 3 Apparent Sincerity	Factor 4 Networking Ability	Commun- -alities
I am particularly good at sensing the motivations and hidden agendas of others.	.856				.716
I always seem to instinctively know the right things to say or do to influence others.	.757				.713
I understand people very well.	.735				.725
I pay close attention to people's facial expressions.	.697				.625
I have good intuition or savvy about how to present myself to others.	.585				.665
It is easy for me to develop good rapport with most people.		.846			.750
I am able to make most people feel comfortable and at ease around me.		.776			.728
I am able to communicate easily and effectively with others.		.743			.653
It is important that people believe I am sincere in what I say and do.			.806		.664
When communicating with others, I try to be genuine in what I say and do.			.719		.610
I try to show a genuine interest in other people.			.693		.529
I spend a lot of time at work developing connections with others.				-.781	.689
I have developed a large network of colleagues and associates at work whom I can call on for support when I really need to get things done.				-.757	.635
I am good at using my connections and network to make things happen at work.				-.645	.561
I spend a lot of time and effort at work networking with others.				-.644	.530
At work, I know a lot of important people and am well connected.				-.539	.585
Eigenvalues	5.790	1.701	1.485	1.400	
% variance explained	36.19	10.63	9.28	8.748	
Cronbach's Alpha	.851	.810	.668	.795	
Items Retained	5	3	3	5	
Mean factor score (n=131)	5.307	5.936	6.372	5.405	
(SD)	.916	.755	.502	.880	

3.3 Multivariate analysis.

3.3.1 Multiple regression model

Regression analysis was used to estimate the effect of (each) independent variable on a dependent variable. The policy capturing study included three groups of variables. Project uncertainty (A) was comprised of three variables each being varied on a binary scale ('low' and 'high'): path-goal clarity, team cohesion and technical complexity. Perceived risk to project success (B) was on a five-point scale ('very low risk' to 'extreme risk'). Lastly, the rated effectiveness of leadership style (C) comprised two variables each rated on a five-point scale ('not effective' to 'extremely effective'), namely transactional leadership style, and transformational leadership style.

Three relationships between these groups of variables were of interest: the statistical effect of project uncertainty on perceived risk to project success (A-B); the effect of project uncertainty on the rated effectiveness of leadership style (A-C); and the effect of perceived risk to project success on the rated effectiveness of leadership style (B-C). In this last case, perceived risk to project success (B) became the independent variable. Transactional and transformational leadership styles were regressed individually as they are considered orthogonal constructs (Bass, 1990).

Therefore, there were five regression models in total:

1. Perceived risk to project success (DV) was regressed on project uncertainty (three IV) (A-B),

2. Transactional leadership style (DV) was regressed on project uncertainty (three IV) (A-C: TX),
3. Transformational leadership (DV) was regressed on project uncertainty (three IV) (A-C: TF).
4. Transactional leadership style (DV) was regressed on perceived risk to project success (one IV) (B-C:TX),
5. Transformational leadership style (DV) was regressed on perceived risk to project success (one IV) (B-C: TF),

3.3.2 Regression analysis protocol

Because policy capturing seeks to 'capture' the effect of information on individual decisions (policies), regression analysis was performed for each SME following the method outlined in Ones and Viswesvaran (1999). Each of the five regression analyses was calculated with the dataset 'split' by 'participant number' i.e. n=131 separate regressions for each regression model. Results from the individual regression analyses were then meta-analysed to calculate two standardised regression statistics: the 'mean adjusted R²' and the 'mean standardized coefficient' (Beta - β) (Spicer, 2005). The 'mean adjusted R²' is the average variance of the dependent variable explained by all independent variables across the individual SME studies. Beta refers to the average correlation of independent variables with the dependent variable across the studies. A standardized coefficient is expressed in terms of standard deviations to allow analysis of variables using different scales (in the first regression - scales of two and five points). Thus, for every standard deviation of increase in the

independent variable, the dependent variable increases (or decreases) by the coefficient value (times the DV standard deviation) (Spicer, 2005). The Beta weights (zero order correlations) indicated the importance of cues for SME choices or decisions (Ones & Viswesvaran, 1999). The observed standard deviation (*SD*) describes the distribution (variance) of the beta scores (β) across the sample of studies. Lastly, the percentage of statistically significant Beta ($p < .05$) (for each IV) across the SME studies indicated the reliability of beta scores. A higher percentage of significant beta scores indicates less chance that the beta scores may be attributable to chance or measurement error.

3.3.3 ANCOVA model

Analysis of covariance explored the observed relationships between project uncertainty (A), project success criteria (B) and leadership style (C) in parallel to regression analyses. That is, ANCOVA analysed the same five IV:DV relationships but with the addition of five covariates - SME experience and the four dimensions of SME political skill (networking ability, social astuteness, Interpersonal influence, and apparent sincerity). Covariates were included in ANCOVA in order to control for between-subject effects. The increased power of the combined sample ($n=1048$) allows both independent variables and all covariates to be simultaneously entered into the calculations. In addition, ANCOVA allowed the inclusion of a random variable (participant number) to control for sampling error due to unknown SME effects (Ones & Viswesvaran, 1999).

3.3.4 ANCOVA protocol

ANCOVA were conducted to allow for possible over-fitting of the data. Over-fitting occurs when insufficient observations for the required variables lead to over-estimations that are not indicative of the population (Babyak, 2004). Following the model of Zhou and Martocchio (2001), ANCOVA were calculated after the regression analyses to explore additional covariates. One- or three-way univariate analyses of covariance were calculated for each of the dependent variables (transactional or transformational leadership styles, or project success criteria) according to relationships in the research model (Figure 1). For each analysis independent variables were entered as fixed factors, SME experience and four SME political skill scores were entered as covariates, and (SME) participant number was entered as a random variable. An initial analysis was run and any non-significant covariates were removed to increase the statistical power for the subsequent iteration. Following ANCOVA, Pearson's (product moment correlation) coefficients were used to ascertain the valence and magnitude of any significant covariate relationships. Lastly, estimated marginal means (and standard deviations) determined the effect for independent variables on dependent variables (having controlled covariates).

3.4 Hypotheses concerning A-B linkages

Because data reduction (EFA) reduced four success (risk) criteria down to one factor (perceived risk) H1 now states that path-goal clarity, technical non-complexity and team cohesion (A) will positively predict perceived risk to project success (B). That is, higher uncertainty will increase perceived risk. H2 predicts that these sources of uncertainty will interact to predict ratings of perceived risks. The perceived risk variable was created from individually averaged scores on all four success criteria (budget, schedule, scope/quality, and team satisfaction).

3.4.1 Regression of perceived risk (B) on project uncertainty (A)

In Figure 1, the first analysis regressed “perceived risk to project success” (B) project uncertainty (A). One SME's data was removed because the SME gave identical answers on all eight scenarios - therefore $n=130$. The meta-analysis (Table 3) showed that the combined sources of uncertainty explained (on average) 75% of the variance in (mean) perceived risk for project success. This is a high correlation and could be the result of ‘over-fitting’ (see ANCOVA below). Beta coefficients showed a positive effect for project uncertainty on perceived risk to project success (i.e. that greater uncertainty resulted in greater risk). Path-goal clarity appeared to be the most important cue for the SME with the highest beta value ($\beta = 0.592$) and beta coefficient scores showed significant ($p < .05$) effects on perceived risk in over two-thirds of the individual SME studies.

Table 3:

*Meta-analysis results for the regressions of **perceived risk to project success** (DV) on project uncertainty (three IVs) (n=130).*

Independent Variables Uncertainty:	Mean Adjusted R ²	Mean standardized coefficient (β)	Observed SD	Percentage of Beta ($p < .05$)
Path-Goal Clarity	0.751	0.592	0.235	67.692
Team Cohesion		0.470	0.253	50.769
Technical Complexity		0.326	0.252	27.692

Team cohesion also appeared to be considered important by SME ($\beta=0.470$) and had a significant effect on perceived risk scores in over half of the individual SME studies. Technical complexity appeared to be the least important cue for SME although the beta value ($\beta=0.326$) still showed a sizeable mean effect on perceived risk to project success. However, technical complexity produced significant effects on perceived risk to project success in only 28% of the SME studies. Therefore, H1 was provisionally supported by the policy capturing study. Caution must be exercised however because these results could have been partly attributable to covariates (SME experience and SME political skills) and random effects.

3.4.2 ANOVA: project uncertainty (A) and perceived risk (B)

Table 4 shows the mean scores per item per uncertainty factor (on perceived risk). SME perceptions of risk to project outcomes arithmetically increased as uncertainty increased from each of the three sources: low path-goal clarity, low team cohesion and high technical complexity. SME

perceptions of risk were lower when all three independent variables were coded as “1” (see Appendix B: scenario ‘B’) ($M=1.6927$, $SD=0.594$). At the other extreme (Scenario F- scored 2+2+2) was perceived as most risky (“high risk”)($M=4.1908$, $SD=0.558$). The order of perceived risk followed the sum of the codes, i.e. Scenarios B (sum=3); A, H and G (sum=4); C, D and E (sum=5); and F (sum=6). When the independent variables are ordered as [path-goal clarity X team cohesion X technical complexity] a clear and incremental series of means is observable (Table 4) as uncertainty increases. To test these findings for statistical significance a three-way univariate ANOVA was run with the three sources of uncertainty (independent variables) and perceived risk to project success (as the single dependent variable). SME experience and political skills (four dimensions) were entered as covariates and participant (SME) was a random within subject variable (each SME responded to $2 \times 2 \times 2 = 8$ scenarios). Initial ANCOVA showed that SME participant number (the random effects variable, level 2) had a non-significant effect ($p=.484$) and was withdrawn from the analysis (as per the ANCOVA protocol: please refer section 3.3.4).

Table 4:

Means and standard deviations of **perceived risk to project success** (DV)* in high and low (binary) conditions for path-goal clarity, team cohesion and technical complexity (three IVs) (n=1048).

Independent Variables			Perceived Risk (DV)	
			Mean	Std. Dev.
High path-goal clarity (=1)	High team cohesion (=1)	Low technical complexity (=1) (Scenario B)	1.6927	0.59369
		High technical complexity (=2) (Scenario A)	2.3244	0.76755
	Low team cohesion (=2)	Low technical complexity (=1) (Scenario H)	2.6584	0.60463
		High technical complexity (=2) (Scenario C)	3.2519	0.60168
Low path-goal clarity (=2)	High team cohesion (=1)	Low technical complexity (=1) (Scenario G)	2.9523	0.66947
		High technical complexity (=2) (Scenario D)	3.4084	0.65648
	Low team cohesion (=2)	Low technical complexity (=1) (Scenario E)	3.5763	0.73438
		High technical complexity (=2) (Scenario F)	4.1908	0.58821

*Ratings for perceived risk to project success were on a five-point scale.

None of the four political skill covariates (social astuteness, interpersonal influence, networking ability, or apparent sincerity) had a statistically significant effect on SME perceptions of risk to project success and were also excluded. Subject matter expert years of experience (SME experience) was marginally significant ($F(1, 1035) = 3.965, p < .05, \eta_p^2 = .004$) and was thus retained under the ANCOVA protocol. The analysis was re-run and SME

experience was then found to be non-significant and thus excluded.

F-tests showed highly statistically significant effects ($p < .001$) on perceived risk for all three sources of project uncertainty (i.e. greater uncertainty resulted in greater perceived risks to project success) (Table 5). Path-goal clarity had the clearest effect ($\eta_p^2 = 0.393$) on perceived risk as was indicated in the meta-analysis of individual SME studies. Again, team cohesion was next most important ($\eta_p^2 = 0.285$) and lastly, technical complexity ($\eta_p^2 = 0.162$). A correlation analysis (Pearson's coefficient) is used

to describe the direction and strength of each independent variable's relationship to transformational leadership ratings. Low path-goal clarity, low team cohesion and high technical complexity correlated significantly and positively with perceived risk. Thus, H1 which stated that sources of uncertainty would positively predict perceived risk to project outcomes was supported by the ANOVA.

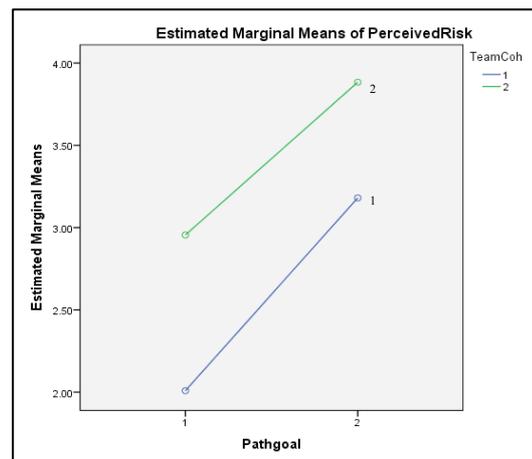


Figure 3.1: The two-way interaction effect of path-goal clarity and team cohesion (1=high and 2=low) on mean SME ratings for perceived risk (SPSS).

Table 5:

Three-way univariate Analysis of Variance results and effect sizes of sources of project uncertainty (IVs) on SME perceptions of **risk to project success** (DV) (n=1048).

Independent variables	Test Statistics			
	df	F	η_p^2	R
Path-goal clarity	1	673.118***	.393	0.536**
Team Cohesion	1	415.376***	.285	0.421**
Technical Complexity	1	201.086***	.162	0.293**
(Team Cohesion x Path-goal clarity)	1	9.035**	.009	
(Team Cohesion x Technical complexity)	1	0.551	.001	
(Path-goal clarity x Technical complexity)	1	0.912	.001	
(Team cohesion x Path-goal clarity x Technical complexity)	1	1.474	.001	

[Key: *p<.05, **p<.01, ***p<.001]

One two-way interaction effect was found between team cohesion and path-goal clarity ($F(1, 1040) = 9.035, p < .01, \eta_p^2 = 0.009$) although the effect (η_p^2) was small. Figure 3.1 indicates that unclear path-goals affected SME perceptions of risk significantly more when team cohesion was high than when team cohesion was low. This means that low team cohesion and low path-goal clarity somehow interacted in predicting perceptions of risk – or that one or both of them moderated the effect of the other on perceived risk (i.e. that team cohesion positively moderated the effect of low path-goal clarity, or that low path-goal clarity negatively moderated the effect of team cohesion). The same effect can be seen in table 4 as

unclear path-goals (i.e. 2x1x1) indicate higher perceived risk than clear path-goals even when both other sources of uncertainty are high (i.e. 1x2x2). This indicates that technical complexity influences SME judgments the least and doesn't affect the risk associated with other sources of project uncertainty. Thus H2, which predicted that sources of uncertainty (A) would interact to co-determine perceived risks (B), was partially supported by ANOVA.

3.5 Hypotheses concerning A-C links

H3 stated that path-goal clarity, team cohesion and technical complexity (A) will correlate negatively with transactional leadership effectiveness ratings (C). That is, greater uncertainty resulting from low path-goal clarity, low team cohesion and high technical complexity will predict *lower* ratings of transactional leadership effectiveness.

H4 stated that path-goal clarity, technical complexity and team cohesion (A) will correlate positively with transformational leadership effectiveness ratings (C). That is, greater uncertainty resulting from low path-goal clarity, low team cohesion and high technical complexity will predict *higher* ratings of transformational leadership effectiveness.

3.5.1 Project uncertainty and transactional leadership (TX)

Regressing transactional leadership (C) on project uncertainty (A)

Four SME's data were excluded because the dependent variable values were constant, reducing the sample to $n=127$. Meta-analysis (Table 6)

showed that path-goal clarity, team cohesion and technical complexity (B) explained (on average) 41% of the variance in the rated effectiveness of transactional leadership style (C). The negative beta coefficients for path-goal clarity and team cohesion in Table 6 ($\beta = -0.339$, and $\beta = -0.216$, respectively) indicated that, as expected, SME judged higher levels of uncertainty to reduce the effectiveness of transactional leadership style – or that lower levels of uncertainty increase transactional leadership effectiveness.

Table 6:

*Meta-analysis results for the regression of SME ratings of **transactional leadership effectiveness** (DV) on sources of project uncertainty (three IVs) (n=127).*

Independent Variable:	Mean Adjusted R ²	Mean standardized coefficient (β)	Observed SD	Percentage of Beta ($p < .05$)
Path-Goal Clarity	0.408	-0.339	0.475	38.211
Team Cohesion		-0.216	0.361	17.886
Technical Complexity		-0.086	0.369	15.447

On average, path-goal clarity ($\beta = -0.339$) was most salient to SMEs when assessing transactional leadership effectiveness with 38% of SME studies showing statistically significant regression equations. Team cohesion ($\beta = -0.216$) significantly affected SME ratings less in 18% of studies. Technical complexity ($\beta = -0.086$) marginally affected ratings in 15% of studies. These findings are equivocal with respect to overall significance, and could have been partially influenced by covariates (SME experience or political

skill dimensions) or random effects (judge effects). For these reasons ANCOVA was employed to determine more precisely the statistical significance of the uncertainty variables with respect to rated efficacy for transaction leadership as the criterion.

ANCOVA: transactional leadership (C) and project uncertainty (A)

Means (Table 7) of the perceived effectiveness of transactional leadership styles for each policy capturing (uncertainty) scenario indicated that SME confidence in transactional leadership decreased as project uncertainty ranged from most certain (scenario B: $M = 3.77$, $SD=.855$) to the most uncertain (scenario F: $M =2.61$, $SD=.925$).

Table 7: (Overleaf).

*Means and standard deviations of SME ratings of **transactional leadership effectiveness** (DV)* in high and low (binary) conditions for path-goal clarity, team cohesion and technical complexity (three IVs) (n=1048).*

Independent Variables			Dependent Variable	
			Mean	SD
High path-goal clarity (=1)	High team cohesion (=1)	Low technical complexity (=1) (Scenario B)	3.77	.855
		High technical complexity (=2) (Scenario A)	3.56	.887
	Low team cohesion (=2)	Low technical complexity (=1) (Scenario H)	3.39	.846
		High technical complexity (=2) (Scenario C)	3.25	.817
Low path-goal clarity (=2)	High team cohesion (=1)	Low technical complexity (=1) (Scenario G)	3.05	.747
		High technical complexity (=2) (Scenario D)	2.99	.881
	Low team cohesion (=2)	Low technical complexity (=1) (Scenario E)	2.92	.886
		High technical complexity (=2) (Scenario F)	2.61	.925

*Ratings for transactional leadership effectiveness were on a five-point scale.

ANCOVA was used to test these observations for statistical significance and to consider the possibility of confounding variables. Following the protocol above in section 3.3.4, an initial one-way ANCOVA indicated that participant number (random variables) was non-significant ($p < .565$). SPSS was unable to compute the covariables with the random variable (returning the error message "Cannot compute the error degrees of freedom using Satterthwaite's method")¹. ANCOVA (excluding participant #) indicated neither social astuteness, interpersonal influence, apparent sincerity, nor networking ability were significant ($p = .905$, $.776$, $.384$, and $.564$, respectively). SME experience was also non-significant ($p = .156$). Thus

¹ "The linear combinations of mean squares generally involve positive coefficients for some mean squares and negative coefficients for others. In some situations this may produce negative values for error mean squares,

the covariates were excluded from the analysis. Subsequent ANOVA results indicated that path-goal clarity, team cohesion, and technical complexity impacted SME ratings of transactional leadership's effectiveness (Table 8). Path-goal clarity had the greatest impact ($F(1,1040)=128.047, p<.001, \eta_p^2=.110$), followed by team cohesion ($F(1, 1040)= 32.421, p<.05, \eta_p^2=.030$), and technical complexity ($F (1, 1040)=11.475, p<.05, \eta_p^2=.011$). No interaction effects between the independent variables were observed.

Table 8:

*Three-way univariate Analysis of Variance results and effect size of project uncertainty (three IVs) on SME ratings of **transactional leadership effectiveness** (DV) (controlled for covariates) (n=1048).*

Independent Variables	Test Statistics			
	df	F	η_p^2	R
Path-goal clarity	1	128.047***	.110	-.325
Team Cohesion	1	32.421***	.030	-.163
Technical Complexity	1	11.475**	.011	-.097
(Team Cohesion x Path-goal clarity)	1	.629	.001	-
(Team Cohesion x Technical complexity)	1	.005	.000	-
(Path-goal clarity x Technical complexity)	1	.629	.001	-
(Team cohesion x Path-goal clarity x Technical complexity)	1	2.291	.002	-

The effect of uncertainty on transactional leadership ratings (seen in the Pearson coefficients R) was negative – as uncertainty increased SME

reported less confidence that transactional leadership would be effective (Table 8). The correlation coefficient was notably higher for path-goal clarity ($R=-0.325$) than for team cohesion ($R=-0.163$) or technical complexity ($R=-0.097$). Thus ANOVA supported the results of the meta-analysis indicating that SME endorsed a transactional leadership style in less uncertain contexts with particular emphasis on path-goal clarity as a policy cue. H3 was supported.

3.5.2 Project uncertainty and *transformational* leadership (TF)

Regressing transformational leadership (C) on project uncertainty (A)

Five SME data were excluded because the dependent variable values were constant reducing the sample to $n=126$. Meta-analysis (Table 9) shows that path-goal clarity, team cohesion and technical uncertainty (A) explained (on average) 30% of the variance in SME ratings of transformational leadership effectiveness (C). The (negative) beta coefficients for path-goal clarity and technical complexity ($\beta=-0.026$, and $\beta=-0.008$, respectively) showed virtually no effect and indicated that team cohesion ($\beta=-0.142$) alone had a discernable influence on transformational leadership ratings.

Table 9:

Meta-analysis results for the regression of SME ratings of **transformational leadership effectiveness** (DV) on sources of project uncertainty (three IVs) (n=126).

Independent Variable:	Mean Adjusted R ²	Mean standardized coefficient (β)	Observed SD	Percentage of Beta ($p < .05$)
Path-Goal Clarity		-0.026	0.485	21.600
Team Cohesion	0.303	-0.142	0.441	19.200
Technical Complexity		-0.008	0.392	10.400

Against expectations, SME judged higher uncertainty to reduce the effectiveness of transformational leadership – in particular, lower team cohesion reduced SME ratings. Thus, team cohesion was found to be statistically significant in predicting transformational leadership ratings in 20% of studies. This finding is marginal with respect to effect size (standardized coefficient size), and could have been partially influenced by covariates (SME experience or political skill dimensions) or random effects (judge effects). For these reasons ANCOVA was again employed to determine more precisely the statistical significance of the uncertainty variables, with respect to rated efficacy for transformational leadership as the criterion.

ANCOVA: project uncertainty (A) and transformational leadership (C)

Mean ratings (Table 10) of the perceived effectiveness of transformational leadership styles for each policy capturing (uncertainty) scenario indicated that SME confidence in transformational leadership

decreased slightly from high team cohesion scenarios (low uncertainty) to low team cohesion scenarios (high uncertainty) (average means=3.623 and 3.413, respectively).

Table 10:

*Means and standard deviations of SME ratings of **transformational leadership effectiveness** (DV)* in high and low (binary) conditions for team cohesion and path-goal clarity and technical complexity (three IVs) (n=1048).*

Independent Variables			Dependent Variable	
			Mean	Std. Dev.
High team cohesion (=1)	High path-goal clarity (=1)	Low technical complexity (=1) (Scenario B)	3.65	.992
		High technical complexity (=2) (Scenario A)	3.64	.833
	Low path-goal clarity (=2)	Low technical complexity (=1) (Scenario G)	3.63	.825
		High technical complexity (=2) (Scenario D)	3.57	.869
Low team cohesion (=2)	High path-goal clarity (=1)	Low technical complexity (=1) (Scenario H)	3.42	.794
		High technical complexity (=2) (Scenario C)	3.44	.834
	Low path-goal clarity (=2)	Low technical complexity (=1) (Scenario E)	3.42	.877
		High technical complexity (=2) (Scenario F)	3.37	1.047

*Ratings for transformational leadership effectiveness were on a five-point scale.

ANCOVA was used to test these observations for statistical significance and to consider the possibility of confounding variables. Following protocol, initial one-way ANCOVA excluded participant number (random variable) as non-significant ($p < .492$). The inclusion of the random variable

prevented SPSS from calculating covariates (receiving error: *Cannot compute the error degrees of freedom using Satterthwaite's method*)¹ therefore ANCOVA was repeated without participant number but with covariates. Of the five covariates, SME experience ($p < .159$) and networking ability ($p < .616$) were next excluded from the analysis and ANCOVA was re-run. This time the three covariates (political skill dimensions) remained statistically significant but of the three independent variables, only team cohesion significantly predicted SME ratings of transformational effectiveness.

Finally, the ANCOVA was run with only team cohesion as predictor variable ($F(1, 1043) = 15.455, p < .001, \eta_p^2 = .015$), and the three significant political skill factors as covariates: social astuteness ($F(1, 1043) = 5.936, p < .05, \eta_p^2 = .006$), interpersonal influence ($F(1, 1043) = 4.391, p < .05, \eta_p^2 = .004$), and apparent sincerity ($F(1, 1043) = 6.458, p < .05, \eta_p^2 = .006$) (Table 11). Having removed the confounding effects of covariates, Pearson coefficients indicated that low team cohesion ($R = -.119$) led SME to judge transformational leadership as less effective. In addition, SME who judged transformational leadership as more effective had higher (self ratings) of social astuteness, interpersonal influence, and apparent sincerity.

Table 11:

*Three-way univariate Analysis of Covariance results and effect size of team cohesion (IV) and covariates (CVs) on SME ratings of **transformational leadership effectiveness** (DV) (n=1048).*

Significant Covariates	Test Statistics			
	df	F	η_p^2	R
Team cohesion	1	15.455	.015	-.119**
Social astuteness	1	5.936*	.006	.139**
Interpersonal influence	1	4.391*	.004	.133**
Apparent sincerity	1	6.458*	.006	.131**

[Key: *p<.05, **p<.01, ***p<.001]

Table 12 shows the estimated (averaged) means of transformational leadership ratings for conditions of high and low team cohesion which are virtually unaffected by the covariates (c.f. M=3.623 and M=3.413 reported above).

Table 12:

*Estimated marginal means and standard error of SME ratings of **transformational leadership effectiveness** (DV)* in high and low (binary) conditions for team cohesion (IV) (controlled for covariates) (n=1048).*

Independent Variable		Dependent Variable	
		Estimated Marginal Mean	Std. Error
Team Cohesion	High (1)	3.624	0.038
	Low (2)	3.412	0.038

*Ratings for transformational leadership effectiveness were on a five-point scale.

When political skill factors were controlled, the estimated marginal mean ratings for transformational leadership (Table 12) *fell* (slightly) when uncertainty rose (i.e. when team cohesion was low). H4 proposed that greater uncertainty would predict *higher* ratings of transformational leadership effectiveness and was thus not supported.

3.6 Hypotheses concerning B-C linkages

Because data reduction (EFA) reduced four success (risk) criteria down to one factor (perceived risk) H5 now states that perceived risk to project success (B) will negatively predict transactional leadership effectiveness ratings (C). That is, higher perceived risk will reduce the rated effectiveness (of transactional leadership style). H6 now states that perceived risk to project success (B) will positively predict transformational leadership effectiveness ratings (C). That is, higher perceived risk will increase the rated effectiveness (of transformational leadership style). In both cases, perceived risk to project success now acts as the independent variable.

To create an independent variable for ANCOVA (level of perceived risk) an equal split of the data was made based on low and high scores. Seven cases of participant data were removed from the dataset because leadership ratings were entered as constants. Perceived risk scores were ordered and evenly split into low ($n=496$) and high ($n=496$) groups to be used for both transactional and transformational leadership regressions. The transformation of perceived risk into a split (binary) independent

variable was therefore achieved by ranking and halving ($n=992$) scenario responses rather than splitting ($n=124$) SME studies. Because each ($n=124$) SME entered scores into eight different policy-capturing tasks ($\pi = 992$) there was the possibility that some SME could be represented in both split groups (for different scenarios) creating confounding participant (judge) effects. However, because 'participant number' (random judge effect) was clearly non-significant from A-B and A-C it was reasoned that the risk of a participant (judge) effect was unlikely. The random covariate (participant #) was accordingly excluded from all B-C ANCOVA analyses because participant effects are implicit within the individual responses (used for splitting the data).

3.6.1 Perceived risk and transactional leadership (TX)

Regressing transactional leadership (C) on perceived risk (B)

Data from four SME studies were excluded because the transactional leadership effectiveness ratings were constant reducing the sample to $n=127$. Meta-analysis (Table 13) shows that the perceived risk to project success (B) explained (on average) only 29% of the variance in the rated effectiveness of transactional leadership(C).

Table 13:

*Meta-analysis results for the regression of SME ratings of **transactional leadership effectiveness** (DV) on perceived risk to project success (IV) (n=127).*

Independent Variable:	Mean Adjusted R ²	Mean standardized coefficient (β)	Observed SD	Percentage of Beta ($p < .05$)
Perceived Risk	0.291	-0.405	0.480	33.858

The negative beta coefficient ($\beta = -0.405$) (Table 13) indicates that SME judged higher levels of project risk to reduce the effectiveness of transactional leadership style (or conversely judged lower levels of risk to enhance transactional effectiveness). H3 was thus supported by the policy capturing study albeit with fairly low levels of variance explained and with only a third of $n = 127$ individual studies achieving a statistically significant result. However, the ratings of leadership effectiveness could be partly affected by covariates (SME experience, and four dimensions of SME political skill). Thus, ANCOVA was employed to test whether the result of the meta-analysis was statistically significant.

ANCOVA: perceived risk (B) and transactional leadership (C)

Table 14 shows the means for transactional leadership effectiveness for low and high levels of perceived risk to project success. The means show that when perceived risk to project success was high then SME ratings of transactional leadership effectiveness decreased.

Table 14:

Means and standard deviations of SME ratings of **transactional leadership effectiveness** (DV) as a function of level of perceived risk to project success (binary variable) (IV) (n=992).

Independent Variable		Transactional Leadership Ratings	
		Mean	Std. Error
Level of Perceived Risk	Low (1)	3.444	0.040
	High (2)	2.931	0.0340

ANCOVA found none of the co-variates (SME experience, and political skills dimensions) were statistically significant and they were thus excluded as per the ANCOVA protocol (section 3.3.4). Thus the means in Table 14 were not adjusted.

Table 15:

One-way univariate Analysis of Variance results and effect size for level of perceived risk to project success (binary IV) for SME ratings of **transactional leadership effectiveness** (DV) (n=992).

Independent Variable	Test Statistics		
	df	F	η_p^2
Level of Perceived Risk	1	80.073***	0.075
Error	990		

[Key: *p<.05, **p<.01, ***p<.001]

The ANOVA in Table 15 indicated that perceived risk to project success was a significant cue for SME in assessing the effectiveness (or appropriateness) of transactional leadership ($F(1, 990) = 80.073, p < .001$,

$\eta_p^2 = .075$). As perceived risk increased, SME ratings of transactional leadership decreased. Thus, H3 was supported with no observed confounding from SME experience or political skills dimensions.

3.6.2 Perceived risk and transformational leadership (TF)

Regressing transformational leadership (C) on perceived risk (B)

Data from five SME studies were excluded because the scores for transformational leadership effectiveness ratings were constant reducing the sample to $n=126$. Meta-analysis (Table 16) showed that perceived risk to project success (B) explained on average) 21% of the variance in the rated effectiveness of transformational leadership (C).

Table 16:

Meta-analysis results for the regression of SME ratings of transformational leadership effectiveness (DV) on perceived risk to project success (IV) (controlled for covariates) (n=126).

Independent Variable	Mean Adjusted R^2	Mean Beta Coefficient	Observed SD	Percentage of Beta ($p < .05$)
Perceived Risk	.210	-0.080	0.565	29.365

The negative beta coefficient ($\beta = -0.080$) suggests that (on average) SME judgments of perceived levels of project risk had a slight negative effect on the rated effectiveness of transformational leadership style. H4 was thus not supported by the policy capturing study with low levels of variance explained and with less than a third of $n=126$ individual studies achieving a statistically significant result (Table 16). However, because this

result could be attributable to covariates (SME experience, and the four dimensions of political skill) and because of the small effect ANCOVA was employed to test whether the result of the meta-analysis was statistically significant.

ANCOVA: perceived risk (B) and transformational leadership (C)

The negligible difference in mean transformational leadership ratings for low versus high levels of perceived risks to project success (Table 17) suggests that perceived risk makes little difference to ratings of transformational leadership.

Table 17:

*Mean and standard deviation of SME ratings of **transformational leadership effectiveness** (DV) as a function of level of perceived risk to project success (binary IV) (n=992).*

Independent Variable		Transformational Leadership Ratings	
		Mean	Std. Dev.
Level of Perceived Risk	Low (1)	3.578	0.039
	High (2)	3.471	0.039

ANCOVA found that SME experience, social astuteness, interpersonal influence and networking ability were all non-significant co-variates. Hence, as per the protocol (section 3.3.4) these covariates were excluded and ANCOVA re-run. Apparent sincerity showed a small ($\eta_p^2=0.021$) but statistically significant effect on SME ratings of transformational leadership (Table 18).

Table 18:

One-way univariate Analysis of Co-variance results and effect size of apparent sincerity (CV) for SME ratings of **transformational leadership effectiveness** (DV) (n=992).

Significant Covariates	Test Statistics		
	df	F	η_p^2
Apparent sincerity	1	21.164***	.021
Error	989		

[Key: *p<.05, **p<.01, ***p<.001]

This time, ANCOVA found level of risk perceived to project success was a non-significant predictor for ratings of transformational leadership effectiveness ($F(1, 989)=3.657, p=.056, \eta_p^2=.004$). Greater perceived risk to project success did not (positively) predict higher SME effectiveness ratings for transformational leadership in this study. H6 was not supported.

3.7 Mini-summary of meta-analyses and ANCOVA

Path-goal clarity, team cohesion, and technical complexity (A) were all observed to strongly and positively influence SME perceptions of risk to project success (B) - in particular path-goal clarity and team cohesion that also interacted (supporting H1 and H2).

Path-goal clarity, team cohesion, and technical complexity (A) all negatively predicted SME ratings of transactional leadership effectiveness (C) – with path-goal clarity indicated as particularly influential (supporting H3). Only team cohesion (A) predicted ratings of transformational

leadership effectiveness (C) and did so in a (small) *negative* direction (thus not supporting H4 which proposed a positive correlation).

Perceived risk to project success (B) negatively predicted SME ratings of transactional leadership (C) (supporting H5) but did not predict transformational leadership effectiveness (C) (thus not supporting H6).

SME political skills (interpersonal influence, apparent sincerity and social astuteness) were not associated with ratings of transactional leadership (C) as a function of perceived risk to project outcomes (B) or sources of project uncertainty (A). SME political skills correlated positively with SME ratings of transformational leadership. Social astuteness, interpersonal influence, and apparent sincerity weakly but positively correlated with SME ratings as a function of sources of project uncertainty (A-C) and apparent sincerity correlated with SME ratings as a function of (levels of) perceived risk to project success (H12 was partially supported).

SME experience (covariate) predicted ratings of neither transactional and transformational leadership style (C) based on perceived risk to project success (B) or sources of project uncertainty (A) (H13 was not supported).

3.8 Perceived risk as a Mediator.

3.8.1 Baron and Kenny model

Baron and Kenny (1986) recommended using four regression equations to ascertain mediation effects: (1) regressing the mediator onto the independent variables (A-B), (2) regressing the dependent variable on the

independent variable (A-C), (3) regressing the dependent variable on the presumed mediator (B-C), and lastly, (4) regressing the dependent variable on both the independent and mediator variables (A-B-C). Steps 1-3 have already been completed:

1. A-B: For mediation to occur, the independent variable must affect the mediator variable. H1 was supported when path-goal clarity, team cohesion, and technical complexity all loaded positively and significantly on perceived risk to project outcomes (Table 3).
2. A-C: For mediation to occur, the independent variable must affect the dependent variable. H5 was supported when all three independent variables (sources of project uncertainty) were statistically significant (negative) predictors of transactional leadership ratings (Table 8). H6 was not supported when the effect of independent variables was shown to be negative on transformational leadership ratings (Table 11). However, team cohesion was found to be a (marginally) statistically significant predictor of transformational leadership ratings. Thus, both dependent variables were predicted by independent variables.
3. B-C: For mediation to occur, the mediator variable must affect the dependent variable(s). H3 was supported when perceived risk loaded significantly (negatively) on transactional leadership ratings (Table 15). H4 was not supported when perceived risk did not load positively on transformational leadership ratings (i.e. greater risk resulted in lower SME ratings for the likely effectiveness of the

transformational leadership style) (Table 19). However, a statistically significant (albeit it negative) effect was observed. Thus, both dependent variables were predicted by the mediator variable.

4. A-B-C: With the above conditions 1-3 met then mediation will show that the effect of the independent variable (A) on the dependent variable (C) will be less (or non-significant) in the final regression (with the mediator entered into the regression as an independent variable).

The research model (Figure 1) proposed that the project (systemic) elements (inputs, task, and output) introduce uncertainties for success measures (of schedule, budget, scope/quality and team satisfaction). Further, the model proposed that responses to these risks include transactional or transformational leadership styles. Hence, it was predicted that perceived risk would act as a mediating variable between path-goal clarity, team cohesion and technical complexity on one hand; and both transactional and transformational leadership styles on the other.

3.8.2 Mediating transactional leadership ratings

Four SME were removed from the transactional leadership regressions (both A-C and B-C) because the dependent variable was rated as a constant. Meta-analysis with this same sample previously showed that all three independent variables significantly predicted transactional leadership with no interactions (Table 6). Therefore, each variable was considered orthogonal and entered into three separate mediation

regressions. Table 19 shows the results of these regression analyses. Earlier results showed that neither SME experience, nor political skill dimensions was statistically significant and consequentially they were excluded from the (transactional) mediation analysis.

Table 19:

*Individual regression coefficients for SME ratings of **transactional leadership effectiveness** (DV) on sources of project uncertainty (IV) (with levels of perceived risk entered as an additional independent variable) (n=1016)*

Independent Variable:	Adjusted R ²	Standardized coefficient (β)	t	Sig.
1.Path-Goal Clarity	.109 (.159)	-0.332 (-0.189)	-11.197 (-5.531)	.000 (.000)
2.Team Cohesion	.027 (.133)	-0.167 (-0.013)	-5.391 (-0.413)	.000 (.680)
3.Technical Complexity	.009 (.133)	-0.099 (0.008)	-3.178 (0.257)	.002 (.797)

Table 19 also shows regressions of transactional leadership ratings (C) on sources of uncertainty (A) with the perceived risk entered as an additional independent variable. When perceived risk was introduced into the regression the standardized coefficient for path-goal clarity reduced from $\beta=-0.332$ ($p<.001$) to $\beta=-0.189$ ($p<.001$). The effect of both team cohesion and technical complexity on transactional leadership ratings became non-significant with the addition of perceived risk as a covariate. According to the Baron and Kenny (1986) mediation model, perceived

risk partially mediated the effect of path-goal clarity and completely mediated the effect of team cohesion and technical complexity on SME ratings of transactional leadership effectiveness. An online Sobel test² was used to test the significance of the partial mediation (indirect effect) of path-goal clarity on transactional leadership ratings (via perceived risk as mediator). The Sobel test returned a significant result ($Z=-8.112$, $p<.001$).

H7 stated that the effect of path-goal clarity, team cohesion and technological complexity (A) on SME ratings of transactional leadership effectiveness (C) would be mediated by SME perceptions of risk to project success (B). The results indicated that perceived risk completely mediated the effect of team cohesion and technical complexity on ratings of transactional leadership. Thus H7 is only partly supported because path-goal clarity retained a direct effect on SME ratings of transactional leadership effectiveness when controlling for a (significant) indirect effect mediated by perceived risk to project success.

3.8.3 Mediating transformational leadership ratings

ANCOVA for perceived risk and transformational leadership ratings (B-C) returned a non-significant relationship. Therefore, according to the Baron and Kenny model (above), perceived risk (B) cannot mediate the relationship between sources of project uncertainty (A) and SME ratings of transformational leadership (C). Thus H8 is not supported.

² retrieved from <http://www.danielsoper.com/statcalc/calculator.aspx?id=31>

3.9 Exploring team attributes (Figure 1)

Section three of the research questionnaire contained three exploratory items asking SME to choose one team attribute from among three (team cooperation, team capability, and team commitment), that would be *least* affected by each source of uncertainty (i.e. path-goal clarity, team cohesion and technical complexity). The team attributes were team cooperation, team capability, and team commitment. A fourth option (“none”) was also offered. Table 20 shows the results of a chi-squared goodness of fit analysis. This test indicates if the frequencies of SME responses are what would be expected (in this case, by chance).

Table 20:

*Observed frequencies (percentages) and test statistics for chi-squared goodness of fit for **project team attributes** least affected by path-goal clarity, team cohesion and technical complexity (n=131)*.*

Independent Variables	Team Attributes potentially affected by path-goal clarity, team cohesion and technical complexity.				Goodness of Fit (to a random distribution)		
	Capability	Cooperation	Commitment	None	X ²	df	Sig.
Path-goal Clarity	59 (45%)	29 (22%)	27 (26%)	16 (12%)	31.046	3	.000
Team Cohesion	85 (65%)	19 (15%)	11 (8%)	16 (12%)	112.145	3	.000
Technical Complexity	34 (26%)	30 (23%)	53 (40%)	14 (11%)	23.534	3	.000

*expected frequencies were (n=131)/4=32.8 in all cases.

The results in table 20 indicate that SME considered team *capability* to be least affected by path-goal clarity [$X^2(3, n=131)=31.046, p<.001$]. That is, according to SME, path-goal clarity affects team cooperation and commitment most. H9 stated that team *cooperation* would be judged least affected by path-goal clarity. Thus, H9 is not supported.

The results in table 20 indicate that SME considered team *capability* to also be least affected by team cohesion [$X^2(3, n=131)=112.145, p<.001$]. That is, team cohesion affects team cooperation and commitment most. H10 stated that team *capability* would be judged least affected by team cohesion. Thus, H10 is supported.

The results in Table 20 indicate that SME considered team *commitment* to be least affected by technical complexity [$X^2(3, n=131)=23.534, p<.001$]. That is, technical complexity affects team cooperation and capability most. H11 stated that team *commitment* would be judged least affected by technical complexity. Thus, H11 is supported.

Discussion

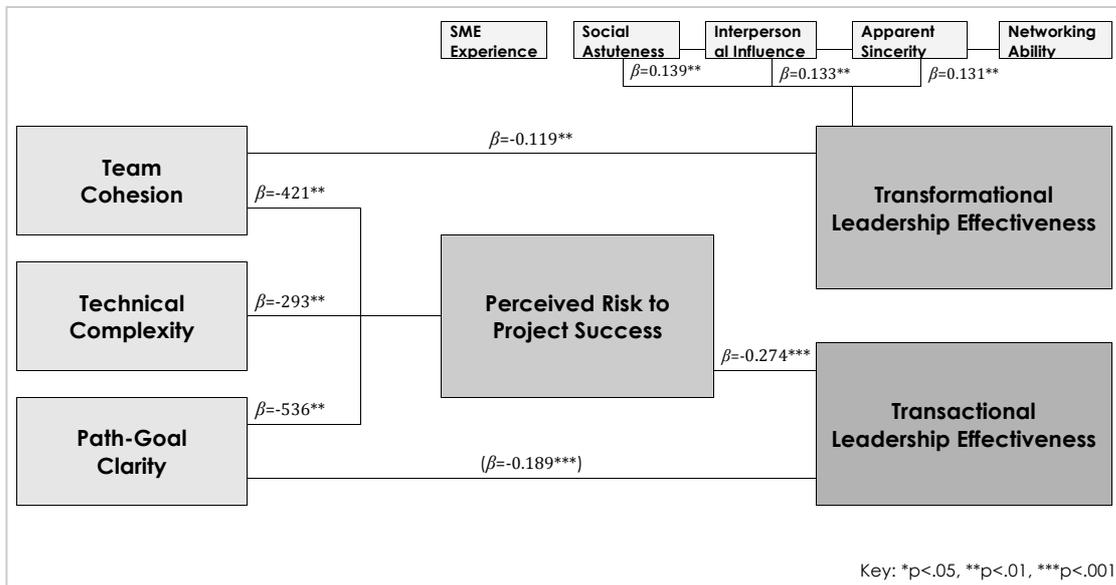


Figure 4.1 Significant linkages for the research model (brackets indicate a partially mediated effect)

Transactional leadership, risk and uncertainty.

Research results (Figure 4.1) tell differing stories for transactional and transformational leadership styles). Greater uncertainty (low path-goal clarity, low team cohesion, and/or technological complexity) directly reduced the effectiveness ratings of transactional leadership. This trend was shown to be a function of the potential effects on project success apart from path-goal clarity that had a significant direct effect on SME judgments of transactional leadership over and above risks to project success. This indicates that SME 'policy' (decisions) regarding leadership of projects in increasingly uncertain contexts considered not only the risk to project success but also considered path-goal clarity especially important. The importance of path-goal clarity to SME ratings is consistent

with the goal-directness of traditional project management approaches. Traditional project management is typically task oriented reflecting a transactional leadership approach. Thus, this result was expected given the traditional approach of PMBOK (PMI, 2008) with emphases being on front-end planning and management by exception.

Transformational leadership, risk and uncertainty.

The results for transformational leadership were contrary to the research model, which posited that project teams working under greater uncertainty would respond better to the empowering and motivational effects of transformational approaches. Team cohesion alone affected SME ratings for transformational leadership under greater uncertainty. This indicates that SME did not consider transformational approaches to be any more effective for defining goals and overcoming technical challenges in times of uncertainty than in times of clarity. In general, however, transformational leadership was rated as more effective than transactional leadership except in circumstances of greatest certainty (Figure 4.2).

The mediation of uncertainty and leadership by risk.

The research model also predicted that the potential for transformational leadership to respond to and prepare for risk contingencies (i.e. risk to success) would enhance its effectiveness (attractiveness) in uncertain contexts – especially given the strong relationship indicated between

sources of uncertainty and risks to project performance. Perceived risk fully mediated the effects of team cohesion and technical complexity on transactional leadership – and partially mediated the effect of path-goal clarity. However, transformational leadership showed a ‘disconnect’ with perceived risks to project success, i.e. there was a no relationship found.

Hence SME confidence in transactional leadership style decreased under greater project uncertainty but varied little for transformational style (Figure 4.2). SME rated the effectiveness of both styles almost equally

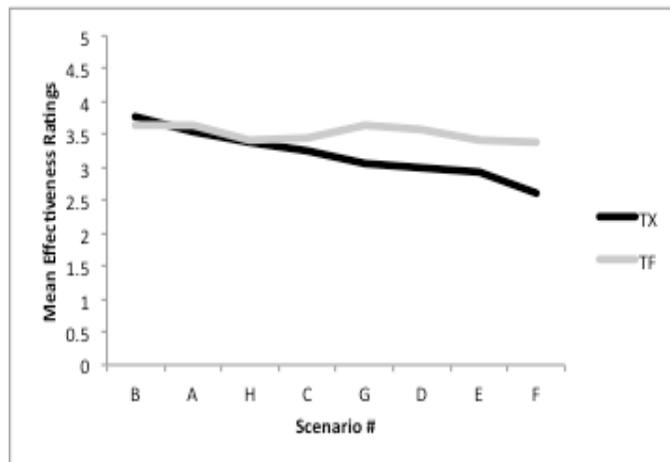


Figure 4.2: Mean effectiveness ratings for both transactional (TX) and transformational (TF) leadership in policy capturing scenarios of increasing uncertainty (B to F).

under conditions of greater certainty but transformational was considered more effective in uncertain conditions. Path-goal clarity was seen as important for transactional leadership effectiveness linking goal direction and task-oriented leadership. Team cohesion was considered as an important factor in transformational leadership effectiveness, linking the social dynamic of a project with relationship-oriented leadership. The question raised by these finding is why transformational leadership was considered irrelevant or ineffective for goal setting and resolving complex or complicated transformations. This is a surprising finding considering that transformational leadership has the enduring support of research

emphasising its usefulness in building 'shared visions' and encouraging innovative and cooperative approaches to problem solving. In turn, these effects have proven positive for commitment, cooperation and capability in high performance teams.

SME experience was correlated with effectiveness ratings for neither transactional nor transformational leadership. It was proposed that the distinct features of project work (temporariness, uniqueness, and goal-directedness) would inform SME leadership policies over time. It is notable that three-quarters of the SME group had high levels of experience (over ten years) and it was expected that SME policy would reflect 'lessons learned' in the field. It was suggested in this study that 'gaps' between theoretical and practical knowledge may partly account for high project failure rates. Conversely, it has also been suggested that project research may be out of step with the actual experiences of project managers (e.g. Cicmil et al., 2006). In This study, the disconnect between transformational leadership theory and This findings are not accounted for by SME experience in the field.

Another covariate investigated by the research project was political skill. As expected, levels of political skill (an index of social effectiveness) were positively correlated with ratings of transformational leadership effectiveness, i.e. higher ratings were associated with higher self-reports of political skill (called 'Communication Questionnaire' in the survey questionnaire). This suggests that social or emotional intelligence could be

a factor in understanding and endorsing transformational leadership (Dulewicz & Higgs, 2005).

Sources of uncertainty (path-goal clarity, team cohesion, and technological complexity) did not correlate with individual success criteria. For example, technical complexity was not linked to project schedule despite the likelihood of simpler tasks staying on schedule (Baccharini, 1996). Similarly, path-goal clarity was not linked to achieving project scope and quality targets despite the likelihood of unclear targets being harder to plan for and work towards (Turner & Cochrane, 1993). Lastly, team cohesion was not linked to project budget, although it seems likely that the poor communication (Newell et al., 2004) or an uncooperative culture (Henrie & Souza-Poza, 2005) could lead to poor work requiring rework or 'fast tracking' (additional resources to maintain schedule) resulting in additional costs.

SME responses in this policy capturing study reduced project budget, schedule, scope/quality, and team satisfaction to a single 'success' construct (perceived risk to project success). This was surprising as the iron triangle of success in particular, is virtually ubiquitous within project literature and essential to traditional methods of monitoring project progress and performance. Thus, success criteria were expected to interact yet also maintain some independence. Again, it must be noted that SME were very experienced practitioners and the melding of project success criteria may simply reflect the interactive nature of (particularly) schedule, budget and scope/quality in real-world situations.

Links to theory

The foci for the research hypotheses were a contingency approach to project leadership and Bass' (1990) full range theory of leadership.

The successful results for hypotheses relating to transactional leadership, risk and uncertainty indicated validity for the research (contingency) model. Uncertainty has been proposed as a means of comparing the effect of project leadership styles (Muller, Geraldi & Turner, 2012; Shenhar & Dvir, 2001; Howell, 2010)). In particular, 'hard' and 'soft' approaches (e.g. Crawford & Pollack, 2004) have enabled the comparison of projects from different industries or applications. The current research model sought to reduce the dimensions of uncertainty to a parsimonious and general level of analysis – employing a systems approach to define important sources of uncertainty at input, transformation and output stages. Notably, the three sources of project uncertainty (path-goal clarity, team cohesion and technical uncertainty) did load significantly and largely orthogonally (apart from a small interaction effect between path-goal clarity and team cohesion) on 'perceived risk' (to project success) supporting their inclusion as independent 'critical success factors'.

Bass' (1990) full range theory of leadership has been adopted by several project theorists (Muller & Turner, 2010; Strang, 2005; Tyssen, Wald & Spieth, 2014). The results for transactional leadership ratings in the policy capturing study supported previous research that indicates transactional

leadership is most appropriate for 'simple' projects – i.e. that greater information allows more certainty around planning and therefore allows the leader-follower relationship to be based around a clear and certain understanding of roles, tasks and rewards.

However, the results for transformational leadership did not support previous project research that suggests highly uncertain or transformational projects are better served by transformational leadership, through increased commitment to project goals (e.g. Leban & Zulauf, 2004), increased cooperation towards project tasks (e.g. Wang, Chou & Jiang, 2005), and increased capability (and empowerment) of the project team (e.g. Dulewicz & Higgs, 2005).

Strengths and limitations of This research:

Policy capturing.

This research project makes a valuable contribution to project research. To our knowledge no research has employed the policy capturing technique to externalise cues used in project decision making. One criticism of project research is the reliance on self-reported data (Clarke, 2012a) and there have been calls for project research that reflects the 'actuality' of project management experience rather than prescriptive approaches (Cicmil et al., 2006). Policy capturing represents an experimental design able to 'capture' experts' policies, which may be unconsciously held, by manipulating independent variables. This avoids a

major bias in self-report methods – social desirability (Karren & Barringer, 2002). Thus, the policy capturing method offers opportunities to further explore important antecedents to project management decisions making without compromising actual project operations.

However, policy capturing also presents tradeoffs and concessions. In order to achieve statistical power each 'mini-study' requires SME to respond to numerous scenario items ($n=8$ in this case). This study used three binary cues (equaling $2 \times 2 \times 2 = 8$ scenarios for the fully factorized (crossed) design), and this was under the recommended 5:1 ratio of items to variables (8:3)(Karren & Barringer, 2002). Thus this study had low power within each individual SME study, however, the advantage of lower items was that fatigue effects were reduced and a good sample size was achieved ($n=131$). Another disadvantage of fewer variables was a lack of realism for project managers. It was interesting to note that of 225 SME that accepted the invitation to respond to the questionnaire 94 failed to complete it. This could be a result of several things: people simply being curious and having a quick look, a lack of confidence in or commitment to supporting local research, time pressures for project management professionals (exacerbating fatigue effects), or a lack of 'face validity' perceived by project managers. Hence, it is possible that the low number of variables both enhanced the response rate in a population likely to be time-poor, but also failed to recreate the desired realism of project situations. This lack of confidence was displayed in constructive and unconstructive ways. One participant completed the questionnaire but

entered the same response (“3”) to each and every scenario item (ironically rating himself maximally on “apparent sincerity”). Another participant who did not complete the questionnaire took the time to write to the researcher and expressed his concern for the study’s level of realism (Appendix C).

Research and practice.

Judging by the observed failure rates for projects in New Zealand and overseas it seems important that research and practice are aligned and mutually supportive. It is of note that project research has been carried out infrequently in New Zealand. Two major pieces of research were the KPMG project management surveys (2010, 2013). Interestingly, the survey authors championed the project management office (PMO) as a critical success factor in large projects in 2010 – only to report a significant decrease in PMO’s by 2013 (along with a further decline in project success rates). This could reflect a lack of alignment between research and practice and risks a huge potential economic cost (including large publicly funded projects). Paradoxically, PMOs (as reservoirs of project ‘knowledge’ and ‘lessons learned’) can help bridge the gap between research and practice (Taylor, Artman & Woelfer, 2012). With a large membership of subject matter experts, PMINZ is well placed to contribute to the sponsorship and support of local project research.

Political skills.

Another strength of this research project was the use of the political skills inventory (Ferris et al., 2005). To our knowledge this is the first time research has used the PSI in project research. The limitations imposed by the number of policy capturing cues restricted the focus of the research model to the internal project environment, however, future research focusing on the external project environment (e.g. stakeholder management) may usefully consider political skills as a critical success factor for project (management) success. Political skills did not correlate with transactional leadership ratings and this is consistent with task oriented-styles. Social astuteness, interpersonal influence and apparent sincerity correlated with transformational consistent with research linking social effectiveness to relations-focused leadership styles. However, one political skill dimension (networking ability) was not a significant correlate of transformational leadership ratings. This is a surprising result since project managers are presumably required to interact with a wide variety of stakeholder groups and tap into the 'power grid' of parent organisations. Future research could examine political skills as independent variables and explore the importance of 'politics' in project leadership and project relationships.

Another research opportunity for political skill is in examining the role that disposition plays in project management policy and success. Some authors (e.g. Bass, 1990) claim that transformational leadership can be learned yet others suggest that personality attributes such as political skill

and social effectiveness (Dulewicz & Higgs, 2003) contribute to person-oriented leadership. If personality is a factor in project leadership style this could affect selection and training policies for organisations appointing project managers (El Sabaa, 2001).

Suggestions for further research:

Methodological limitations restricted the inclusion of key features of project organisations in this study- for example, project duration (Zwikael & Unger-Aviram, 2010) and project stage (Pinto & Prescott, 1988). It is likely that urgency offers one possible explanation for the unsupported hypotheses around transformational leadership, i.e. the lack of time required to build and potentialise team cooperation, commitment and capability (Ryoma & Tapanaien, 2010). The life-cycle stage of a project is likely a key determinant of project leadership roles ranging from front-end planning to monitoring and executing the project tasks. The application of one leadership style across a project life-cycle is likely to be unlikely given the different mix of tasks and relationships across and within each stage. However, Strang (2005) observes that transformational behaviours don't need to be constantly present – provided they are present when required.

Conclusions

Despite the identified limitations of policy capturing studies, This research showed that this method can unearth unexpected 'policies' that SME are potentially unaware of. Ultimately, the path to a 'theory of the project'

may lie in examining at a general level the effects that features common to the project form such as urgency, uniqueness and goal-directedness have on project outcomes and the applicability of theories such as transformational leadership. This research identified a 'disconnect' between project management and transformational leadership theory in uncertain project contexts. One possibility is that PMINZ members (being students of the Project Management Book of Knowledge or PMBOK) are more disposed towards transactional (task) approaches. The results for transactional leadership in this study are consistent with front-end planning and the task oriented PMBOK model (Westerveld, 2003).

One assumption made by the researcher was that project management professionals would be familiar with transformational leadership models that have endured for over forty years. The significant effect of (only) team cohesion in the policy capturing study suggests that transformational leadership was seen as a team development tool rather than a strategic response to project uncertainty and risk. However, the lack of correlation between transformational leadership, risk and uncertainty was also a reflection that ratings for transformational simply didn't move much under any contingency. Overall, SME did rate transformational leadership consistently as "moderately effective" and consistently higher than transactional. This leaves the possibilities that (1) for some reason Bass' full range theory is not applicable to projects (and another more effective leadership model is required) or that (2) the potential benefits of transformational leadership for complex or uncertain

transformational change have not been embraced by the project management institute (although SME are likely to be accredited to other project standards).

Contingency approaches argue that successful projects align capability with strategy (Crawford, et al., 2006; Howell, et al., 2010). This study examined the idea of matching project leadership style with levels project uncertainty. This reflects project manager-project fit (PM-P fit) (Malach-Pines et al., 2009) and authentic leadership models (Lloyd-Walker & Walker, 2011; Avolio & Gardner, 2005). These theories suggest that in order to be maximally effective project leaders should be aware of their strengths and build on them. The project manager appears to need be 'all things to all people' – especially in the traditional top-down, leader-centric models. However, research suggests that complex, innovative or uncertain project require person-oriented approaches to enhance team capabilities, cooperation and commitment to shared (albeit ambiguous or incomplete) goals. Of course, the task-oriented roles of traditional project management remain important – not least in order to remain accountable to project sponsors.

Ultimately, the skill sets required for managing project work are quite different to the skills required to communicate and negotiate with stakeholder groups, including the project team. Potentially this could mean reconsidering the role of project 'management' and project 'leadership'. New approaches could include shared leadership models at the team level (Clarke, 2012b) or the separation of project management

and project leadership roles either across the entire project lifecycle or between project stages. If leadership (transformational) roles are fundamentally restricted by the urgency of project timelines (and this is shown to impact upon project success) it may also be a case of, simply, “more haste, less speed”.

References.

- Adams, J., & Richards, J. D. (1985). A policy-capturing approach to examine relationships between attitudes and leadership style. *Psychological reports, 57*(3), 1279-1289.
- Aiman-Smith, L., Scullen, S. E., & Barr, S. H. (2002). Conducting studies of decision making in organizational contexts: A tutorial for policy-capturing and other regression-based techniques. *Organizational Research Methods, 5*(4), 388-414.
- Anbari, F., Bredillet, C. N., & Turner, J. R. (2008). Perspectives in research in project management. In Best Paper Proceedings, American Academy of Management Annual Conference, Anaheim, Academy of Management, New York, NY, August.
- Andersen, E. (2010). Are we getting any better? Comparing project management in the years 2000 and 2008. *Project Management Journal, 41*(4), 4-16.
- Anderson, D. K., & Merna, T. (2003). Project management strategy—project management represented as a process based set of management domains and the consequences for project management strategy. *International Journal of Project Management, 21*(6), 387-393.
- Aronson, Z. H., Shenhar, A. J., & Reilly, R. R. (2010). Project spirit: Placing partakers' emotions, attitudes and norms in the context of project vision, artifacts, leader values, contextual performance and success. *The Journal of High Technology Management Research, 21*(1), 2-13.

- Atkinson, R. (1999). Project management: cost, time and quality, two best guesses and a phenomenon, its time to accept other success criteria. *International journal of project management*, 17(6), 337-342.
- Atkinson, R., Crawford, L., & Ward, S. (2006). Fundamental uncertainties in projects and the scope of project management. *International journal of project management*, 24(8), 687-698.
- Ayman, R., Chemers, M. M., & Fiedler, F. (1995). The contingency model of leadership effectiveness: Its levels of analysis. *The Leadership Quarterly*, 6(2), 147-167.
- Babyak, M. A. (2004). What you see may not be what you get: a brief, nontechnical introduction to overfitting in regression-type models. *Psychosomatic medicine*, 66(3), 411-421.
- Baccarini, D. (1999). The logical framework method for defining project success. *Project management journal*, 30(4), 25-32.
- Baiden, B. K., & Price, A. D. (2011). The effect of integration on project delivery team effectiveness. *International Journal of Project Management*, 29(2), 129-136.
- Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of personality and social psychology*, 51(6), 1173.
- Bass, B. M. (1991). From transactional to transformational leadership: Learning to share the vision. *Organizational dynamics*, 18(3), 19-31.
- Bass, B. M. (1997). Does the transactional–transformational leadership paradigm transcend organizational and national boundaries?. *American psychologist*, 52(2), 130.

- Bass, B. M., Avolio, B. J., Jung, D. I., & Berson, Y. (2003). Predicting unit performance by assessing transformational and transactional leadership. *Journal of applied psychology, 88*(2), 207-218.
- Beal, D. J., Cohen, R. R., Burke, M. J., & McLendon, C. L. (2003). Cohesion and performance in groups: a meta-analytic clarification of construct relations. *Journal of applied psychology, 88*(6), 989.
- Belassi, W., & Tukel, O. I. (1996). A new framework for determining critical success/failure factors in projects. *International journal of project management, 14*(3), 141-151.
- Besner, C., & Hobbs, B. (2012). An empirical identification of project management toolsets and a comparison among project types. *Project Management Journal, 43*(5), 24-46.
- Bosch-Rekvelde, M., Jongkind, Y., Mooi, H., Bakker, H., & Verbraeck, A. (2011). Grasping project complexity in large engineering projects: The TOE (Technical, Organizational and Environmental) framework. *International Journal of Project Management, 29*(6), 728-739.
- Bourne, L., & Walker, D. H. (2004). Advancing project management in learning organizations. *The Learning Organization, 11*(3), 226-243.
- Bourne, L., & Walker, D. H. (2005). The paradox of project control. *Team Performance Management: An International Journal, 11*(5/6), 157-178.
- Bredillet, C. N. (2010). Blowing hot and cold on project management. *Project Management Journal, 41*(3), 4-20.
- Bull, R. C. (2010). *Moving from project management to project leadership: a practical guide to leading groups*. CRC Press.

- Chang, A., & Bordia, P. (2001). A multidimensional approach to the group cohesion-group performance relationship. *Small Group Research, 32*(4), 379-405.
- Chou, S. W., & He, M. Y. (2011). The factors that affect the performance of open source software development—the perspective of social capital and expertise integration. *Information Systems Journal, 21*(2), 195-219.
- Chow, T., & Cao, D. B. (2008). A survey study of critical success factors in agile software projects. *Journal of Systems and Software, 81*(6), 961-971.
- Christenson, D., & Walker, D. H. (2008). Using vision as a critical success element in project management. *International Journal of Managing Projects in Business, 1*(4), 611-622.
- Cicmil, S., Williams, T., Thomas, J., & Hodgson, D. (2006). Rethinking project management: researching the actuality of projects. *International Journal of Project Management, 24*(8), 675-686.
- Clarke, N. (2010). Emotional intelligence abilities and their relationships with team processes. *Team Performance Management: An International Journal, 16*(1/2), 6-32.
- Clarke, N. (2012a). Leadership in projects: what we know from the literature and new insights. *Team Performance Management: An International Journal, 18*(3/4), 128-148.
- Clarke, N. (2012b). Shared leadership in projects: a matter of substance over style. *Team Performance Management: An International Journal, 18*(3/4), 196-209.

- Collyer, S., & Warren, C. M. (2009). Project management approaches for dynamic environments. *International Journal of Project Management*, 27(4), 355-364.
- Conger, J. A., & Kanungo, R. N. (1988). The empowerment process: Integrating theory and practice. *Academy of management review*, 13(3), 471-482.
- Cooke-Davies, T., Cicmil, S., Crawford, L., & Richardson, K. (2007). Mapping the strange landscape of complexity theory, and its relationship to project management. *Project Management Journal*, 38(2), 50-61.
- Crawford, L., & Pollack, J. (2004). Hard and soft projects: a framework for analysis. *International Journal of Project Management*, 22(8), 645-653.
- Crawford, L., & Pollack, J. (2007). How generic are project management knowledge and practice? *Project Management Quarterly*, 38(1), 87.
- Crawford, L., Hobbs, J. B., & Turner, J. R. (2006). Aligning capability with strategy: Categorizing projects to do the right projects and to do them right. *Project Management Journal*, 37(2), 38-50.
- Daniel, D. W. (1990). Hard problems in a soft world. *International Journal of Project Management*, 8(2), 79-83.
- Dansereau, F., Graen, G., & Haga, W. J. (1975). A vertical dyad linkage approach to leadership within formal organizations: A longitudinal investigation of the role making process. *Organizational behavior and human performance*, 13(1), 46-78.
- Davidshofer, K. R., & Murphy, C. O. (2005). *Psychological testing: principles and applications*. Pearson/Prentice-Upper Saddle River, NJ.

- Davis, P. R., & Walker, D. H. T. (2009). Building capability in construction projects: a relationship-based approach. *Engineering, Construction and Architectural Management*, 16(5), 475-489.
- Di Vincenzo, F., & Mascia, D. (2012). Social capital in project-based organizations: Its role, structure, and impact on project performance. *International Journal of Project Management*, 30(1), 5-14.
- Dulewicz, V., & Higgs, M. (2003). A new approach to assessing leadership dimensions, styles context. *Competency and Emotional Intelligence Quarterly*, 11(2), 224-232.
- Dulewicz, V., & Higgs, M. (2005). Assessing leadership styles and organisational context. *Journal of Managerial Psychology*, 20(2), 105-123.
- Dulewicz, V., Higgs, M., & Slaski, M. (2003). Measuring emotional intelligence: Content, construct and criterion-related validity. *Journal of Managerial Psychology*, 18(5), 405-420.
- Dvir, D., Raz, T., & Shenhar, A. J. (2003). An empirical analysis of the relationship between project planning and project success. *International Journal of Project Management*, 21(2), 89-95.
- Eisenbach, R., Watson, K., & Pillai, R. (1999). Transformational leadership in the context of organizational change. *Journal of organizational change management*, 12(2), 80-89.
- El-Sabaa, S. (2001). The skills and career path of an effective project manager. *International journal of project management*, 19(1), 1-7.
- Ferris, G. R., Blickle, G., Schneider, P. B., Kramer, J., Zettler, I., Solga, J., & Meurs, J. A. (2008). Political skill construct and criterion-related validation: A two-study investigation. *Journal of Managerial Psychology*, 23(7), 744-771.

- Ferris, G. R., Perrewé, P. L., Anthony, W. P., & Gilmore, D. C. (2000). Political skill at work. *Organizational Dynamics*, 28(4), 25-37.
- Ferris, G. R., Treadway, D. C., Kolodinsky, R. W., Hochwarter, W. A., Kacmar, C. J., Douglas, C., & Frink, D. D. (2005). Development and validation of the political skill inventory. *Journal of Management*, 31(1), 126-152.
- Fortune, J., & White, D. (2006). Framing of project critical success factors by a systems model. *International Journal of Project Management*, 24(1), 53-65.
- Gentry, W., B. Leslie, J., C. Gilmore, D., Parker Ellen III, B., R. Ferris, G., & C. Treadway, D. (2013). Personality and political skill as distal and proximal predictors of leadership evaluations. *Career Development International*, 18(6), 569-588.
- Geraldi, J. G., & Adlbrecht, G. (2007). On faith, fact and interaction in projects. *Project Management Journal*, 38(1), 32-43.
- Geraldi, J., & Lechter, T. (2012). Gantt charts revisited: A critical analysis of its roots and implications to the management of projects today. *International Journal of Managing Projects in Business*, 5(4), 578-594.
- Goffee, R., & Jones, G. (2000). Why should anyone be led by you? *Harvard Business Review*, Sept-Oct, 63-70.
- Gray, R. J. (2001). Organisational climate and project success. *International journal of project management*, 19(2), 103-109.
- Hagen, M., & Park, S. (2013). Ambiguity acceptance as a function of project management: A new critical success factor. *Project Management Journal*, 44(2), 52-66.

- Han, J., & Hovav, A. (2013). To bridge or to bond? Diverse social connections in an IS project team. *International Journal of Project Management*, 31(3), 378-390.
- Hartog, D. N., Muijen, J. J., & Koopman, P. L. (1997). Transactional versus transformational leadership: An analysis of the MLQ. *Journal of occupational and organizational psychology*, 70(1), 19-34.
- He, Q., Luo, L., Hu, Y., & Chan, A. P. (2015). Measuring the complexity of mega construction projects in China—A fuzzy analytic network process analysis. *International Journal of Project Management*, 33(3), 549-563.
- Heinz, U., Baga, T., Gebert, D., & Kearney, E. (2006). Leadership and cooperation as success factors in innovative R&D projects on electronic platforms. *Team Performance Management: An International Journal*, 12(3/4), 66-76.
- Henrie, M., & Sousa-Posa, A. (2005). Project management: a cultural literary review. *Project Management Journal* 36(1), 5-14.
- Higgs, M. (2003). How can we make sense of leadership in the 21st century?. *Leadership & organization development journal*, 24(5), 273-284.
- Higgs, M., & Rowland, D. (2001). Developing change leaders: Assessing the impact of a development programme. *Journal of Change Management*, 2(1), 47-64.
- Hogan, R., & Shelton, D. (1998). A socioanalytic perspective on job performance. *Human performance*, 11(2-3), 129-144.
- Hogan, R., Curphy, G. J., & Hogan, J. (1994). What we know about leadership: Effectiveness and personality. *American psychologist*, 49(6), 493.

- House, R. J. (1971). A path goal theory of leader effectiveness. *Administrative science quarterly*, 321-339.
- House, R. J. (1996). Path-goal theory of leadership: Lessons, legacy, and a reformulated theory. *The Leadership Quarterly*, 7(3), 323-352.
- Howell, D., Windahl, C., & Seidel, R. (2010). A project contingency framework based on uncertainty and its consequences. *International Journal of Project Management*, 28(3), 256-264.
- Hsu, J. S. C., Shih, S. P., Chiang, J. C., & Liu, J. Y. C. (2012). The impact of transactive memory systems on IS development teams' coordination, communication, and performance. *International Journal of Project Management*, 30(3), 329-340.
- IBM (n.d.) Receiving error: Cannot compute the error degrees of freedom using Satterthwaite's method. (Retrieved May 25 from <http://www-01.ibm.com/support/docview.wss?uid=swg21475368>)
- Ika, L. A. (2009). Project success as a topic in project management journals. *Project Management Journal*, 40(4), 6-19.
- Izam Ibrahim, K., Costello, S. B., & Wilkinson, S. (2013). Key practice indicators of team integration in construction projects: a review. *Team Performance Management: An International Journal*, 19(3/4), 132-152.
- Jermier, J. M., & Kerr, S. (1997). "Substitutes for leadership: Their meaning and measurement"—Contextual recollections and current observations. *The Leadership Quarterly*, 8(2), 95-101.
- Jha, K. N., & Iyer, K. C. (2006). Critical determinants of project coordination. *International Journal of Project Management*, 24(4), 314-322.

- Jha, K. N., & Iyer, K. C. (2007). Commitment, coordination, competence and the iron triangle. *International Journal of Project Management*, 25(5), 527-540.
- Judge, T. A., & Piccolo, R. F. (2004). Transformational and transactional leadership: a meta-analytic test of their relative validity. *Journal of applied psychology*, 89(5), 755.
- Jugdev, K., & Müller, R. (2005). A retrospective look at our evolving understanding of project success. *Project Management Journal*, 36(4), 19-31.
- Jung, D. I., & Sosik, J. J. (2002). Transformational leadership in work groups the role of empowerment, cohesiveness, and collective-efficacy on perceived group performance. *Small group research*, 33(3), 313-336.
- Kaiser, H. F. (1974). An index of factorial simplicity. *Psychometrika*, 39(1), 31-36.
- Kapsali, M. (2011). Systems thinking in innovation project management: A match that works. *International Journal of Project Management*, 29(4), 396-407.
- Karren, R. J., & Barringer, M. W. (2002). A review and analysis of the policy-capturing methodology in organizational research: Guidelines for research and practice. *Organizational Research Methods*, 5(4), 337-361.
- Katz, D., & Kahn, R. L. (1966). *The psychology of organizations*. New York: HR Folks International.
- Keegan, A. E., & Den Hartog, D. N. (2004). Transformational leadership in a project-based environment: a comparative study of the leadership styles of project managers and line managers. *International journal of project management*, 22(8), 609-617.

- Keller, R. T. (1992). Transformational leadership and the performance of research and development project groups. *Journal of management*, 18(3), 489-501.
- Keller, R. T. (2006). Transformational leadership, initiating structure, and substitutes for leadership: a longitudinal study of research and development project team performance. *Journal of applied psychology*, 91(1), 202.
- Kenny, D. A., & La Voie, L. (1985). Separating individual and group effects. *Journal of Personality and Social Psychology*, 48(2), 339.
- Kerr, S., & Jermier, J. M. (1978). Substitutes for leadership: Their meaning and measurement. *Organizational behavior and human performance*, 22(3), 375-403.
- KPMG (2010). *New Zealand Project Management Survey 2010*. KPMG:NZ.
- KPMG (2013). *Project Management Survey Report 2013*. KPMG:NZ.
- Kratzer, J., Leenders, R. T. A., & Van Engelen, J. M. (2010). The social network among engineering design teams and their creativity: A case study among teams in two product development programs. *International Journal of Project Management*, 28(5), 428-436.
- Kutsch, E., & Hall, M. (2010). Deliberate ignorance in project risk management. *International journal of project management*, 28(3), 245-255.
- Landy, F. J., & Conte, J. M. (2007). *Work in the 21th century. An Introduction To Industrial And Organizational Psychology*. Malden: Blackwell Publishing.

- Leban, W., & Zulauf, C. (2004). Linking emotional intelligence abilities and transformational leadership styles. *Leadership & Organization Development Journal*, 25(7), 554-564.
- Limsila, K., & Ogunlana, S. O. (2008). Performance and leadership outcome correlates of leadership styles and subordinate commitment. *Engineering, construction and architectural management*, 15(2), 164-184.
- Liu, A. M., & Fang, Z. (2006). A power-based leadership approach to project management. *Construction Management and Economics*, 24(5), 497-507.
- Lovell, R. J. (1993). Power and the project manager. *International Journal of Project Management*, 11(2), 73-78.
- Lowe, K. B., Kroeck, K. G., & Sivasubramaniam, N. (1996). Effectiveness correlates of transformational and transactional leadership: A meta-analytic review of the MLQ literature. *The Leadership Quarterly*, 7(3), 385-425.
- Lu, Y., Luo, L., Wang, H., Le, Y., & Shi, Q. (2015). Measurement model of project complexity for large-scale projects from task and organization perspective. *International Journal of Project Management*, 33(3), 610-622.
- Lundin, R. A., & Söderholm, A. (1995). A theory of the temporary organization. *Scandinavian Journal of management*, 11(4), 437-455.
- Malach-Pines, A., Dvir, D., & Sadeh, A. (2009). Project manager-project (PM-P) fit and project success. *International Journal of Operations & Production Management*, 29(3), 268-291.

- Mayer, J. D., Caruso, D. R., Panter, A. T., & Salovey, P. (2012). The growing significance of hot intelligences. *American Psychologist*, *67*(6), 502-503.
- Morgan Tuuli, M., Rowlinson, S., Fellows, R., & Liu, A. M. (2012). Empowering the project team: impact of leadership style and team context. *Team Performance Management: An International Journal*, *18*(3/4), 149-175.
- Müller, R., & Jugdev, K. (2012). Critical success factors in projects: Pinto, Slevin, and Prescott-The elucidation of project success. *International Journal of Managing Projects in Business*, *5*(4), 757-775.
- Müller, R., & Turner, J. R. (2007). Matching the project manager's leadership style to project type. *International journal of project management*, *25*(1), 21-32.
- Müller, R., & Turner, R. (2010). Leadership competency profiles of successful project managers. *International Journal of Project Management*, *28*(5), 437-448.
- Muller, R., Geraldi, J., & Turner, J. R. (2012). Relationships between leadership and success in different types of project complexities. *Engineering Management, IEEE Transactions on*, *59*(1), 77-90.
- Newell, S., Tansley, C., & Huang, J. (2004). Social capital and knowledge integration in an ERP project team: the importance of bridging and bonding. *British Journal of Management*, *15*(S1), S43-S57.
- Ones, D. S., & Viswesvaran, C. (1999). Relative importance of personality dimensions for expatriate selection: A policy capturing study. *Human Performance*, *12*(3-4), 275-294.

- Özaralli, N. (2003). Effects of transformational leadership on empowerment and team effectiveness. *Leadership & Organization Development Journal*, 24(6), 335-344.
- Packendorff, J. (1995). Inquiring into the temporary organization: new directions for project management research. *Scandinavian journal of management*, 11(4), 319-333.
- Pallant, J. (2011). *SPSS Survival Manual: A step by step guide to data analysis using SPSS*. Australia.
- Perminova, O., Gustafsson, M., & Wikström, K. (2008). Defining uncertainty in projects—a new perspective. *International Journal of Project Management*, 26(1), 73-79.
- Pich, M. T., Loch, C. H., & Meyer, A. D. (2002). On uncertainty, ambiguity, and complexity in project management. *Management science*, 48(8), 1008-1023.
- Pinto, J. K. (2000). Understanding the role of politics in successful project management. *International Journal of Project Management*, 18(2), 85-91.
- Pinto, J. K., & Prescott, J. E. (1988). Variations in critical success factors over the stages in the project life cycle. *Journal of management*, 14(1), 5-18.
- Pinto, J. K., & Slevin, D. P. (1987). Critical factors in successful project implementation. *IEEE Transactions on Engineering Management*, 24(1), 22-27.
- Piperca, S., & Floricel, S. (2012). A typology of unexpected events in complex projects. *International Journal of Managing Projects in Business*, 5(2), 248-265.

- Pmi, S. C. (2008). *A guide to the project management body of knowledge (PMBOK)(2008 ed.)*. Newton Square, PA, USA. In Project Management Institute.
- Pollack, J. (2007). The changing paradigms of project management. *International Journal of Project Management*, 25(3), 266-274.
- Rolstadås, A., Tommelein, I., Morten Schiefloe, P., & Ballard, G. (2014). Understanding project success through analysis of project management approach. *International Journal of Managing Projects in Business*, 7(4), 638-660.
- Rowold, J., & Heinitz, K. (2007). Transformational and charismatic leadership: Assessing the convergent, divergent and criterion validity of the MLQ and the CKS. *The Leadership Quarterly*, 18(2), 121-133.
- Ryömä, A., & Tapanainen, T. (2010). The Applicability of Transformational Leadership to Shortterm Projects. In *Proceedings of the 6th European Conference on Management Leadership and Governance*. ECMLG (October 2010), 332-338.
- Saynisch, M. (2010). Beyond frontiers of traditional project management: An approach to evolutionary, self-organizational principles and the complexity theory—results of the research program. *Project Management Journal*, 41(2), 21-37.
- Schein, E. H. (1983). The Role of the Founder in Creating Organizational Culture. *Organizational Dynamics*, Summer, 13-28.
- Seibert, S. E., Wang, G., & Courtright, S. H. (2011). Antecedents and consequences of psychological and team empowerment in

- organizations: a meta-analytic review. *Journal of Applied Psychology*, 96(5), 981.
- Semadar, A., Robins, G., & Ferris, G. R. (2006). Comparing the validity of multiple social effectiveness constructs in the prediction of managerial job performance. *Journal of Organizational Behavior*, 27(4), 443-461.
- Serrador, P., & Turner, R. (2015). The relationship between project success and project efficiency. *Project Management Journal*, 46(1), 30-39.
- Shafritz, J., Ott, J., & Jang, Y. (2015). *Classics of organization theory*. Cengage Learning.
- Shenhar, A. J. (2001). One size does not fit all projects: Exploring classical contingency domains. *Management Science*, 47(3), 394-414.
- Shenhar, A. J., & Dvir, D. (1996). Toward a typological theory of project management. *Research policy*, 25(4), 607-632.
- Shenhar, A. J., & Dvir, D. (2004). Project management evolution: past history and future research directions. In *PMI Research Conference Proceedings, PMP (Vol. 2)*.
- Shenhar, A. J., Dvir, D., & Levy, O. (1997). Project success: a multidimensional, strategic concept. In *Innovation in Technology Management-The Key to Global Leadership*. PICMET'97: Portland International Conference on Management and Technology (p. 391). IEEE.
- Shi, J., Chen, Z., & Zhou, L. (2011). Testing differential mediation effects of sub-dimensions of political skills in linking proactive personality to employee performance. *Journal of Business and Psychology*, 26(3), 359-369.

- Sivasubramaniam, N., Liebowitz, S. J., & Lackman, C. L. (2012). Determinants of New Product Development Team Performance: A Meta-analytic Review. *Journal of Product Innovation Management*, 29(5), 803-820.
- Söderholm, A. (2008). Project management of unexpected events. *International Journal of Project Management*, 26(1), 80-86.
- Söderlund, J. (2002). On the development of project management research: schools of thought and critique. *International Project management journal*, 8(1), 20-31.
- Söderlund, J. (2004). Building theories of project management: past research, questions for the future. *International journal of project management*, 22(3), 183-191.
- Spector, P. E. (2008). *Industrial and organizational psychology. Research and practice*. Wiley and Sons: Australia.
- Spicer, J. (2005). *Making sense of multivariate data analysis: an intuitive approach*. Sage.
- Statistics New Zealand (2013). *Census QuickStats about national highlights*. URL: <http://www.stats.govt.nz/Census/2013-census/profile-and-summary-reports/quickstats-about-national-highlights/cultural-diversity.aspx> [Accessed 25 October 2015].
- Strang, K. D. (2005). Examining effective and ineffective transformational project leadership. *Team Performance Management: An International Journal*, 11(3/4), 68-103.
- Stubbs Koman, E., & Wolff, S. B. (2008). Emotional intelligence competencies in the team and team leader: A multi-level examination of the impact of

- emotional intelligence on team performance. *Journal of Management Development*, 27(1), 55-75.
- Sudhakar, G., Farooq, A., & Patnaik, S. (2011). Soft factors affecting the performance of software development teams. *Team Performance Management: An International Journal*, 17(3/4), 187-205.
- Suhonen, M., & Paasivaara, L. (2011). Shared human capital in project management: a systematic review of the literature. *Project Management Journal*, 42(2), 4-16.
- Tansley, C., & Newell, S. (2007). Project social capital, leadership and trust: A study of human resource information systems development. *Journal of Managerial Psychology*, 22(4), 350-368.
- Taylor, H., Artman, E., & Woelfer, J.P. (2012). Information technology project risk management: bridging the gap between research and practice. *Journal of information technology*, 27, 17-34.
- Thamhain, H. (2013). Managing risks in complex projects. *Project Management Journal*, 44(2), 20-35.
- Thamhain, H. J. (2004). Linkages of project environment to performance: lessons for team leadership. *International Journal of Project Management*, 22(7), 533-544.
- Thompson, J. D. (1967). Organizations in action: Social science bases of administrative theory. In J. Shafritz, J. Ott, & Y. Jang, Y. (Eds.), *Classics of organization theory (8th Edition)* (pp.359-373). Cengage Learning.
- Turner, J. R. (2006a). Towards a theory of project management: The nature of the project. *International Journal of Project Management*, 24(1), 1-3.

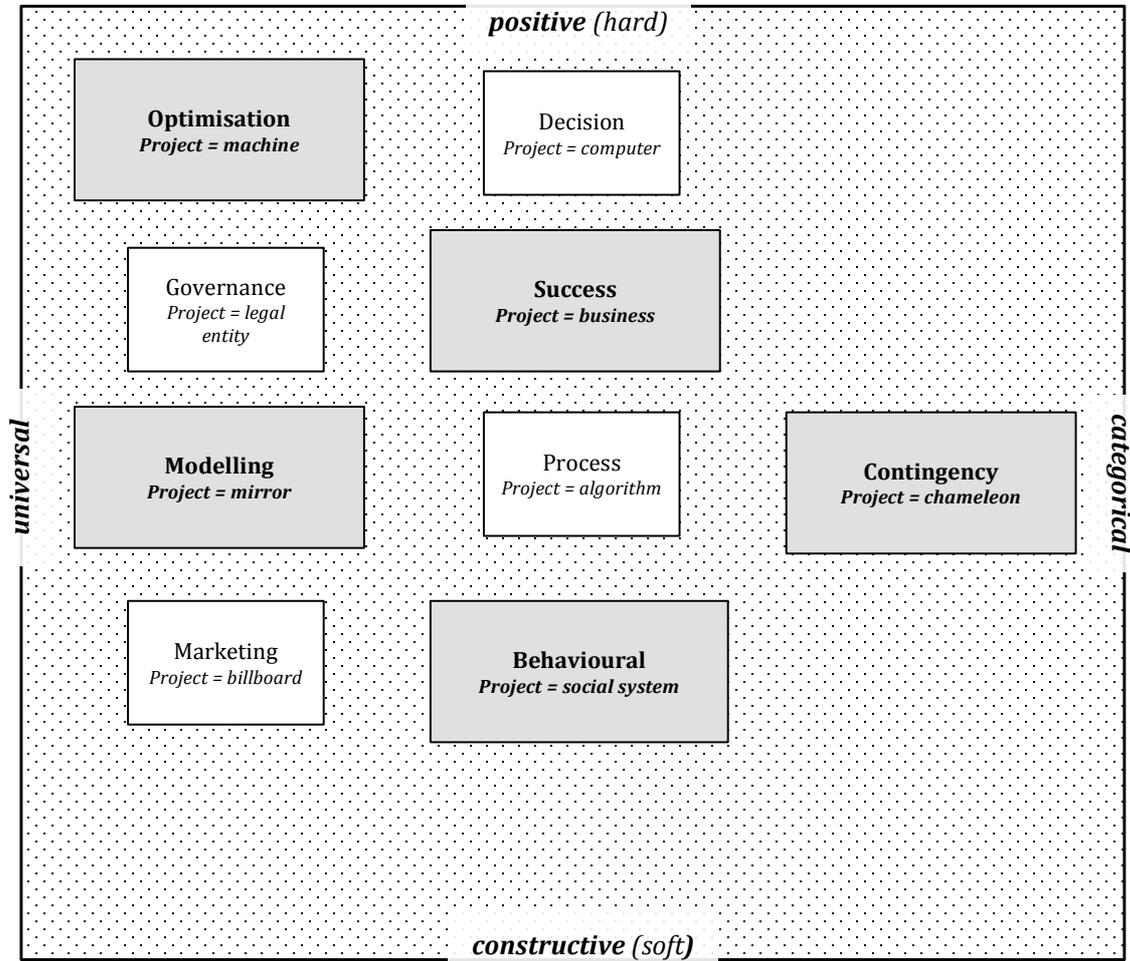
- Turner, J. R. (2006b). Towards a theory of project management: the functions of project management. *International Journal of Project Management*, 24(3), 187-189.
- Turner, J. R., & Cochrane, R. A. (1993). Goals-and-methods matrix: coping with projects with ill defined goals and/or methods of achieving them. *International Journal of project management*, 11(2), 93-102.
- Turner, J. R., & Müller, R. (2003). On the nature of the project as a temporary organization. *International Journal of Project Management*, 21(1), 1-8.
- Tyssen, A. K., Wald, A., & Heidenreich, S. (2014). Leadership in the Context of Temporary Organizations A Study on the Effects of Transactional and Transformational Leadership on Followers' Commitment in Projects. *Journal of Leadership & Organizational Studies*, 21(4), 376-393.
- Tyssen, A. K., Wald, A., & Spieth, P. (2014). The challenge of transactional and transformational leadership in projects. *International Journal of Project Management*, 32(3), 365-375.
- Valentinov, V. (2014). The Complexity–Sustainability Trade-Off in Niklas Luhmann's Social Systems Theory. *Systems Research and Behavioral Science*, 31(1), 14-22.
- Vidal, L. A., & Marle, F. (2008). Understanding project complexity: implications on project management. *Kybernetes*, 37(8), 1094-1110.
- Walker, D. H. T. (2004). Understanding the role of" vision" in project success. *Engineering Management Review, IEEE*, 32(4), 57-73.
- Wang, E. T., Ying, T. C., Jiang, J. J., & Klein, G. (2006). Group cohesion in organizational innovation: An empirical examination of ERP implementation. *Information and Software Technology*, 48(4), 235-244.

- Wang, E., Chou, H. W., & Jiang, J. (2005). The impacts of charismatic leadership style on team cohesiveness and overall performance during ERP implementation. *International Journal of Project Management*, 23(3), 173-180.
- Weis, S., & Süß, H. M. (2007). Reviving the search for social intelligence—A multitrait-multimethod study of its structure and construct validity. *Personality and Individual Differences*, 42(1), 3-14.
- Westerveld, E. (2003). The Project Excellence Model®: linking success criteria and critical success factors. *International Journal of Project Management*, 21(6), 411-418.
- Whitty, S. J., & Maylor, H. (2009). And then came complex project management (revised). *International Journal of Project Management*, 27(3), 304-310.
- Whitty, S. J., & Schulz, M. F. (2007). The impact of Puritan ideology on aspects of project management. *International Journal of Project Management*, 25(1), 10-20.
- Williams, T. M. (1999). The need for new paradigms for complex projects. *International journal of project management*, 17(5), 269-273.
- Williams, T., & Samset, K. (2010). Issues in front-end decision making on projects. *Project Management Journal*, 41(2), 38-49.
- Xia, B., & Chan, A. P. (2012). Measuring complexity for building projects: a Delphi study. *Engineering, Construction and Architectural Management*, 19(1), 7-24.
- Yang, L. R., Huang, C. F., & Wu, K. S. (2011). The association among project manager's leadership style, teamwork and project success. *International journal of project management*, 29(3), 258-267.

- Yang, S. B., & Ok Choi, S. (2009). Employee empowerment and team performance: Autonomy, responsibility, information, and creativity. *Team Performance Management: An International Journal*, 15(5/6), 289-301.
- Yuan, M., Zhang, X., Chen, Z., Vogel, D. R., & Chu, X. (2009). Antecedents of coordination effectiveness of software developer dyads from interacting teams: an empirical investigation. *IEEE Transactions on Engineering Management*, 56(3), 494-507.
- Yukl, G. (2012). Effective leadership behavior: What we know and what questions need more attention. *The Academy of Management Perspectives*, 26(4), 66-85.
- Yukl, G. A. (2013). *Leadership in organizations*. Boston: Pearson.
- Zander, A. (1979). The psychology of group processes. *Annual review of psychology*, 30(1), 417-451.
- Zhou, J., & Martocchio, J. J. (2001). Chinese and American managers' compensation award decisions: a comparative policy-capturing study. *Personnel Psychology*, 54(1), 115-145.
- Zika-Viktorsson, A., Hovmark, S., & Nordqvist, S. (2003). Psychosocial aspects of project work: a comparison between product development and construction projects. *International Journal of Project Management*, 21(8), 563-569.
- Zwikael, O., & Unger-Aviram, E. (2010). HRM in project groups: The effect of project duration on team development effectiveness. *International Journal of Project Management*, 28(5), 413-421.

Appendix A: Mapping Project and Project Management Research Perspectives

[Adapted from Anbari et al. (2008) and Soderlund (2002, 2004b)].



Appendix B: The research questionnaire

**Project Leadership and Project Risk:
A policy capturing study of New Zealand Project Managers.**

Research Information Sheet

Thank you for taking the time to support this interesting research. Completing the survey will take approximately 15 minutes.

The Research:

This research considers leadership styles under different project conditions.

Participants apply their expertise as project management professionals to a series of hypothetical scenarios and answer additional leadership questions.

Brendon Mercer is conducting this research project in partial requirement for Master of Arts (Industrial and Organisational psychology) under the supervision of Prof. Stuart Carr (Psychology Department, Massey University).

Who can participate?

Members of the Project Management Institute of New Zealand (PMINZ) are invited to complete an online, or a paper and pencil questionnaire. Participants should have experience managing projects for one or more years.

Your rights as a participant:

You are under no obligation to accept this invitation. If you decide to participate, completion and submission of the questionnaire implies consent. You have the right to decline to answer any particular question. Participants are not required to supply identification, or to disclose actual project experiences. Computer IP data will not be retained.

Data resulting from this research will be securely stored at Massey University for 5 years, after which it will be destroyed. Results will be made available to PMINZ members at the completion of the research.

Contact Information:

If you have any questions please feel free to contact the researcher or supervisor.

Researcher:

Brendon Mercer
School of Psychology
Massey University
T: +64 (021) 732840
Email: workpsyc@outlook.com

Supervisor:

Professor Stuart C. Carr
School of Psychology
Massey University
T: +64 (09) 414 0800 ext. 43108
Email: S.C.Carr@massey.ac.nz

Ethical Approval: This project has been reviewed and approved by the Massey University Human Ethics Committee: Northern, Application 14/033. If you have any concerns about the conduct of this research, please contact Dr Andrew Chrystall, Acting Chair, Massey University Human Ethics Committee: Northern, telephone 09 414 0800 x 43317 email humanethicsnorth@massey.ac.nz

Research Questionnaire

**Project Leadership and Project Risk:
A policy capturing study of New Zealand Project Managers.**

The Research Questionnaire contains four sections.

1. Participant Data (FIVE items)
2. Project Scenarios (EIGHT scenarios)
3. Additional Leadership Question (THREE items)
4. Communication Questionnaire (18 items)

There is no time limit for this questionnaire.
You should allow up to 20 minutes to complete.

Section 1.
Participant Data

These items allow for an overall description of the participant group.

PD1. Please indicate your age in numerals only (e.g."35")

- _____

PD2. Please indicate your gender:

- Female
- Male

PD3. Please indicate your Project Management experience:

- <5 years
- 5-10 years
- 10-15 years
- >15 year

PD4. Please nominate the one project area you consider your main area of project experience:

- Engineering/ Construction
- Information systems/ IT
- Organisational change
- Other: Please state _____

PD5. Please nominate your (primary) ethnic identity*.

- European New Zealander
- Māori/ Tangata whenua
- Asian
- Pacific Peoples
- Middle Eastern/ Latin American/ African
- Other

*<http://www.stats.govt.nz/Census/2013-census/profile-and-summary-reports/infographic-culture-identity.aspx>

Section 2.
Project Scenarios Task

As a project management expert, your task is to rate the likely risks within a range of (new) project scenarios and the likely effectiveness of different leadership styles in responding to those risks.

The same two leadership styles are considered in each hypothetical scenario.

Please note that each scenario task includes relevant definitions.

There are 8 project scenarios (with two practice scenarios preceding the task). Try to imagine these scenarios in the context of your own project management experience.

Project conditions describe a project's output, human resource and tasks:

- Path-Goal Clarity
- Project Team Cohesion
- Technical Complexity

Project Risk represents potential threats to project outcomes:

- Scope and Quality
- Budget and Schedule
- Project Team Satisfaction

Leadership styles describes differing foci for project managers:

- Transactional
- Transformational

Definitions

Project Conditions

- Path-Goal Clarity: How clear is the vision for the project?
Are deliverables measurable? Is there an accepted best practice?
- Project Team Cohesion: How adaptive are the human resources?
Are working relationships and communication channels established?
- Technical Complexity: How is the project (work) organised?
How numerous and/or inter-dependent are the scheduled tasks?

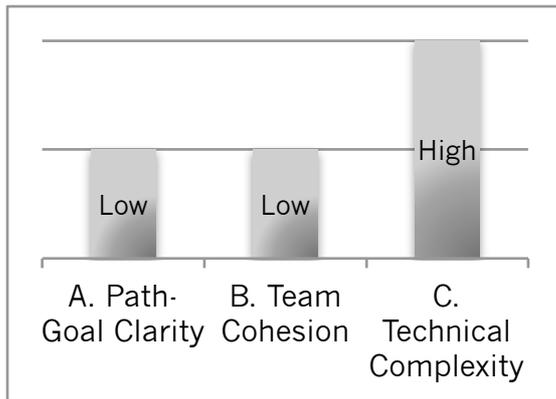
Project Risk

- Scope and Quality: Will outputs meet specifications and standards?
- Budget and Schedule: Will the project achieve efficiency targets?
- Team Satisfaction: Will the project team be satisfied with the results and management of the project?

Leadership Styles

- Transactional leaders define, execute and monitor tasks; rewarding achievement of milestones and correcting for deviations from planned progress.
- Transformational leaders inspire committed, cooperative and capable relationships through shared goals, effective communication and personal development.

Example (Project X):



- A. Deliverables are 'fuzzy' and require innovative methods.
- B. Team members interact infrequently and only as required.
- C. Tasks are highly numerous, and interdependent.

In your opinion how much risk do the conditions above pose for (successful) project management outcomes? (Please rate each outcome)

		Very Low Risk	Low Risk	Moderate Risk	High Risk	Extreme Risk
X1	Meeting Scope and Quality	☐	☐	☐	☐	☐
X2	On Budget	☐	☐	☐	☐	☐
X3	On Schedule	☐	☐	☐	☐	☐
X4	With High Team Satisfaction	☐	☐	☐	☐	☐

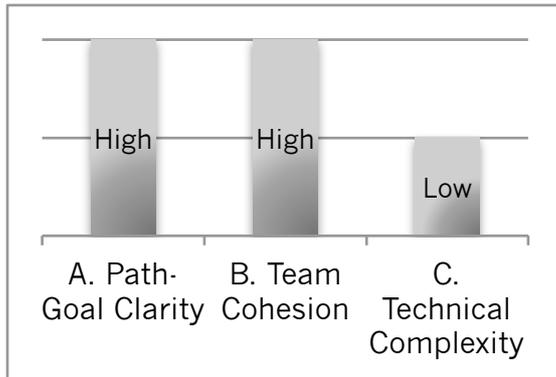
In your opinion how effectively might transactional and transformational leaders respond to these risks? (Please rate both styles)

		Not Effectively	Slightly Effectively	Moderately Effectively	Very Effectively	Extremely Effectively
X5	Transactional	☐	☐	☐	☐	☐
X6	Transformational	☐	☐	☐	☐	☐

Transactional Leadership Style: defining, executing and monitoring project tasks; rewarding achievement and correcting for deviations from planned progress.

Transformational Leadership Style: inspiring committed, cooperative and capable working relationships through a shared vision, open communication and personal development.

Example (Project Y):



- A. Deliverables are specific and suit proven methods.
- B. Team members interact extensively, identifying as a group.
- C. Tasks are relatively few, and discrete.

In your opinion how much risk do the conditions above pose for (successful) project management outcomes? (Please rate each outcome)

		Very Low Risk	Low Risk	Moderate Risk	High Risk	Extreme Risk
Y1	Meeting Scope and Quality	∅	∅	∅	∅	∅
Y2	On Budget	∅	∅	∅	∅	∅
Y3	On Schedule	∅	∅	∅	∅	∅
Y4	With High Team Satisfaction	∅	∅	∅	∅	∅

In your opinion how effectively might transactional and transformational leaders respond to these risks? (Please rate both styles)

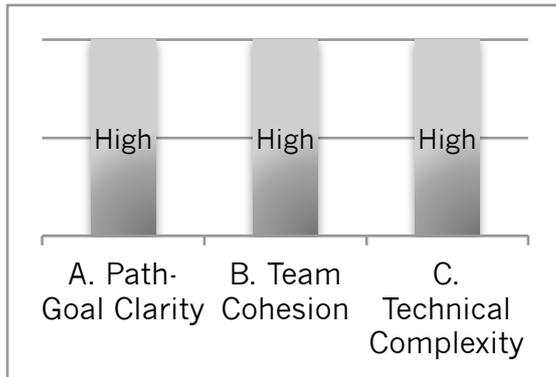
		Not Effectively	Slightly Effectively	Moderately Effectively	Very Effectively	Extremely Effectively
Y5	Transactional	∅	∅	∅	∅	∅
Y6	Transformational	∅	∅	∅	∅	∅

Transactional Leadership Style: defining, executing and monitoring project tasks: rewarding achievement and correcting for deviations from planned progress.

Transformational Leadership Style: inspiring committed, cooperative and capable working relationships through a shared vision, open communication and personal development.

Project Scenarios

Project A:



- A. Deliverables are specific and suit proven methods.
- B. Team members interact extensively, identifying as a group.
- C. Tasks are highly numerous, and interdependent.

In your opinion how much risk do the conditions above pose for (successful) project management outcomes? (Please rate each outcome)

		Very Low Risk	Low Risk	Moderate Risk	High Risk	Extreme Risk
A1	Meeting Scope and Quality	☐	☐	☐	☐	☐
A2	On Budget	☐	☐	☐	☐	☐
A3	On Schedule	☐	☐	☐	☐	☐
A4	With High Team Satisfaction	☐	☐	☐	☐	☐

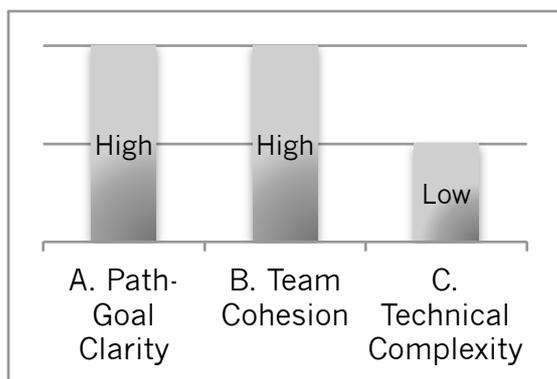
In your opinion how effectively might transactional and transformational leaders respond to these risks? (Please rate both styles)

		Not Effectively	Slightly Effectively	Moderately Effectively	Very Effectively	Extremely Effectively
A5	Transactional	☐	☐	☐	☐	☐
A6	Transformational	☐	☐	☐	☐	☐

Transactional Leadership Style: defining, executing and monitoring project tasks: rewarding achievement and correcting for deviations from planned progress.

Transformational Leadership Style: inspiring committed, cooperative and capable working relationships through a shared vision, open communication and personal development.

Project B:



- A. Deliverables are specific and suit proven methods.
- B. Team members interact extensively, identifying as a group.
- C. Tasks are relatively few, and discrete.

In your opinion how much risk do the conditions above pose for (successful) project management outcomes? (Please rate each outcome)

		Very Low Risk	Low Risk	Moderate Risk	High Risk	Extreme Risk
B1	Meeting Scope and Quality	☐	☐	☐	☐	☐
B2	On Budget	☐	☐	☐	☐	☐
B3	On Schedule	☐	☐	☐	☐	☐
B4	With High Team Satisfaction	☐	☐	☐	☐	☐

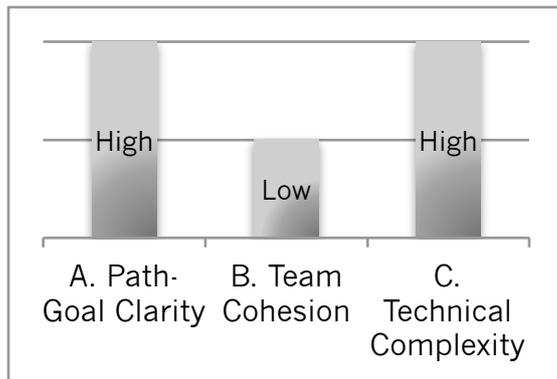
In your opinion how effectively might transactional and transformational leaders respond to these risks? (Please rate both styles)

		Not Effectively	Slightly Effectively	Moderately Effectively	Very Effectively	Extremely Effectively
B5	Transactional	☐	☐	☐	☐	☐
B6	Transformational	☐	☐	☐	☐	☐

Transactional Leadership Style: defining, executing and monitoring project tasks; rewarding achievement and correcting for deviations from planned progress.

Transformational Leadership Style: inspiring committed, cooperative and capable working relationships through a shared vision, open communication and personal development.

Project C:



- A. Deliverables are specific and suit proven methods.
- B. Team members interact infrequently and only as required.
- C. Tasks are highly numerous, and interdependent.

In your opinion how much risk do the conditions above pose for (successful) project management outcomes? (Please rate each outcome)

		Very Low Risk	Low Risk	Moderate Risk	High Risk	Extreme Risk
C1	Meeting Scope and Quality	☐	☐	☐	☐	☐
C2	On Budget	☐	☐	☐	☐	☐
C3	On Schedule	☐	☐	☐	☐	☐
C4	With High Team Satisfaction	☐	☐	☐	☐	☐

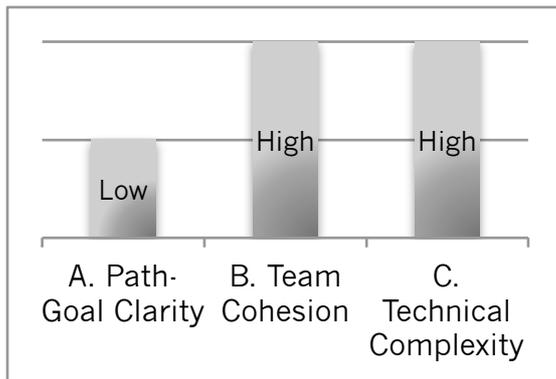
In your opinion how effectively might transactional and transformational leaders respond to these risks? (Please rate both styles)

		Not Effectively	Slightly Effectively	Moderately Effectively	Very Effectively	Extremely Effectively
C5	Transactional	☐	☐	☐	☐	☐
C6	Transformational	☐	☐	☐	☐	☐

Transactional Leadership Style: defining, executing and monitoring project tasks: rewarding achievement and correcting for deviations from planned progress.

Transformational Leadership Style: inspiring committed, cooperative and capable working relationships through a shared vision, open communication and personal development.

Project D:



- A. Deliverables are 'fuzzy' and require innovative methods.
- B. Team members interact extensively, identifying as a group.
- C. Tasks are highly numerous, and interdependent.

In your opinion how much risk do the conditions above pose for (successful) project management outcomes? (Please rate each outcome)

		Very Low Risk	Low Risk	Moderate Risk	High Risk	Extreme Risk
D1	Meeting Scope and Quality	☐	☐	☐	☐	☐
D2	On Budget	☐	☐	☐	☐	☐
D3	On Schedule	☐	☐	☐	☐	☐
D4	With High Team Satisfaction	☐	☐	☐	☐	☐

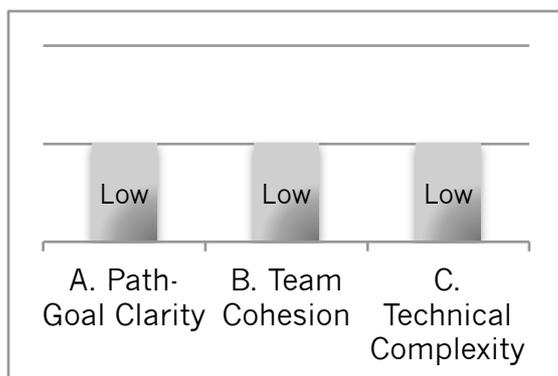
In your opinion how effectively might transactional and transformational leaders respond to these risks? (Please rate both styles)

		Not Effectively	Slightly Effectively	Moderately Effectively	Very Effectively	Extremely Effectively
D5	Transactional	☐	☐	☐	☐	☐
D6	Transformational	☐	☐	☐	☐	☐

Transactional Leadership Style: defining, executing and monitoring project tasks: rewarding achievement and correcting for deviations from planned progress.

Transformational Leadership Style: inspiring committed, cooperative and capable working relationships through a shared vision, open communication and personal development.

Project E:



- A. Deliverables are 'fuzzy' and require innovative methods.
- B. Team members interact infrequently and only as required.
- C. Tasks are relatively few, and discrete.

In your opinion how much risk do the conditions above pose for (successful) project management outcomes? (Please rate each outcome)

		Very Low Risk	Low Risk	Moderate Risk	High Risk	Extreme Risk
E1	Meeting Scope and Quality	☐	☐	☐	☐	☐
E2	On Budget	☐	☐	☐	☐	☐
E3	On Schedule	☐	☐	☐	☐	☐
E4	With High Team Satisfaction	☐	☐	☐	☐	☐

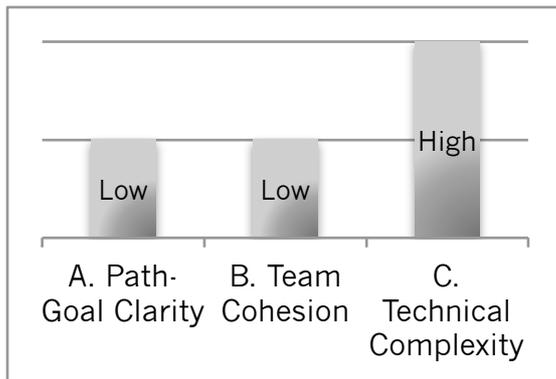
In your opinion how effectively might transactional and transformational leaders respond to these risks? (Please rate both styles)

		Not Effectively	Slightly Effectively	Moderately Effectively	Very Effectively	Extremely Effectively
E5	Transactional	☐	☐	☐	☐	☐
E6	Transformational	☐	☐	☐	☐	☐

Transactional Leadership Style: defining, executing and monitoring project tasks: rewarding achievement and correcting for deviations from planned progress.

Transformational Leadership Style: inspiring committed, cooperative and capable working relationships through a shared vision, open communication and personal development.

Project F:



- A. Deliverables are 'fuzzy' and require innovative methods.
- B. Team members interact infrequently and only as required.
- C. Tasks are highly numerous, and interdependent.

In your opinion how much risk do the conditions above pose for (successful) project management outcomes? (Please rate each outcome)

		Very Low Risk	Low Risk	Moderate Risk	High Risk	Extreme Risk
F1	Meeting Scope and Quality	☐	☐	☐	☐	☐
F2	On Budget	☐	☐	☐	☐	☐
F3	On Schedule	☐	☐	☐	☐	☐
F4	With High Team Satisfaction	☐	☐	☐	☐	☐

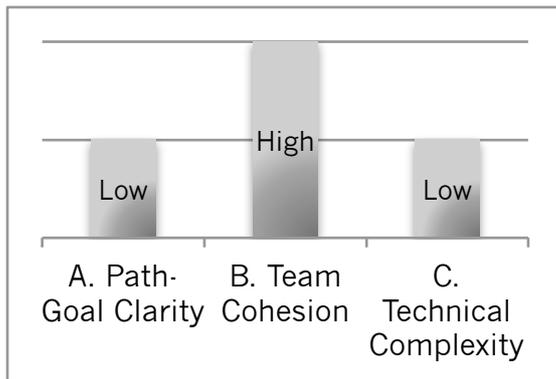
In your opinion how effectively might transactional and transformational leaders respond to these risks? (Please rate both styles)

		Not Effectively	Slightly Effectively	Moderately Effectively	Very Effectively	Extremely Effectively
F5	Transactional	☐	☐	☐	☐	☐
F6	Transformational	☐	☐	☐	☐	☐

Transactional Leadership Style: defining, executing and monitoring project tasks: rewarding achievement and correcting for deviations from planned progress.

Transformational Leadership Style: inspiring committed, cooperative and capable working relationships through a shared vision, open communication and personal development.

Project G:



- A. Deliverables are 'fuzzy' and require innovative methods.
- B. Team members interact extensively, identifying as a group.
- C. Tasks are relatively few, and discrete.

In your opinion how much risk do the conditions above pose for (successful) project management outcomes? (Please rate each outcome)

		Very Low Risk	Low Risk	Moderate Risk	High Risk	Extreme Risk
G1	Meeting Scope and Quality	☐	☐	☐	☐	☐
G2	On Budget	☐	☐	☐	☐	☐
G3	On Schedule	☐	☐	☐	☐	☐
G4	With High Team Satisfaction	☐	☐	☐	☐	☐

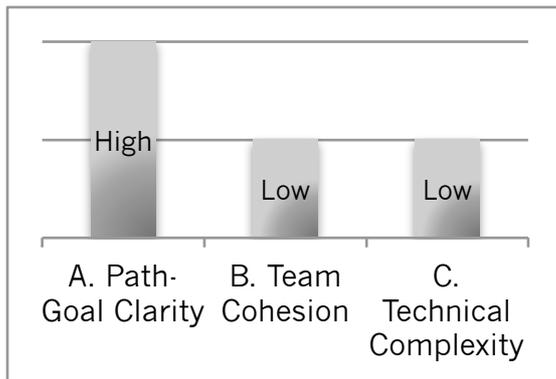
In your opinion how effectively might transactional and transformational leaders respond to these risks? (Please rate both styles)

		Not Effectively	Slightly Effectively	Moderately Effectively	Very Effectively	Extremely Effectively
G5	Transactional	☐	☐	☐	☐	☐
G6	Transformational	☐	☐	☐	☐	☐

Transactional Leadership Style: defining, executing and monitoring project tasks: rewarding achievement and correcting for deviations from planned progress.

Transformational Leadership Style: inspiring committed, cooperative and capable working relationships through a shared vision, open communication and personal development.

Project H



- A. Deliverables are specific and suit proven methods.
- B. Team members interact infrequently and only as required.
- C. Tasks are relatively few, and discrete

In your opinion how much risk do the conditions above pose for (successful) project management outcomes? (Please rate each outcome)

		Very Low Risk	Low Risk	Moderate Risk	High Risk	Extreme Risk
H1	Meeting Scope and Quality	☐	☐	☐	☐	☐
H2	On Budget	☐	☐	☐	☐	☐
H3	On Schedule	☐	☐	☐	☐	☐
H4	With High Team Satisfaction	☐	☐	☐	☐	☐

In your opinion how effectively might transactional and transformational leaders respond to these risks? (Please rate both styles)

		Not Effectively	Slightly Effectively	Moderately Effectively	Very Effectively	Extremely Effectively
H5	Transactional	☐	☐	☐	☐	☐
H6	Transformational	☐	☐	☐	☐	☐

Transactional Leadership Style: defining, executing and monitoring project tasks: rewarding achievement and correcting for deviations from planned progress.

Transformational Leadership Style: inspiring committed, cooperative and capable working relationships through a shared vision, open communication and personal development.

Section 3.

Additional Leadership Questions

Project teams may possess various attributes:

- Capability (skills and knowledge)
- Cooperation (group ethos)
- Commitment (investment in outcomes)

[I.] What attribute, if any, might be LEAST affected by Path-Goal Clarity?

(Please indicate one only)

Capability	<input type="checkbox"/>
Cooperation	<input type="checkbox"/>
Commitment	<input type="checkbox"/>
None	<input type="checkbox"/>

[J.] What attribute, if any, might be LEAST affected by Team Cohesion?

(Please indicate one only)

Capability	<input type="checkbox"/>
Cooperation	<input type="checkbox"/>
Commitment	<input type="checkbox"/>
None	<input type="checkbox"/>

[K.] What attribute, if any, might be LEAST affected by Technical Complexity?

(Please indicate only one)

Capability	<input type="checkbox"/>
Cooperation	<input type="checkbox"/>
Commitment	<input type="checkbox"/>
None	<input type="checkbox"/>

Section 4.

Communication Questionnaire

This short questionnaire asks you about your preferred style of communicating at work.

Given that project managers often move between organisations, you might like to think of a time you were part of an organisation for a significant period.

Instructions: Using the following 7-point scale, tick a response beside each item below that best describes how much you agree with that statement about yourself.

	Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree
1. I spend a lot of time and effort at work networking with others.	<input type="checkbox"/>						
2. I am able to make most people feel comfortable and at ease around me.	<input type="checkbox"/>						
3. I am able to communicate easily and effectively with others.	<input type="checkbox"/>						
4. It is easy for me to develop good rapport with most people.	<input type="checkbox"/>						
5. I understand people very well.	<input type="checkbox"/>						
6. I am good at building relationships with influential people at work.	<input type="checkbox"/>						
7. I am particularly good at sensing the motivations and hidden agendas of others.	<input type="checkbox"/>						
8. When communicating with others, I try to be genuine in what I say and do.	<input type="checkbox"/>						

	Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree
9. I have developed a large network of colleagues and associates at work whom I can call on for support when I really need to get things done.	☐	☐	☐	☐	☐	☐	☐
10. At work, I know a lot of important people and am well connected.	☐	☐	☐	☐	☐	☐	☐
11. I spend a lot of time at work developing connections with others.	☐	☐	☐	☐	☐	☐	☐
12. I am good at getting people to like me.	☐	☐	☐	☐	☐	☐	☐
13. It is important that people believe I am sincere in what I say and do.	☐	☐	☐	☐	☐	☐	☐
14. I try to show a genuine interest in other people.	☐	☐	☐	☐	☐	☐	☐
15. I am good at using my connections and network to make things happen at work.	☐	☐	☐	☐	☐	☐	☐
16. I have good intuition or savvy about how to present myself to others.	☐	☐	☐	☐	☐	☐	☐
17. I always seem to instinctively know the right things to say or do to influence others.	☐	☐	☐	☐	☐	☐	☐
18. I pay close attention to people's facial expressions.	☐	☐	☐	☐	☐	☐	☐

Thank you for taking the time to support this research.
 I look forward to sharing my results with PMINZ.
 -Brendon Mercer CAPM

Appendix C: SME correspondence (1)

Hi -----

I have started to answer Brendon's survey but abandoned it and after consideration I feel obligated to share with you and him my reasons for doing so.

The reason I abandoned the survey is because in my opinion the framing of the questions is reductionist and overly simplified.

I felt that the way they were framed and implications resulting is limiting and does not capture the richness of the environment that we actually face as professionals in this field.

This is particularly the case with the binary model of leadership that is proposed.

The questions appeared to me to have been structured with a view to simplifying the analysis, as opposed to providing an exposition of the reality.

Based on the above it is my opinion that the survey will have limited ecological validity (i.e. not representing the true environment and therefore not valid.)

Sorry I could not provide you with better feedback, but one of our CoE requirements is honesty, and the above is the honest opinion of a 25 year professional in the field, for what it is worth.

Kind regards

Appendix D: The research invitation

Wanted.



Research Project Participants

Hi, my name is Brendon Mercer and I am completing a Master of Arts degree at Massey University.

I am researching Project Managers' responses to *risk factors*. I would like to invite PMINZ members and colleagues to support some homegrown research that promises to initiate interesting discussions on Project Leadership.

My research comprises a short *anonymous* questionnaire in which *project management experts* are asked to respond to a series of hypothetical project scenarios and answer some additional questions.

Of course, your support will be crucial to my project and I'm hoping to present my research to PMINZ branches next year.

My research is titled "**Project Management and Project Risk: A Policy Capturing study of New Zealand Project Managers**"

The questionnaire can be found online at:
<https://goo.gl/Ve0mnK>

Kind regards,
Brendon Mercer (CAPM)