

#### Rating Defence Major Project Success:

## The Role of Personal Attributes and Stakeholder Relationships

# Abstract

In this paper we develop and test a model of the associations between major project managers' personal attributes and project success in the context of the Australian Defence industry. In our model, emotional intelligence, cognitive flexibility and systemic thinking were hypothesised to relate to project success, mediated by internal and external stakeholder relationships. The model was tested in an online survey with 373 major project managers. Emotional intelligence and cognitive flexibility were found to be related to the development, quality and effectiveness of major project managers' relationships with both internal and external stakeholders; and these in turn were associated with their ratings of project success. Systemic thinking, however, had no relationship with either stakeholder relationships or project success. Additional research is needed to examine the contribution of a wider range of personal attributes on stakeholder relationships and project success, and to assess whether this model is applicable in other industries and types of projects.

## 1. Introduction

Australian organisations are currently involved in over 200 Defence-related major projects, many of which do not meet time, budget or quality requirements, resulting in large time and/or cost project overruns. In 2008 the Australian Defence Minister announced that one third of Defence acquisitions totalling \$23 billion were at risk of failure (Fitzgibbon, 2008).

The context of this research is Australian aerospace and Defence industry major projects. The rational for this decision to focus on one type of industry and project is based on research that has found project manager competencies and critical project success factors to differ between industries and project type (Abdullah, Rahman, Harun, Alashwaland Beksin, 2010; Dvir, Lipovetsky, Shenhar and Tishler, 1998; Müller and Turner, 2007; Pinto and Mantel, 1990). There are many instances where these major projects have not met their business objectives and/or projects have had to be cancelled; so much so that such outcomes have come to be considered commonplace. For example, the Australian Defence sector Seasprite Helicopters major project was cancelled after 11 years at a cost of \$1.3 billion to Australian tax payers. Similarly, the Collins Class Submarine (CCS) project (1989-2003) was plagued by controversy. The project's size and complexity, unmet organisational capabilities and a lack of individual competencies were offered as the cause of the project's difficulties (Report to the Australian Minister for Defence by Macintosh and Prescott, 20 June 1999). As these examples attest, these problematical projects tend to be complex in nature, with multiple project factors interacting and impacting each other within a complex systems environment.

The Project Management Body of Knowledge (PMBoK) (PMI, 2008: 5) defines a project as "a unique temporary endeavour undertaken to create a unique product, service, or result". According to Müller and Turner (2010), project type is defined by complexity, size, contract, culture, importance, urgency, life-cycle, budget and uniqueness. Major projects differ from other types of projects in terms of five key elements operating throughout the project life cycle, namely: (1) having a budget exceeding AUD 500 million; (2) being characterised by complexity, uncertainty, ambiguity and dynamic interfaces; (3) running for a period that exceeds the technology cycle time of the technologies involved; (4) potentially attract a high level of public and political interest; and/or (5) defined by effect rather than by solution (Chang, Hatcher and Kim, 2013; Flyvberg, 2009; Müller and Turner, 2010; Zhai, Xin and Cheng, 2009). We adopt this definition of major projects for this study. The heart of this paper concerns a permanent organisation with temporary and permanent project managers, and multiple projects of every size, complexity and duration. While all projects, by definition, are considered temporary in nature with set start dates and end dates, and are managed as temporary entities, the projects of interest to this study are of a longer duration with end dates that may extend 10 to 20 years into the future. Our focus is on their multiple major projects and those people with a project manager role within them.

The decision to constrain this research to major projects was informed by several factors. First, the primary focus of this research is the development, quality and effectiveness of project managers' stakeholder relationships. Effective stakeholder management is considered of even greater importance for global projects than for national or state based projects as they typically involve larger numbers of stakeholders who are often dispersed around the world (Aaltonen, Jaakko, and Tuomas, 2008). Second, the likelihood of project failure has been found to increase as the size, duration and complexity of the project increases (Marrewijk, Clegg, Pitsis and Veenswijk, 2008; Sauer, Gemino and Reich, 2007). For example, in a recent study Eweje, Turner and Müller (2012) suggest that major project managers have the ability to influence the strategic direction of organisations, where a poor decision from the major project manager can potentially wipe out the annual profit of the organisation. Third, there is evidence to suggest that due to the unique features of major projects, analysis within the framework of smaller scale or more traditional projects may not be effective (Dvir, Sadeh and Malach-Pines, 2006; Hass, 2009; Shenhar, Dvir, Levy and Maltz, 2001; Tatikonda and Rosenthal, 2000). Indeed, Müller and Turner (2007; 2010) found the competency and attribution requirements of project managers differ as a function of project type. It could, therefore, be argued that major projects warrant their own research.

However, despite an increased interest and the potential for significant time and monetary savings, empirical research within the context of major projects

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remains limited. The implication of this is that there is an urgent need for better management and leadership of such projects. In this respect, Henley (2007) pointed out that Australian, United Kingdom and United States Governments, and Defence industries have supported initiatives that deliver a comprehensive competency standard for the assessment and development of managers of major projects; and moreover that these standards emphasise advanced management skills and processes. However, empirical evidence of the project manager attributes and behaviours required for competent performance (that impact on the success of these projects) is quite limited (Sohmen, Parker and Downie, 2008). This study aims to provide empirical data to address this shortcoming.

In this research we explore how Australian major project managers' stakeholder relationships competence influences project success, and how an underlying set of attributes assist in the effective management of both internal and external stakeholders.

## 1.1. Theoretical Framework

#### 1.1.1. Competency Theory

There are several definitions as to what constitutes a competency in the literature. Mulder (2008) was able to classify the definitions into two types of competency; task-orientated and behaviour-orientated. Gadeken (1994) has differentiated between task-based competencies and personal competencies using the analogy of a standard pilot and a 'top gun' pilot. The basic set of skills needed to fly can be broken down into tasks while the skills required for an exceptional pilot also require an analysis of personal competence. Gadeken (1994) considers a project manager's job to involve sufficient complexity to render a task-analysis approach too simplistic. Therefore, the conceptualisation of competency employed by this research and most commonly used in the project manager competency literature (Shao and Müller, 2011) most closely aligns with the second type of competency, which has been defined by Turner, Müller and Dulewicz (2009: 199), as "a combination of knowledge (qualification), skills (ability to do a task) and core personality characteristics (motives, traits and self-concepts) that lead to superior results". According to Erpenbeck and Heyse (1999 as cited in Ley and Albert, 2003), individuals employ a self-organising process whereby they combine their knowledge, skills and attributes to suit the situation.

Boyatzis (2009) argues performance-based competencies are a behavioural indication of emotional, social and cognitive intelligence, as competencies can be observed through an individual's actions and the underlying intent that governs the action. According to Boyatzis (2009), once the environmental demands have been understood, competencies may be indicative of an individual's potential performance. Subsequently, knowledge of the major project environment in which major project managers are required to develop high quality, effective relationships with their internal and external stakeholders has been used to identify the attributes that may facilitate the skills that the project managers require. This reasoning adheres to contingency theory, whereby superior performance is achieved when an individual's capability matches the demands created by their environment (Boyatzis, 2009; Fiedler, 1964).

Competence performance theory, an extension of the theory of knowledge spaces, suggests that competencies can predict performance outcomes and explain poor performance (Ley and Albert, 2003). This research focuses on the identification and assessment of major project managers' stakeholder relationship competence.

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There is a strong association between the management of a project and the performance of a project. Slevin and Pinto (2004) argue that project success is not a result of a particular set of project management techniques but from understanding how people can create an environment conducive to project success. Attempts have been made to identify the competencies that project managers require to effectively manage the projects they have been assigned (Crawford and Turner, 2007). In 2003, Dulewicz and Higgs developed the Leadership Dimensions Questionnaire (LDQ) to identify the competence profiles of effective leaders. The LDQ consists of 15 dimensions or competencies which load onto three competences; emotional, managerial and intellectual competence. Dulewicz and Higgs were able to differentiate effective leaders from other leaders using the LDQ framework.

Müller and Turner (2007) used the LDQ to assess whether project manager competencies operate as project success factors, and whether different sets of competencies are required for different types of projects. Emotional competencies were found to significantly contribute to the success of a project while managerial competencies were sometimes found to contribute. However, intellectual competencies were found to negatively correlate with project success at times. In addition, the competencies profiles required by a project manager were found to differ in relation to project type. Recently, Müller and Turner (2010) extended their earlier research by investigating whether different project manager competency profiles correlated with different project types. Müller and Turner's (2010) results indicated that successful project managers across all projects types possess four competencies: one intellectual competency (critical thinking) and three emotional competencies (influence, motivation and conscientiousness). Notably, project managers of successful projects considered high in complexity were found to score significantly higher in all fifteen competencies. Furthermore, project managers of successful projects considered to be of a high level of importance scored significantly higher in all competencies except one, emotional competency (selfawareness), two intellectual competencies (vision and strategic perspective) and one managerial competency (achieving). Thus, Müller and Turner (2010) were able to conclude that different project manager competency profiles are required for different types of projects. However, these differences tend to lessen as the level of project complexity and importance increase, as most of the competencies become necessary for success.

Despite the popularity of Dulewicz and Higgs' (2003) three leadership competencies (Mills, 2009), Jordan, Ashkanasy and Ascough, (2007) contend that Dulewicz and Higgs (2003) have conceptualised emotional intelligence as comprising of confounding factors, such as personality. Furthermore, McClelland (1973) has argued competencies identified as important for a particular organisation and culture will be context sensitive and, therefore, not generalisable to other organisations and cultures. McClelland (1973) further argues that a generalisable competency cannot have any practical application. Together, these studies provide support for the association between project manager's emotional, managerial and intellectual competence and project success.

By relating these findings to the context of major projects in the defence industry it seems reasonable to conclude that emotional, managerial and intellectual competence are necessary for project success. A corollary of this is that there is a need to investigate project managers' underlying attributes and how they contribute to project processes and outcomes of major projects.

#### 1.1.2. Relational Competency Theory

The major project manager competence of interest to this paper is relational competence. Relational competence theory is a psychology theory that "focuses on how effectively we deal with each other, with intimates and non-intimates in close/distant, committed/uncommitted, dependent/interdependent/independent, and short/prolonged relationships" (L'Abate, 2010: 7). Research by Gadeken (1991) validated a set of personal competencies considered characteristic of top performers (see Cullen and Gadeken, 1990) against a group of defence project managers in the United Kingdom. Of the eight project manager competencies considered characteristic of top performing project managers one competency was 'focus on external stakeholders' and another competency 'thrive on relationships and influence'. The respondents spoke about how rare it was for the project manager to remain in their project office. Instead, project managers spend most of their time out working with external stakeholders. The second competency was considered of particular importance as "project managers have no formal power over these external stakeholders, they must rely on their ability to cultivate relationships and use influence strategies to achieve their objectives" (Gadeken, 2002).

This paper does not directly relate to the leadership research and literature *per se* as we view the project manager more broadly to encompass all aspects of their role, of which leadership is just one. Furthermore, external stakeholders may hold an equal or higher position than the project manager; as such the project manager may not operate from a formally assigned leadership role and instead must rely on other skills to manage and influence these relationships. It is important to understand which knowledge, skills and attributes underpin relational competence, as well as the competences identified as contributing to effective major project manager performance (emotional, managerial and intellectual competence).

## 1.1.3. Project Manager Knowledge

Dominant project management discourse (such as the guide to 'Project Management Body of Knowledge' (PMBoK) and the 'Association for Project Management Body of Knowledge' (APMBoK)) operates on the assumption that project management is a set of normative procedures, applicable to most projects most of the time (Williams, 2005). Implied is that failure to adhere to these procedures will result in poorly managed projects, resulting in inevitable project failure regardless of the project managers' personal attributes or behaviours, or project type (Müller and Turner, 2010). The lack of consideration of the project manager's impact is evidenced by the PMBoK guide, which as recently as 2004, did not recognise leadership as a project management competency (Brill, Bishop and Walker, 2006) nor did they recognise any other competency outside the knowledge competencies (Crawford, 2005). Crawford explored the relationship between senior management's perceptions of effective project management, and the standards set by the PMBoK guide (PMI, 2004) and the Australian National Competency Standards for Project Management. Crawford was unable to find a relationship between them. Whitty (2010) argues that the oversimplification of the project manager by the traditional project management guidelines inadvertently acts to foster project failure and hinders opportunities for development.

Müller and Turner (2010) concluded that more project manager competence is required as complexity increases. A corollary of this is that there is a need to investigate project managers' attributes and how they contribute to project processes and outcomes of Australian major projects. In one such qualitative study of 15 Australian major project managers, Pisarski and Brook (2013) found these managers discussed four underlying skill sets as leading to behaviour imperative to the success of stakeholder relationships and overall project success. They found technical skills were important to understanding the business side but emotional intelligence, cognitive flexibility and systemic thinking combined to produce high quality, effective relationships with both internal and external stakeholders, which in turn led to project success.

We therefore propose a new theoretical framework outlining emotional intelligence, cognitive flexibility and systemic thinking as underpinning project manager's attributes that facilitate emotional, managerial and intellectual competencies. We suggest further that these attributes lead to project success via the mediating mechanisms of internal and external stakeholder relationship development, quality, and effectiveness (see Figure 1).

# ---INSERT FIGURE 1 ABOUT HERE---

#### 1.2. Project Success

Although the issue of how to define and to analyse major project success has been with us for some time (e.g., see Shenhar, Levy and Dvir, 1997), our understanding is still evolving (Thomas and Fernadez, 2008). For instance, according to Jugdev and Müller (2005), project success was once defined by performance measures; specifically, the operational contingencies of scope, schedule and budget, often referred to as the 'iron triangle'. In the late 1990s, however, project management scholars shifted toward a more people-focused perspective. In this view, success is measured by the interpersonal and behavioural skills of project teams as well as customer and stakeholder satisfaction (Jugdev and Müller, 2005; Pinto, 1990). Moreover, it is now widely agreed that project success should be viewed holistically, taking into account operational and strategic aspects of success (Martinsuo, Gemunden and Huemann, 2012; Müller, Geraldi and Turner, 2007). For the purposes of the present study therefore, we define major project success holistically as *a project's ability to meet its operational and stakeholder objectives* – *with emphasis on the people side of project success factors rather than only the 'iron triangle'* (Procaccino and Verner, 2006). We are interested, in particular, in project success factors thought to contribute to project success; these include the major project having clearly defined goals and direction, appropriate organisational support, an appropriate network for the communication of all relevant data and the ability to manage unforeseen complications as they arise (Pinto, 1990).

## 1.3. Stakeholder Relationships

The work of researchers in both the project and major project management areas (e.g., see Allen, Stelzner and Wielkiewicz, 1998; Bourne and Walker, 2008; Clark, 2010; Eweje et al., 2012; Sutterfield, Friday-Stroud and Shivers-Blackwell, 2006; Wielkiewicz, 2002) suggests that the relationship between major project managers and their stakeholders, (both internal to the organisation and external) exerts a critical influence on the project processes and outcomes, and ultimate success or failure of the project. Jones (1995) posits in particular that stakeholder relationships that are trusting, cooperative and altruistic in nature will be more effective over more opportunistic stakeholder relationships.

Moreover, poor stakeholder management contributes to reduced stakeholder satisfaction with the project outcomes and may negatively impact the feasibility and viability of an organisation (Bourne and Walker, 2005; Foley and Zahner, 2009; Preble, 2005). Manowong and Ogunlana (2010) add that future opportunities for collaboration with the stakeholders may also be hindered by poor management, while Walker, Bourne and Rowlinson (2007) contend further that effective stakeholder relationships, and particularly stakeholder perceptions and expectations, need to be managed appropriately. Finally, we note that Jepsen and Eskerod (2009) support the Walker et al. (2007) view, suggesting that project managers require the capabilities and skills to create and to maintain effective stakeholder relationships.

Turning now to workplace relationships and stakeholders, we note that Barbee and Cunningham (2009: 1699) conceptualise workplace relationships as "initiated, maintained or dissolved" at work, while Bourne and Walker (2006: 31) define a stakeholder as "individuals or groups who have an interest or some aspect of rights or ownership in the project, and can contribute to, or be impacted by, the outcomes of a project". We therefore define stakeholder relationships as *interpersonal workplace relationships between major project managers and internal project stakeholders (e.g. the manager's project team members or immediate superior/supervisor) or external project stakeholders (e.g., third-party contractors, the government or the customer).* Based on the above discussion, we hypothesise that this applies equally to both internal and external stakeholders, so that:

- H1a: The quality of *internal* stakeholders' relationships with major project managers will have a direct and positive effect on project success.
- H1b: The quality of *external* stakeholders' relationships with major project managers will have a direct and positive effect on project success.

## *1.4. Emotional Intelligence*

Ashkanasy and Daus (2005) note that the ability-based model of emotional intelligence (Mayer and Salovey, 1997) is the 'gold standard'. In this respect, Mayer and Salovey (1997) defined the construct in terms of an individual's ability to perceive, to appraise and to express emotion, in themselves and others; so that they may understand and regulate emotion to facilitate thought and intellectual growth.

Mayer and Salovey also divided the construct into four separate components: "(a) accurately perceiving emotion, (b) using emotions to facilitate thought, (c) understanding emotion, and (d) managing emotion" (Mayer, Roberts and Barsade, 2008: 513). When defined in this way, emotional intelligence may be seen to measure emotional competence and thus to represent the emotional, managerial and intellectual competence constructs posited by Dulewicz and Higgs (2003) – that we argue are critical for major project success.

Support for the notion that emotional intelligence abilities are important for project success can be found in an empirical study of 53 project managers recently undertaken by Clark (2010). Clark found in particular that emotional awareness, a component of emotional intelligence, was a key determinant of project manager effectiveness. He also found that, following training in emotional intelligence, those project managers with the greatest awareness of their own and others' emotions were better able to offer appropriate assistance and to negotiate social encounters with their colleagues and project partners. Based on these findings, Clark concluded that research into understanding emotional awareness and emotional reactions should help us to understand project managers' behaviour better, and especially the role emotions play in project success and failure.

We argue here that Clark's (2010) findings are likely to be especially applicable to major projects, which typically have a large number of stakeholders both internal and external to the organisation. Such projects are often organised in matrix structures, with managers managing multiple project teams and multiple stakeholders whilst answerable to multiple masters over a relatively lengthy period of time. This would seem to provide a rich environment for potential conflicts, tensions and differing views, thus understanding their own emotions and that of others appears to be a competency required to manage these constant tensions and challenges (Thomas and Mengel, 2008).

As we noted earlier, we base our conceptualisation of emotional intelligence on the Mayer and Salovey (1997) ability model. In this view, major project managers emotional intelligence is defined as their ability to appraise and to be aware of their own and others' emotional states so that, via cognitive processing, they are able to manage both their own and others' emotions. Combining this definition with our discussion of stakeholder relationships, we hypothesise (see Figure 1):

- H2: Major project managers' emotional intelligence is positively related to project success.
- H3: Major project managers' emotional intelligence is positively related to both internal (H3a) and external (H3b) stakeholder relationships.
- H4: The effect of major project managers' emotional intelligence on project success is mediated by both internal (H4a) and external (H4b) stakeholder relationships.
- 1.5. Cognitive Flexibility

Dennis and Vander Wal (2010) define cognitive flexibility as the ability to alternate between cognitive sets in response to changes in the external environment. In this respect, a cognitive set is a particular arrangement of mental resources (Kamigaki, Fukushima and Miyashita, 2009) that allows individuals to respond consistently to stimuli so they can navigate the environment effectively and efficiently (see also Piech, Hampshire, Owen and Parkinson, 2009). This cognitive process is controlled by executive brain functions that are "general purpose control mechanisms that modulate the operation of various cognitive sub-processes and thereby regulate the dynamics of human cognition" (Miyake, Friedman, Emerson, Witzki, Howerter and Wager, 2000: 50). The validity of cognitive flexibility theory has been shown in neurological imaging studies utilising PET (positron emission tomography) scans (Heath, Higgs and Ambruso, 2008).

Anderson and Martin (1995) identified three separate components of cognitive flexibility: (1) awareness, (2) willingness and (3) self-efficacy. A cognitively flexible individual will be *aware* of available alternatives in a given situation; will have the *willingness* to adapt to the situation by choosing the appropriate alternative way of responding; and will have the *self-efficacy* to believe that s/he possesses the ability to adapt to complex situations.

In the context of major projects, which are characterised by constant changes in the technological and political environment, personnel, stakeholders and their expectations (Chang et al., 2013), success in this environment can be seen to require awareness, willingness, and self-efficacy to adapt to the continuous changes, and the high level of uncertainty and ambiguity in this project environment. We define cognitive flexibility as *the ability to analyse situations critically by seeing the situation from multiple viewpoints; that is, to work with the complexity often found in major projects and then to make decisions as to the most appropriate course of action.* 

Empirical evidence has shown that cognitive flexibility is positively related to interpersonal communication competence (Rubin and Martin, 1994) and selfconfidence in novel situations (Anderson and Martin, 1995). Cognitively flexible individuals have also been shown to be more adaptable and open-minded (DeYoung Peterson and Higgins, 2005), tolerant of ambiguity (Sidanius, 1988) and less inclined to make premature decisions and to experience stress (Furnham and Ribchester, 1995). In addition, Martin, Anderson and Thweatt (1998) found that cognitive flexibility is related to argumentativeness and tolerance for disagreement – which together have the potential to increase verbal aggression. Interestingly, Martin and colleagues (1998) also found cognitive flexibility is negatively related to verbal aggression.

The findings of Martin and colleagues (1998) are particularly germane to the present study. We argue that this is because their findings can be explained in terms of an ability to act in emotionally intelligent ways. The research evidence suggests further that cognitive flexibility may also enable managerial and intellectual skills to be actualised (Anderson and Martin, 1995; DeYoung et al., 2005; Furnham and Ribchester, 1995; Sidanius, 1988). If this is so, then it is reasonable to conclude that cognitive flexibility should serve to enhance effective leadership of major projects. Thus, we further hypothesise (see Figure 1):

- H5: Cognitive flexibility is positively related to emotional intelligence.
- H6: Cognitive flexibility is positively related to project success.
- H7: Cognitive flexibility is positively related to both internal (H7a) and external (H7b) stakeholder relationships.
- H8: The effect of cognitive flexibility on project success is mediated by both internal (H8a) and external (H8b) stakeholder relationships.

# 1.6. Systemic Thinking

Our final set of hypotheses is based on the idea that, for businesses to maintain a competitive edge, processes must be in place to enable the organisation to change, to grow and to adapt as quickly and effectively as possible. In this instance, Wielkiewicz (2000) claims the traditional, hierarchical way of thinking is no longer appropriate or adequate for this task. A hierarchical way of thinking implies organisations are "structured in a stable, hierarchical manner with power and control

focused in the upper levels of the hierarchy" (Wielkiewicz, 2000: 110). In contrast, a *systemic way* of thinking suggests an organisation is a complex adaptive system akin to a nest of ants. The focus is holistic, while appreciating the "multidimensional and multilevel nature of complex systems" (Schwaninger, 2009:3).

Taking this line of argument a step further, Allen et al., (1998) argue that no one individual is capable of leading such an organisation. Consequently, Allen and colleagues developed *Systemic Leadership Theory*; where leaders direct their attention to increasing the flow of information and the number of employees actively involved in decision-making processes. More recently, Ackoff, Addison and Carey (2010) defined systems thinking as a set of habits or practices within a framework based on the belief that the component parts of a system can best be understood in the context of their relationships with each other and with other systems, rather than in isolation. We adopt this definition here.

Diversity and multiple feedback loops are also key principles behind systemic leadership theory (Wielkiewicz, 2002). This is supported by the work of Eweje and colleagues (2012), who found that major project managers have the ability to influence the strategic direction of organisations (i.e., where a poor decision from the major project manager can potentially wipe out the annual profit of an organisation). Thus, in a study of sixty nine major project managers in the oil and gas industry, Eweje and associates found that information on both internal and external stakeholder pulse had the greatest influence on the long term strategic value of the project; and that ability to recognise areas of risk exposure and factoring this into decision making processes improved the quality of decisions. These findings suggest it is important for project managers to consider the system *as a whole* when coordinating, integrating, and managing the different elements of the sub-systems and of the entire project as well as the impact their behaviour may have on stakeholders. On this basis, we hypothesise (Figure 1):

H9: Systemic thinking is positively related to project success.

- H10: Systemic thinking is positively related to both internal (H10a) and external(H10b) stakeholder relationships.
- H11: The effect of systemic thinking on project success is mediated by both internal (H11a) and external (H11b) stakeholder relationships.

In summary, although there is a substantial body of qualitative research that has identified the importance of stakeholder relations; little quantitative research appears to have investigated the effect of Australian major project managers' behaviours and attributes on stakeholder relationships, particularly in terms of their development, quality and effectiveness. Consequently, there is still a gap in knowledge about the behaviours and attributes required by major project managers to develop and sustain effective, high quality stakeholder relationships. In our research, we seek to fill this gap by examining the impact of the attributes- emotional intelligence, cognitive flexibility and systemic thinking on stakeholder relationships and major project success as outlined in previous sections and illustrated in Figure 1.

## 2. Method

## 2.1. Sample Demographics and Procedure

The data collected for this study was part of a larger study using an electronic survey of employees contributing to Australian major projects through a variety of Australian military Defence contracts. Human resource managers in the participating organisation distributed the self-administered electronic surveys to each staff member. In the larger study a total of 1582 questionnaires were completed from a possible 2500, representing a response rate of 63.3%. Of the 1582 respondents, 373 identified themselves as major project managers and formed the participants of this paper. Three hundred and thirteen (n =313) of the respondents were male (83.9%) and sixty were female (16.1%). The mean age bracket was 46 to 50 years. Approximately 72% had either an undergraduate qualification (27.1%) or postgraduate degree (44.8%). Their experience on major projects varied with 48.2% having one-five years experience, 31.6% with six-ten years and 17.1% with more than 11 years experience.

# 2.2. Measures

This research involved five independent variables and one dependent variable. Three of the independent variables are personal attributes: (1) emotional intelligence, (2) cognitive flexibility and (3) systemic thinking; and two are project management processes: (4) internal stakeholder relationships and (5) external stakeholder relationships. We also included the internal and external stakeholder relationship constructs as mediators. The dependent variable was project success. The measurement instruments for each of the variables are described below.

#### 2.2.1. Independent variables

We used Wong and Law's (2002) 16-item Emotional Intelligence Scale to measure emotional intelligence. This short measure of emotional intelligence has been specifically designed for use in leadership and management research (Wong and Law, 2002). Four items assess participants' level of ability against each of Mayer and Salovey's (1997) four factors of emotional intelligence: (1) appraisal and expression of emotion in oneself (OwnA), (2) appraisal and recognition of emotion in others (OthA), (3) regulation of emotion in oneself (OwnM) and (4) the use of emotion to facilitate thought (OthM). Each item is rated on a Likert scale from 1 (strongly disagree) to 7 (strongly agree). Wong and Law (2002) reported an overall scale reliability of .86; we found it to be .87.

We measured cognitive flexibility using Martin and Rubin's (1995) 12-item Cognitive Flexibility Scale. This scale assesses respondents' degree of flexibility in decision making, problem solving and thinking. Each item is rated on a Likert scale from 1 (strongly disagree) to 6 (strongly agree), and indicates how accurately the statement describes the participant's beliefs and feelings about their behaviour (in comparison to the general population). Martin and Rubin (1995) reported reliability coefficients of .76 to .77; we found it to be .70.

To measure thinking about leadership processes in accordance with Allen and colleagues'(1998) theory of leadership, we used the Systemic Thinking Scale developed by Wielkiewicz (2002). This scale assesses participants' ability to think systemically about organisational leadership processes by relating various concepts to organisational success. Wielkiewicz's (2002) reported an internal consistency of .89, and we found it to be .85.

Finally, we measured the quality and effectiveness of internal and external stakeholder relationships. We employed two separate scales; one to assess Internal Stakeholder Relationships (ISR) and the other for External Stakeholder Relationships (ESR) (Mazur and Pisarski, 2013). The development of these scales was based on Fisher, Maltz and Jaworski (1997) Relationship Effectiveness scale and Abdel-Halim's (1981) Perceived Ability-Job Fit scale. The two scales each consist of 14 items across three sub-factors: (a) stakeholder relationship development (establishment and maintenance), (b) stakeholder relationship quality, and (c) stakeholder relationship effectiveness. The scales are identical in all respects but use different wording when referring to internal stakeholders ("the people I work with") and external stakeholder ("stakeholders"). Example items include: "I feel competent and fully able to maintain relationships with people I work with" and "My stakeholder relationships always achieve their objectives." The scales were rated on a Likert scale from 1 (strongly disagree) to 5 (strongly agree). The internal consistency of the ISR scale in our study was .90 while the reliability of the ESR scale was .92.

# 2.2.2. Dependent Variable

The dependent variable, project success, was measured using Pinto's (1990) 50item Project Implementation Profile (PIP) scale. Pinto based the scale on ten factors earlier identified by Pinto and Slevin (1989) as critical to the successful implementation of a project. Using this scale, respondents evaluate both technical and people-related factors. The scale is designed to assess project implementation performance generalised across different types of projects and organisations (Pinto, 1990; Pinto and Mantel, 1990).

We used the PIP to assess participants' perceptions of their current or most recent projects against four of the ten factors: (1) project mission, (2) top management support, (3) communication, and (4) trouble-shooting. The decision to use these project success factors has been based on the objectives of this research and a review of the project success literature (Belout and Gauvreau, 2004; Ika, 2009; Larson & Gobeli, 1989; Pinto & Mantel, 1990; Slevin and Pinto, 1987). Although the PIP is a subjective measure of project success, after reviewing the project success literature published between 1984 and 2004, Ika (2009: 7) has noted that one of the biggest issues in defining project success is that there is no 'absolute' project success as it is dependent on "perception and perspective". Each factor has five items and is rated on a Likert scale from 1 (strongly agree) to 7 (strongly disagree). Pinto (1990) recorded alpha coefficients between .79 and .90 for each of the 10 factors. In our research, reliabilities were .93 for the overall scale, .79 for project mission, .91 for top management support, .89 for communication and .88 for trouble-shooting.

## 2.2.2. Control Variables

As major project managers' competencies and critical project success factors have been found to differ as a function of project type and complexity (Müller and Turner, 2007; 2010), as well as between project industries (Zwikael, 2009), this research focused on one type of project in one industry – major projects in the Defence industry. Subsequently, data was not collected from other projects types or project industries. Thus, type, complexity and industry could not be used as control variables. Nevertheless, independent samples t-tests and one-way ANOVAs were conducted to assess whether sex, age or education level impacted the research variables. No significant differences were found for sex or age, and education had an impact on external stakeholder relationships only. As such, sex, age and education were not included in the structural equation model to reduce the complexity of the model.

# 2.3. Analysis

All analyses were conducted using software packages SPSS version 19.0 and Mplus version 6.0. Before analysing our data, we conducted missing values analysis using Little's (1988) Missing Completely at Random (MCAR) test. We also screened the data for univariate outliers and inspected the univariate histograms, expected normal probability plots and Fisher's skewness and kurtosis coefficients. The data has been analysed using confirmatory factor analysis and structural equation modelling.

## **3. Results**

As Little's (1988) MCAR test was not significant, the data were found to be missing at random (MAR), that is, missing data were found to be independent of the observable variables and unobservable parameters of interest. Therefore, the data was imputed using the EM maximum likelihood estimation technique (Hair, Black, Babin and Anderson, 2010). There were no univariate outliers identified in the data set as all item responses were within the range of the scales and, therefore, were deemed representative of the population. According to Comrey and Reise (2002) and Byrne (2010), a sample size of 373 is optimal for the purposes of factor analysis and structural equation modelling.

The fit indices that we report comprise the  $\chi^2$  statistic, the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), the Root Mean Square Error of Approximation (RMSEA), and the Standardised Root Mean Residual (SRMR). The CFI compares the model that is being assessed and an independent model that assumes the variables are uncorrelated while the TLI compares the normed chi-squared values for the hypothesised model and the null model. As the TLI is not normed, values can range from less than 0 to over 1 (Hair et al., 2010). Cut-off values greater than .95 indicate that the data fits the model (Hu and Bentler, 1999). RMSEA accounts for the error of estimation in the population, while SRMR reflects the average distance between the observed covariance matrix and the expected covariance matrix (Byrne, 2010). Hu and Bentler (1999) recommend cut-off values of .06 for the RMSEA and .09 for SRMR.

# 3.1. A Two Stage Analysis of the Measurement Model 3.1.1 One Factor Congeneric Model for Each Scale

We used confirmatory factor analysis (CFA) to check on each of the scales using single factor models. The scales used to measure emotional intelligence, internal stakeholder relationships, external stakeholder relationships and project success demonstrated better fit as second-order models with sub-factors. Items with squared multiple correlations of less than .2 were removed from the scales on the basis that these items were shown to be poor measures of the construct. We also cleaned up highly covariant items within each factor, since our aim was to identify the items that best represented each factor and sub-factor. Within each factor, the item with the lowest reliability was deleted when the modification index was greater than 10.

Subsequently, two of the items as well as all of the reverse score items were removed from the cognitive flexibility scale leaving a 6-item scale. For the emotional intelligence scale, three items were deleted, reducing the scale to 15 items. Finally, six items were removed from the systemic thinking scale leaving eight items. All of the remaining items showed convergent validity (p < .05). The modified one factor congeneric measurement models and second-order models all met the acceptable levels for fit. The full set of fit indices is displayed in Table 1.

----INSERT TABLE 1 ABOUT HERE----

# 3.1.2 The Full Measurement Model

We analysed the measurement model in a single confirmatory factor analysis. A review of the modification indices revealed a number of error terms with covariances (Modification Indices >10.00) between the internal stakeholder relationship scale and the external stakeholder relationship scale. As the two scales are measuring similar constructs, the error terms have been covaried. The remaining modification

indices were within an acceptable range. All items were retained. Descriptive statistics, correlations and inter-item reliabilities are provided in Table 2 for the dependent and independent variables.

--- INSERT TABLE 2 ABOUT HERE---

# 3.3. Common Method Variance

As all of the constructs were measured at the same time using the same method (electronic, self-report surveys), there is a chance that the effects may be biased (Podsakoff, MacKenzie, and Podsakoff, 2012). To assess whether a proportion of the observed covariance can be attributed to the use of a shared method of measurement, we controlled for a single unmeasured latent method factor in our confirmatory factor analysis (Podsakoff, MacKenzie, Lee and Podsakoff , 2003). The first-order method factor was constrained to avoid an under-identified model while the measurement factor loadings were free to vary. The fit indices for the model without (Model A) and with the method factor (Model B) were compared. The fit indices for the models were: Model A:  $\chi^2/df = 1.67$ , RMSEA = .04, SRMR = .06, TLI = .89, and CFI = .89; and Model B:  $\chi^2/df = 1.57$ , RMSEA = .04, SRMR = .05, TLI = .90, and CFI = .90. The addition of the method factor resulted in a slight improvement in the model.

To investigate this further, we calculated the differences between the standardised regression estimates for Model A and Model B. Differences greater than .20 may indicate common method variance. Four of the 98 differences were greater than .20, but less than .27. Harman's one factor test (1976) was used to further check for evidence of common method variance (CMV). All of the items were combined in an exploratory factor analysis. As 13 factors had eigenvalues greater than one and the first factor accounted for less than 20 percent of the total

variance, unidimensionality amongst the items is less likely to be a concern. These analyses suggest that, while common method variance may have influenced the results; the effects are very small.

## 3.4. Structural Equation Modelling

To reduce the complexity of the model stemming from the number of items and second-order models, item parcels were created using Kishton and Widaman's (1994) domain representative parcelling method. Testing of the hypothesised model demonstrated that the data was a good fit to the model (Figure 1, RMSEA = .04; SRMR =.04). The TLI and CFI values are also within the recommended cut-off criteria for acceptable fit: TLI =.97; CFI = .97 (Hu and Bentler, 1999). We retained the non-significant pathways in the analysis of the final model to demonstrate which of the pathways were significant and non-significant and to what extent. In Figure 2, we illustrate the final path model with only the significant standardised pathways shown. The fit statistics for the final model were:  $\chi^2/df = 1.52$ , RMSEA = .04, SRMR = .04, TLI = .97 and CFI = .97.

# ---- INSERT FIGURE 2 ABOUT HERE----

# 3.4.2. Direct Effects

As can be seen in Table 3 – and as we hypothesised – internal (H1a) and external (H1b) stakeholder relationships were both significantly and positively related to project success. Emotional intelligence was significantly related to project success (H2), and to internal (H3a) and external (H3b) stakeholder relationships. Cognitive flexibility was significantly related to emotional intelligence (H5) but not to project success (H6). Cognitive flexibility was also significantly related to internal (H7a) and external (H7b) stakeholder relationships. Finally, our results indicated that systemic thinking was not significantly related to project success (H9) or internal (H10a) or external (H10b) stakeholder relationships.

## --- INSERT TABLE 3 ABOUT HERE---

# 3.4.3. Indirect Effects

In H4, we hypothesised that the relationship between emotional intelligence and project success would be mediated by the indirect effects of internal (H4a) and external (H4b) stakeholder relationships on project success. Results of our study also supported these hypotheses (see Table 3). We also hypothesised that the relationship between cognitive flexibility and project success would also be mediated by the indirect effects of internal (H8a) and external (H8b) stakeholder relationships on project success. These hypotheses were both supported. As shown in Table 3, however, the effect of systemic thinking on project success was not mediated by either internal or external stakeholder relationships (as we hypothesised in H11a and H11b).

# 4. Discussion

In the introduction to this article, we proposed a new theoretical framework outlining emotional intelligence, cognitive flexibility and systemic thinking as overarching personal attributes that facilitate emotional, managerial and intellectual competence. We further suggested these overarching attributes lead to project success via the mediating mechanisms of internal and external stakeholder relationships (Figure 1). We explored how major project managers' stakeholder behaviour influences ratings of project success; and whether an underlying set of attributes, cognitive flexibility, emotional intelligence and systemic thinking assist in the development, quality and effectiveness of both internal and external stakeholder relationships. For the most part, in line with our theorising, our findings revealed a complex set of direct and mediated relationships between major project managers' emotional intelligence, cognitive flexibility, and stakeholder relationships and project success ratings (Figure 2).

We found in particular that, as major project managers' ability to develop high quality, effective relationships with both their internal and external stakeholders increased, there was a corresponding increase in ratings of project success. These results suggest that the relationships built by major project managers with their stakeholders directly effects the alignment of stakeholders to the major projects goals and stated mission; the organisational support given to the project; the effectiveness of communication in relation to decision making, information and feedback loops; and the identification of problems.

## 4.1. Emotional Intelligence

Our findings also support the idea that major project managers' emotional intelligence is positively related to the development, quality and effectiveness of internal and external stakeholder relationships. In particular, our hypothesised relationship between emotional intelligence and both internal and external stakeholder relationships was supported. Thus, we found that major project managers' awareness and management of their own and other peoples' emotional states was associated with their ability to establish, to maintain, and to achieve high quality, effective relationships – with both internal and external stakeholders.

We also hypothesised and found that major project manager emotional intelligence is related to ratings of project success. We found that the effect of emotional intelligence on project success ratings was mediated by both internal and external stakeholder relationships. This indicates, consistent with our theory, that the emotional intelligence of major project managers is associated with an increased likelihood of project success; and this relationship is enhanced through the quality and effectiveness of the stakeholder relationships they were able to build and maintain.

## 4.2. Cognitive Flexibility

We defined cognitive flexibility as an ability to analyse situations critically by seeing the situation from multiple viewpoints; that is, to work with the complexity often found in major projects and then to make decisions as to the most appropriate course of action. Cognitive flexibility theorists (e.g., see Zalonis, Christidi, Bonakis, Kararizou, Triantafyllou, Paraskevas and Vasilopoulos, 2009) suggest that cognitively flexible people have learnt to grasp the nature of complex information. As we hypothesised, we found that the cognitive flexibility of major project managers was positively related to their emotional intelligence. This finding also supports the work of Rubin and Martin (1994) who found a positive relationship between cognitive flexibility and interpersonal communication.

A major project environment is characterised by complexity, uncertainty, ambiguity and dynamic interfaces (Flyvjberg, 2009). We therefore hypothesised that cognitive flexibility would have a positive relationship with both internal and external stakeholder relationships. This hypothesis was also supported. We found that major project managers' cognitive flexibility was related to their stakeholder relationship ability, for stakeholders both internal and external to the organisation.

We also hypothesised that there would be a positive direct relationship between cognitive flexibility and project success ratings; but this was not supported. We found, however, and again consistent with our theory, that the relationship between cognitive flexibility and project success was mediated by both internal and external stakeholder relationships (as we hypothesised). This indicates that the cognitive flexibility of major project managers is associated with increased likelihood of project success through the quality and effectiveness of both their internal and external stakeholder relationships (they were able to build).

# 4.2. Systemic Thinking

We noted in the introduction to this article that a systemic way of thinking suggests an organisation is a complex adaptive system where the focus is on the whole, while appreciating the "multidimensional and multilevel nature of complex systems" (Schwaninger, 2009: 3). We used Ackoff and colleagues' (2010) definition of systemic thinking as a set of habits or practices within a framework that is based on the belief that the component parts of a system can best be understood in the context of relationships with each other and with other systems, rather than in isolation. On the other hand, Allen and colleagues (1998) believe no one individual is capable of leading such an organisation. Despite this warning, but consistent with Ackoff and colleagues' definition, we posited that systemic thinking would still have direct and mediated relationships with internal and external stakeholder relationship abilities and project success. In the end, however, and in support of Allen and colleagues' position, we found no support for any of these relationships.

## 4.3. Limitations and Future Research

As with any study, there are limitations to our work. We identify five that will need to be addressed in future research. First, the research design is cross-sectional and confined to a narrow sector of major projects, namely, the Australian Defence industry. A broader reaching, longitudinal study would assist understanding of whether these findings can be generalised across industries, types of projects and cultural groups. Second, by focusing on just three attributes with the potential to enhance stakeholder relationships and major project success, we may have taken on overly narrow perspective. Future research is needed to examine the contribution of other personal attributes on stakeholder relationships. Also the focus on the people side of project success would benefit in future research which incorporates all the operational and strategic measures of project success.

Third, our data were collected using a single-sitting self-report format, making our findings subject to common methods effects. We controlled for these effects based on the recommendations of Podsakoff and colleagues (2012) and found that, while there was evidence of some CMV in our results, this effect was small. Nonetheless, future researchers should seek to replicate our results using multisource and/or objective data sources. The fact that at least one of our independent variables (systemic thinking) was found to be unrelated to the dependent variables in the study, gives us additional confidence that the relationships that we did find to be significant were not artefacts of CMV.

The fourth limitation is that we used a self-report measure of emotional intelligence. While the measure we used is based on the Mayer and Salovey (1997) model, the general consensus (e.g., see Ashkanasy and Daus, 2005) is that the ability measure (the MSCEIT: Mayer, Salovey, Caruso, and Sitarenois, 2003) is preferred. In the instance of the research environment of our study, however, it was not possible to administer the MSCEIT for practical reasons. Future research, however, should consider using this objective ability test of emotional intelligence. The fifth and final limitation is that project type, complexity and industry were not controlled for. In future, it is recommended that researchers control for project type, complexity and industry when investigating the associations between the research variables.

## 4.4. Contributions to Theory and Practice

Notwithstanding these limitations, we believe that our study does hold potential to strengthen our understanding of how people skills can enhance project success and largely supports the findings of Pisarski and Brook (2013). Our results indicate in particular the importance of the kinds of interpersonal skills project managers may need to facilitate major project success. Dulewizc and Higgs (2003) identified three types of leadership competence associated with success: emotional, managerial and intellectual competence. In the study we report here, we used measures of emotional intelligence and cognitive flexibility, which contain elements of emotion and intellect, and show they are indeed related to project success supporting and extending the work of Dulewizc and Higgs (2003) and the work of Müller and Turner (2010). As suggested by Eweje and colleagues (2012) it appears that emotional intelligence demonstrated by project managers in major projects indeed are critical skills that support better decision making and the development of high quality, effective relationships leading to success. We found support for these contentions; with competence in cognitive flexibility and the subsequent actioning of these cognitions via the major project manager's emotional intelligence. To our knowledge this is the first paper that demonstrates the potential role of cognitive flexibility to strengthen the ability to use emotional intelligence to enhance the development of high quality, effective relationships with both internal and external stakeholders in the area of major projects. These finding are especially important because they focus on the impact that the major project manager has on aspects of project success, which Turner and Müller (2006) and Eweje and colleagues (2013)

believe is one contribution to the project success literature that needs additional research, and may reduce the risk that poor decision making by major project managers can have on the organisation's performance.

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Figure 1: Hypothesised relationships between the variables

Model	V)	дf	V2/df	n	ттт	CFI	DWSEA	SPMP
WIUUCI	ΛL	ui	<b>Λ2</b> /UI	h	1 1/1	CFI	NNBLA	SKIIK
Project Success	241.644	86	2.81	0.00	.94	.95	.07	.04
Emotional	194.903	86	2.27	0.00	.94	.95	.06	.04
Intelligence								
Cognitive Flexibility	7.44	5	1.49	0.19	.98	.99	.04	.02
Systemic Thinking	56.98	20	2.85	0.00	.95	.97	.07	.03
Internal Stakeholder	107.920	51	2.12	0.00	.97	.97	.05	.03
Relationships								
External Stakeholder	109.345	51	2.14	0.00	.97	.98	.06	.04
Relationships								

Table 1: Confirmatory factor analysis model fit (N= 373)

Variables	Mean (SD)	1	2	3	4	5	6
<b>N</b> 1 11 11	(SD)						
Dependent Variable							
1. Project Success	4.98	(.93)					
	(1.04)						
Independent Variables							
2. Emotional Intelligence	5.17	.36**	(.87)				
C C	(.62)		. ,				
3. Cognitive Flexibility	5.15	$.17^{**}$	.38**	(.70)			
	(.44)						
4. Systemic Thinking	4.25	$.20^{**}$	.37**	.37**	(.85)		
	(.46)				. ,		
5. Internal Stakeholder	3.88	.43**	.52**	$.40^{**}$	.36**	(.90)	
Relationships	(.44)						
6 External Stakeholder	3 78	18 <sup>**</sup>	46 <sup>**</sup>	30**	<b>26</b> **	<b>5</b> 8 <sup>**</sup>	(02)
	5.76	.40	.40	.50	.20	.30	(.92)
Relationships	(.49)						

Table 2: Means, standard deviations, correlations and inter-item reliabilities

Notes: All coefficients significant at p <.001; Figures in parentheses on the diagonal are indicate Alpha reliabilities.



Figure 2: Significant standardised pathways for the final model; \*\* = p < .001; \* = p < .05

Independent		Dependent	ß	S.E	C.R.	P	Finding	
Variables		Variables	,				0	
Direct Effects								
ISR	$\rightarrow$	PS	.23	.07	3.13	0.00	H1a Supported	
ESR	$\rightarrow$	PS	.34	.06	5.44	0.00	H1b Supported	
EI	$\rightarrow$	PS	.14	.07	2.14	0.03	H2 Supported	
EI	$\rightarrow$	ISR	.37	.06	6.43	0.00	H3a Supported	
EI	$\rightarrow$	ESR	.39	.06	6.53	0.00	H3b Supported	
CF	$\rightarrow$	EI	.55	.05	11.37	0.00	H5 Supported	
CF	$\rightarrow$	PS	09	.08	-1.12	0.26	H6 Not Supported	
CF	$\rightarrow$	ISR	.29	.08	3.83	0.00	H7a Supported	
CF	$\rightarrow$	ESR	.17	.08	2.14	0.03	H7b Supported	
ST	$\rightarrow$	PS	.00	.06	0.08	0.93	H9 Not Supported	
ST	$\rightarrow$	ISR	.10	.06	1.56	0.12	H10a Not Supported	
ST	$\rightarrow$	ESR	.04	.06	0.65	0.51	H10b Not Supported	
Indirect Effec	ts (Medi	ated Relations	ships)					
EI	IRS	PS	.09	.03	2.87	0.00	H4a Supported	
EI	ERS	PS	.13	.03	4.38	0.00	H4b Supported	
CF	IRS	PS	.06	.03	2.40	0.02	H8a Supported	
CF	ERS	PS	.06	.03	2.04	0.04	H8b Supported	
ST	IRS	PS	.02	.02	1.50	0.13	H11a Not Supported	
ST	ERS	PS	.01	.02	0.66	0.51	H11b Not Supported	
Total Effects								
EI	$\rightarrow$	PS	.64	.12	5.39	0.00	Supported	
CF	$\rightarrow$	PS	.11	.25	0.43	0.67	Not Supported	
ST	$\rightarrow$	PS	.10	.20	0.53	0.60	Not Supported	

Table 3: Direct, Indirect and Total Effects (N=373)

Note. B = Standardised regression weights; C.R. = Critical ratio; \*\* p = <.001; \* p = <.05; S.E = Standardised Error.