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Handout 3

HRM in project groups: The effect of project duration on team development effectiveness

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Abstract

The literature has found contradictory results regarding the impact of human resource management on project success. This paper focuses on one important human resource management process – team development – to investigate its importance in the project environment. Results show that most team development practices that work well in the operational business environment do not have a significant influence on project success. However, project duration was found to moderate the relationship between team development and project success: the effectiveness of team development increases in longer projects. The paper identifies and analyzes team development practices that have a positive impact on project success exclusively in long projects.

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1. Introduction

Human resource management (HRM) practices are critical for organizational success (Banker et al., 1996; Dul-bohn and Martocchio, 1998; Newell et al., 2004). However, their importance in the unique project environment is still unclear. On the one hand, the literature has identified HRM as an important factor towards project success (e.g. Tampoe and Thurloway, 1993; Barczak and Wilemon, 1992; Thamhain, 2004a) and a core element of project management bodies of knowledge (e.g. Kerzner, 2009; Meredith and Mantel, 2009; PMI, 2008). On the other hand, several recent empirical studies found HRM to have a limited effect on project success (e.g. Pinto and Prescott, 1988; Belout and Gauvreau, 2004; Ebtehaj and Afshari, 2006). In order to explain these contradictory results, the purpose of this study was to further investigate

the effectiveness of HRM in the project environment in general, with particular reference to exclusive project scenarios (Zwikael, 2008). In other words, this paper aims to explore the circumstances under which HRM practices are more effective towards improving project success.

Because HRM is a vast area, which has both a management support role and an employee support role (Turner et al., 2008) this paper does not intend to cover all its related processes. For example, the PMBOK (PMI, 2008) identifies four project HRM processes: develop human resource plan, acquire project team, develop project team, and manage project team. This paper focuses on team development, as the existing literature recognizes it as critical for organizational and project success (Kerzner, 2009; Weinkauff and Hoegl, 2002). Team development is under the direct responsibility of the project manager, who is expected to engage in activities such as training, and rewarding.

In order to better understand the role of team development in various type of projects, the objectives of this paper are to: (1) explore the contribution of different team

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development practices to project success; (2) identify those team development practices that have the greatest influence on project success; and (3) investigate potential moderating variables that may influence the relationship between team development and project success. As a result, this paper aims at improving the knowledge on team development effectiveness in general and across different project scenarios in particular. The following sections review the relevant literature and present the research model, hypotheses, results, implications, and contribution of this study to theory.

2. Literature review

This section reviews the relevant literature in the areas of teams, project teams, and project team development.

2.1. Teams

With the growing complexity of the work environment, many organizations have reconstructed individual work procedures into team processes to increase productivity and enhance organizational effectiveness (Banker et al., 1996; Dulebohn and Martocchio, 1998; Katzenbach and Smith, 1993; Mohrman et al., 1995; Newell et al., 2004). A team is defined as “a small number of people with complementary skills who are committed to a common purpose, performance goals and approach for which they are mutually accountable” (Katzenbach and Smith, 1993). Team members have specific roles or functions and the life span of membership is limited (Cannon-Bowers and Salas, 1998).

Six types of work teams have been identified in the group and team literature: project, production, service, action/performing, management and advisory teams (Hackman, 1990; Sundstrom et al., 2000). Due to its complexity and uniqueness, the first type – project teams – is what we focus on in this paper.

2.2. Project teams

As project teams are a unique type of teams, Huemann et al. (2007) suggested the conditions under which HRM emerges in the project-oriented organization may differ from those associated with mainstream HRM. A project is defined as any series of activities and tasks that have a specific objective to be completed within certain specifications, have defined start and end dates, and have funding limits (Kerzner, 2009). Project teams carry out defined, specialized, time-limited projects that disperse upon completion of project (Chen et al., 2004). This creates a dynamic work environment, where additional pressures can be imposed on the employee from fluctuating work-loads, uncertain requirements, and multiple role demands (Turner et al., 2008).

Members of project teams tend to come from different departments or units within the organization, as is appar-

ent in project and new product development teams (Sundstrom et al., 2000; Richards and Moger, 2000). In many instances, project teams are comprised of white-collar professionals who collaborate on an assigned or original project. However, it should be noted that the fact project teams operate in various contexts and industries and within different organizational structures (Kerzner, 2009; Dvir et al., 2006) also affects the way these projects should be managed. Furthermore, the tasks that project teams engage in usually involve the application of considerable knowledge and expertise (Simpson, 2006). Such project teams have been associated with high levels of innovation and autonomy (Sundstrom et al., 1990).

Project teams are generally cross-functional (Cunningham and Chelladurai, 2004; Chen et al., 2004; Cohen and Baily, 1997). Research has supported many positive outcomes to cross-functional project teams. These include greater external communication and technical quality (e.g. Keller, 2001), creativity (Jassawalla and Sashittal, 1999), and group performance (Pelled et al., 1999). However, the literature has also demonstrated negative outcomes for these teams, including lower levels of cohesion (Jehn, 1997), slower reaction times (Hambrick et al., 1996), increased costs (AitSahlia et al., 1995), and employee stress (Keller, 2001). Few researchers have even gone as far as to suggest that cross-functional teams have the potential to “worsen morale, exacerbate divisiveness, and elevate cynicism among participants” (Jassawalla and Sashittal, 1999).

2.3. Project team development

Project team development is the process of improving the competencies, team interaction, and the overall team environment to enhance project performance (PMI, 2008). This process transforms a collection of individuals with different needs, backgrounds, and expertise into an integrated, effective work unit (Thamhain and Wilemon, 1987). As a result, team leadership skills are important for project managers (Turner and Müller, 2006; Müller and Turner, 2007).

There are three phases in development of project teams (Weinkauff and Hoegl, 2002). The first phase is referred to as the “conceive phase”. During this phase, the project manager and the team focus on project goal-setting, determination of approach, and resource planning. This is followed by the “organizing phase” in which the manager and team members engage in boundary establishment, delineation of relationships, team task design, determination of values and norms and the securing of resources. Finally, during the “accomplish phase”, most of the activities are directed towards enabling the team members to work together as effectively as possible in order to successfully complete the project at hand. Leadership roles, such as direction, effective communication, autonomy, accomplishment, recognition, and the defining of clear organizational objectives, have been shown to have a strong

influence on innovative team performance (Thamhain, 2004a; Ochi, 2006).

The literature has identified team development practices that affect team performance (Dulebohn and Martocchio, 1998; Mohrman et al., 1995). For example, Weinkauff and Hoegl (2002) identified seven types of team development practices: controlling, securing information flow, conflict resolution, coaching and development, rewarding, granting of autonomy, and feedback. The PMBOK (PMI, 2008) suggests six tools and techniques for team development: interpersonal skills, training, team building activities, ground rules, co-location, and recognition and rewards.

2.4. The effectiveness of project team development

Findings relating to the effect of HRM practices on project team success are inconsistent in the management literature. Specifically, some studies found little or no effect of HRM activities on project success, whereas others found significant relationships.

Some studies have found team development practices to be essential for project success. For example, Tampoe and Thurloway (1993) found that encouraging mutuality, a sense of belonging, providing rewards and enabling creative autonomy is likely to result in improved project performance; Barczak and Wilemon (1992) found that goal-setting, autonomy and senior management support are significant discriminators of successful new product development team leaders. Thamhain (2004a) suggested project team development to be an ongoing process in order to achieve and sustain high project performance. All these findings emphasize the importance of team development in the project management environment.

Analysis of the HRM literature in the project environment reveals mixed findings. Belout and Gauvreau (2004) found personnel factors to have an insignificant impact on project success, and Ebtehaj and Afshari (2006) did not find HRM practices to have a significant impact on project success in 12 large oil and gas projects. Fortune and White (2006) reached a similar conclusion while analyzing 15 different studies. Pinto and Prescott (1988) identified the personnel factor as being marginal to project success. Moreover, numerous studies have found that HRM practices are not commonly performed by project managers (e.g. Larson and Gobeli, 1989; Pinto and Slevin, 1988; Zwikael and Globerson, 2004).

According to the studies mentioned above, the management research has not found clear and strong support regarding the impact of HRM and team development practices on project performance and success. These results support Huemann et al. (2007), who claim there is a missing link between the HRM literature and project management practice. This may also explain why project managers tend to invest the majority of their effort in more technical types of project management activities which include scheduling, budgeting, risk management, and controlling (Scott-Young

and Samson, 2008; Zwikael and Globerson, 2006). An analysis of the literature reveals several reasons that may explain why HRM is not successfully practiced in project teams.

2.4.1. Lack of authority

In some organizational structures, project team members do not receive direct supervision from project managers, but from their functional supervisor. Most employees rely more on their functional manager, who is responsible for their promotion, training, and work schedule. Moreover, in functional and matrix organizations, most project managers have no authority in many team development areas, such as reward and training, which are decided by a functional manager. As a result, team development practices that work well in other areas are not effective in the project environment (Kerzner, 2009; Huemann et al., 2007).

2.4.2. Team member availability

Unlike in other organizational teams, a project team member may participate in several projects at the same time. Hence, it is more complicated to develop a team, which includes members who spend only part of their time on a project (Kavadias and Loch, 2003; Kerzner, 2009).

2.4.3. Heterogeneous teams

Most project teams involve members from different disciplines. For example, a software development project may include a programmer, a data base analyst, a quality assurance manager, as well as an account manager, a lawyer, and a training department representative. It is more difficult in such a setting to develop employees with different backgrounds into one cohesive team (Globerson and Zwikael, 2002).

2.4.4. Time of project manager assignment

In some cases, a project manager is assigned only after the project has already started (Foti, 2005). In these cases, the project manager must rush into urgent project planning and execution, which leaves him/her no time for team development activities.

2.4.5. Job oriented project managers

In many technological organizations, project managers are assigned to projects due to their aligned technical skills. As a result, many project managers are job oriented, rather than people oriented, and have too little team development skills (Meredith and Mantel, 2009).

2.4.6. Lack of proper training

Project managers “do” what they are trained to do! In other words, project managers are trained for and know how to perform traditional project management activities, such as scheduling, budgeting, and risk management. Therefore, they may find it easier to engage in such activities, rather than to deal with team development practices,

with lack of knowledge, skills, and tools to do so effectively (e.g. PMI, 2008).

However, another factor that may explain those cases of low HRM contribution to project success is the fact that projects are limited in time. Team development effort takes time to bear fruit while a project is a temporary time-limited endeavor. Therefore, the positive effects of team development effort may not manifest themselves by the end of the project. In addition, because of time limits of projects, team members are rarely sent to training sessions during a busy project (Herroelen, 2005; Anderson and Joglekar, 2005). This may mean that the investment in HRM practices in long project is more effective than in short ones. If true, project duration may moderate the effect of HRM on project success.

Another support to the above approach can be found in the literature. Dvir et al. (2006) claim that there is no “one size project”. In other words, project management practices that work well in one project scenario may not be as effective in another and vice versa (Pinto, 2002; Scott-Young and Samson, 2008; Swink et al., 2006; Johnson et al., 2001; Thamhain, 2004b). This suggests that unique project team development practices should be identified for different project types and durations.

3. Conceptual framework

In line with the literature, this section introduces research hypotheses, a model developed for their investigation, and the description of the study.

3.1. Research hypotheses

3.1.1. The impact of team development effort on project success

Due to inconsistencies in the literature (discussed earlier), the first hypothesis deals with the level that project success is correlated with the amount of effort invested by project managers in team development practices. Therefore, the first research hypothesis is:

H1: There is a positive correlation between the effort made towards project team development and project success.

3.1.2. The interaction between project duration and team development to influence on project success

The literature review section identified project duration as a central factor in project management. Hence, project duration may moderate the effectiveness of team development on project success, that is the effectiveness of team development practices in short and long projects is dissimilar:

H2: The longer project duration is, team development has stronger impact on project success.

As in longer projects, there is more to implement team development practices, it is expected that in these projects, team development practices have stronger influence on project success. Furthermore, as long projects usually carry great weight to the organization that manages them, there is more at stake for a project manager to work hard on these complex issues.

3.2. The research model

In order to test the research hypotheses, a model was developed to investigate the impact of team development on project success for various project durations. The unit of measurement in this study was a project.

The independent variable in this model is project team development. The list of team development practices was identified from the group, team and project management literature included the development of communication systems, empowerment, negotiation, problem solving, time management, auditing, creativity, collaboration, focusing on task functions, team maintenance functions, general management skills, setting ground rules, and collocation (see Williams, 2002; Richards and Moger, 2000; Stokes, 1990; PMI, 2008; Thamhain, 2004a). Twenty-eight of these team development practices were included in the initial version of the questionnaire. Each item was rated on a seven-point Likert scale ranging from 1 (never) to 7 (always).

Project success is the dependent variable in this model. This paper does not accept the traditional approach of gauging project success using the “golden” or the “iron” triangle, i.e. that the project be completed on time, within budget, and to specification (Bryde, 2005; Jha and Iyer, 2007; Bourne and Walker, 2005; Gardiner and Stewart, 2000). This is the operational mindset, which is influenced by the “get the job done” approach (Dvir et al., 2006).

While the first three success dimensions are limited as they relate only to project management success, the fourth one captures organizational benefits that are important to the funding organization. Customer satisfaction is a core project success measure (e.g. Dvir and Lechler, 2004; Hackman, 1987; Baker et al., 1988; Scott-Young and Samson, 2008; Dvir et al., 2006; Lim and Mohamed, 1999; Zwikael and Sadeh, 2007; Voetsch, 2004; Bryde, 2005). For example, Lipovetsky et al., 1997 found customer satisfaction to be the most important project success criteria. Consequently, four project success variables were used as the dependent variables of this research:

1. Schedule overrun was calculated as the actual project schedule as a percentage of the original plan.
2. Cost overrun was calculated as the actual project cost as a percentage of the original plan.
3. Project performance, refers to the quality of outputs, was measured on a scale of 1 (low performance) to 7 (high performance).
4. Customer satisfaction was measured on a scale of 1 (low customer satisfaction) to 7 (high customer satisfaction).

Project duration is included as a moderating variable, as argued in the second hypothesis.

3.3. Data collection

The research team collected data from 99 project teams from 37 different organizations in Israel during the years 2004–05. These organizations were chosen to make sure the research sample included both small and large companies and to relatively reflect different industrial sectors across the country. Each organization had a research assistant assigned to personally visit the organization, meet with top management, explain the importance of the research, deliver the questionnaires, and clarify unclear items. All projects included in this study had already been completed, making it possible to evaluate all of the project success measures. All questionnaire responses were anonymous, personally collected by the research assistants.

Two questionnaires were distributed to gather data about each project: one to the project manager, and the other to his/her supervisor. The questionnaire distributed to project managers focused on the amount of effort he/she had invested in team development practices. In this questionnaire, project managers rated the relative amount of effort they extended in each team development practice during the last project completed.

Only questionnaires with less than 10% missing data were included in this study. The result was that 81 project teams participated in this current study. This sample size is not uncommon in leading studies – compare, for example, 56 teams (Scott-Young and Samson, 2008), 45 teams (Stewart and Barrick, 2000), or 39 teams (Wurst et al., 2001). An analysis of team size in the study's projects shows that 36% of the projects include small teams with no more than five members, with the 54% of project teams consisting of 10 or less team members.

Additional analyses of organization type indicated that 67% of the project teams were from organizations in the private sector, whereas 33% were from public sector organizations. In addition, this sample includes projects executed in software, engineering, production, and communications organizations. This distribution is representative of the sectors in the local Israeli industry.

We asked the supervisors to refer to the same project that had been referred to by the project manager. This questionnaire included four items pertaining to project success dimensions, as indicated earlier. In order to avoid “same source bias”, the supervisors reported project success results.

The average schedule overrun in these projects was 13%, ranging from 0% ahead of time up to a schedule overrun of 50%. The average cost overrun was 10%, and ranged from 0% to 30% of its original budget. Project performance average was 6.0, ranging from 3 to 7, while customer satisfaction average was 5.8, ranging from 2 to 7. These results are similar to previous studies (e.g. Zwikael and Globerson, 2004).

4. Results

First, we calculated the reliability of the items in the questionnaire using Cronbach alpha. The index value for all team development items is $\alpha = 0.871$, reflecting high level of reliability (Cronbach, 1951; Garmezy et al., 1967).

Then, we conducted a factor analysis to group these team development practices. This analysis showed that 18 items explain 74% of the variance, while grouped into six areas – training, pay and reward, coordination, goal clarity, collocation, and recognition. The results of the cluster analysis exercise and the identification of team development practices included in each area are presented in Table 1.

The results in Table 1 also demonstrate high values of Cronbach alpha for all team development areas, ranging from 0.76 to 0.91. These results not only allow us to clearly identify six team development areas, but also ensure that the practices comprised each area have been well selected. The six team development areas identified in this exercise were training, pay and reward, coordination, goal clarity, collocation, and recognition.

4.1. Hypothesis 1 – the impact of team development effort on project success

The first hypothesis claims a positive correlation between the extent of use of project team development practices and project success. First, we conducted a correlation analysis that included the six team development areas and four project success measures, as presented in Table 2.

As previously found in the literature, significant correlations were found among project success measures (e.g. Dvir and Lechler, 2004). These results motivated us to use a multivariate approach for data analysis, where all four success measures were calculated simultaneously in one regression run, and later divided into unique results for each success measure separately. However, one significant correlation was noticed among all possible 24 pairs of six team development areas and four project success measures: this is the case of recognition and customer satisfaction. These results indicate low direct influence of team development on project success.

To further examine the impact of the six team development areas on project success measures, we used multivariate linear regression. In this analysis, the six team development areas acted as the independent variables. The four project success measures served as the dependent variables. The following model developed as a result:

$$\text{Project success} = a_0 + \sum b_i * PTDA_i \quad (1)$$

where: $PTDA_i$, the effort invested in project team development area i (as the average of team development practices comprise the area, measured between 1 and 7); $i = 1, \dots, 6$ for all team development areas.

Table 1
Results of the factor analysis exercise.

Team development area	Cumulative per cent of variance	Team development practices	Components					
			1	2	3	4	5	6
Training ($\alpha = 0.91$)	26.5	Decisions regarding what kind of training is required for team members	0.861	0.130	0.244	0.003	0.033	0.197
		Selecting who will be trained	0.895	0.236	0.091	−0.021	−0.046	0.157
		Deciding the training content	0.880	0.120	0.007	0.042	0.202	0.084
Pay and reward ($\alpha = 0.78$)	41.5	Decisions regarding pay of team members	−0.102	0.86	0.165	−0.098	0.067	0.062
		Decisions regarding the job security of team members	0.125	0.615	0.113	−0.028	0.003	0.306
		Rewarding individual team members according to individual accomplishments	0.264	0.798	−0.111	0.061	−0.033	0.061
		Rewarding the team given goal attainment and additional accomplishments	0.292	0.758	0.016	0.207	0.041	−0.038
Coordination ($\alpha = 0.71$)	52.1	Clarity of project cost	0.019	0.083	0.707	−0.085	0.151	−0.019
		To enable the team members to initially meet with each other at the beginning of the project	0.229	0.007	0.810	0.182	−0.048	0.038
		To enable the team members meet with each other regularly during the project	−0.072	−0.01	0.719	0.173	0.232	0.216
		Developing a distribution list of all team members of the project	0.248	0.123	0.539	0.208	0.240	−0.102
Goal clarity ($\alpha = 0.82$)	61.1	Clarity of project end output	0.007	0.088	0.028	0.914	0.043	0.003
		Clarity of project quality	0.020	0.046	0.099	0.872	0.131	0.155
		Clarity of project schedule	0.005	−0.08	0.32	0.667	0.077	0.339
Collocation ($\alpha = 0.83$)	68.1	To obtain resources to enable team members to work at the same physical location	0.102	0.035	0.17	0.074	0.906	−0.004
		To have organizational permission to actually gather most of project team members at the same physical location	0.051	0.014	0.211	0.127	0.876	0.047
		Social recognition (public recognition and praise) of contributions and achievements of individual members	0.211	0.117	−0.128	0.211	−0.011	0.821
Recognition ($\alpha = 0.76$)	74.1	Social recognition (public recognition and praise) of team contributions and achievements to the overall organization	0.170	0.176	0.206	0.127	0.046	0.801

Table 2
Correlations among study variables.

	Training	Pay and reward	Coordination	Goal clarity	Collocation	Recognition	Schedule overrun	Cost overrun	Project performance	Customer satisfaction
Training	1.00	.384**	.269*	.100	.173	.349**	−.043	.101	−.079	.009
Pay and reward		1.00	.163	.106	.085	.308**	−.195	−.112	.048	.072
Coordination			1.00	.309**	.395**	.191	−.146	−.070	−.146	−.163
Goal clarity				1.00	.243*	.336**	−.150	−.105	.132	.188
Collocation					1.00	.085	−.041	−.072	−.146	.057
Recognition						1.00	−.174	−.044	.190	.303**
Schedule overrun							1.00	.670**	−.382**	−.116
Cost overrun								1.00	−.594**	−.253*
Project performance									1.00	.345**
Customer satisfaction										1.00

* $p < 0.05$.
 ** $p < 0.01$.

Table 3 presents statistical *F* values, and the significance value for each team development area.

Table 3 shows no significant impact of any of the team development areas on project success. Moreover, the *R* squared for this regression run was very low (0.089 for schedule overrun; 0.063 for cost overrun; 0.070 for project performance; and 0.162 for customer satisfaction). As a result, the first hypothesis cannot be accepted, and it remains that in general, team development has no significant contribution to project success.

4.2. Hypothesis 2 – the interaction between project duration and team development to influence on project success

The second hypothesis examines the moderating effect of project duration on the relationship between team development and project success. If supported, this hypothesis suggests that team development is effective only in selected project scenarios (short or long-term projects). For this purpose, we executed a non-linear multivariate regression with all four project success measures acting as the depen-

Table 3

Impact of team development areas on project success – results of a multivariate regression.

Team Development Area	F value	Significance level
Intercept	13.634	0.000**
Training	0.771	0.548
Pay and reward	0.812	0.522
Coordination	1.573	0.192
Goal clarity	0.609	0.658
Collocation	0.619	0.651
Recognition	1.780	0.144

$p < 0.05$.

** $p < 0.01$.

dent variable. The independent variables included interactions between project duration and the six team development areas. The following model developed as a result:

$$\text{Project success} = a_0 + \sum b_i * PTDA_i * D \quad (2)$$

where: $PTDA_i$, the effort invested in project team development area i (as the average of team development practices comprise the area, measured between 1 and 7); D , project duration (in months); $i = 1, \dots, 6$ for all team development areas.

Table 4, which presents F values and significance levels for this analysis, illustrates two interactions that significantly influence project success. This means that only in longer projects, ‘pay and reward’ and ‘coordination’ have a positive influence on project success. More specifically, ‘pay and reward’ mainly contribute to reduced schedule overrun (significance value 0.012), while ‘coordination’ has a major impact on improved customer satisfaction (significance value 0.004). In addition, R squared for success measures increased with the addition of ‘project duration’ as a moderating variable: (0.176 for schedule overrun; 0.082 for cost overrun; 0.033 for project performance; and 0.186 for customer satisfaction).

In alignment with the second research hypothesis, we can now claim that team development has effective results on project success only in long projects and with respect to specific team development areas, i.e. pay and reward, and coordination. Hence, executing team development practices in other cases may be a waste of expensive time and resources. Managers should understand which team

development practices are most effective in each project scenario, and act accordingly.

5. Discussion

The initial motivation for this study was to further explore the contradictory results that appear in the literature regarding the impact of project team development on project success. This study developed a model that specifies the effect of team development practices on project success. This basic model indicates that team development has no significant impact on project success. These findings are aligned with some other studies (e.g. Ebtehaj and Afs-hari, 2006; Belout and Gauvreau, 2004). Common explanations for these results include Lack of project manager authority, limited team member availability, heterogeneous teams, late project manager assignment, and lack of proper training (Kerzner, 2009; Zwikael and Globerson, 2004; Huemann et al., 2007; Kavadias and Loch, 2003; Globerson and Zwikael, 2002; Foti, 2005; Meredith and Mantel, 2009).

However, this study also found that project duration moderates the relationship between team development and project success. Specifically, we found that ‘pay and reward’ and ‘coordination’ team development areas have a positive impact on project success only in long projects. According to the sample of this study, longer projects are those lasting more than a year. In shorter projects, the effectiveness of team development practices may not be worth the time and resources invested in them. As a result, project managers may insist on having the resources to reward team members in long-term projects, where the effect of a reward on behavior is noticeable.

The inclusion of project duration as a moderating variable resulted with stronger results, as is witnessed with a high R squared. These results are particularly strong, given that the use of objective outcome measures (time and cost overrun) is known to produce lower results than subjective measures, and that several technical factors excluded from our models are strongly predictive of capital project outcomes (Nemes and Lukas, 1996).

This study can partly explain the inconsistency found in the literature regarding the effectiveness of team development in projects. Indeed, it shows that team development does not fit all projects in the same manner. According to our results, the reason for this may be differences across projects, as can be noticed by their different durations. As a result, we suggest that the amount of effort that a project manager should put in team development depends on the unique nature of the project in hand.

6. Practical implications

Although previous studies, as well as this one, found that team development in general has only a low influence on project success, we believe that team development practices are important in the project environment. However, project

Table 4

The impact of the interactions among project characteristics and team development practices on project success.

Factor	F	Significance value
Intercept (a_0)	805.4	0.000**
Project duration \times Training (b_1)	1.715	0.158
Project duration \times Pay and reward (b_2)	3.420	0.014*
Project duration \times Coordination (b_3)	3.373	0.015*
Project duration \times Goal clarity (b_4)	0.254	0.906
Project duration \times Collocation (b_5)	0.761	0.555
Project duration \times Recognition (b_6)	0.887	0.477

* $p < 0.05$.

** $p < 0.01$.

managers should carefully select team development practices that fit their unique project scenario and its duration. Specifically, we suggest organizations to focus on pay and reward, and coordination practices in long projects (see Masters and Frazier, 2007). For example, it is important to actively recognize the contribution and achievements of individual team members through rewards that are perceived as valuable, such as financial rewards in the form of bonuses. According to the model used in this study, in projects lasting over than one year, project managers may want to focus on the following team development practices:

1. Rewarding team members according to individual accomplishments.
2. Achieving funds to be able to pay bonuses to team members.
3. Increasing job security of team members.
4. Rewarding the team given goal attainment and additional accomplishments.
5. Encouraging team members to meet with each other during the project.

The above team development practices are also in line with the team motivation and job satisfaction literatures (McClurg, 2001). As there is a missing link between the project management and HRM literature (Huemann et al., 2007), and following the results of this study, the implementation of traditional team development practices that work effectively outside the project context is not sufficient for the unique project environment. This may mean that additional project-tailored approaches and tools should be developed. The focus of such efforts should be with team development practices that were found in this study to have a positive impact on project success in some project scenarios: pay and reward, and coordination.

A limitation of this research is that the generalization of results and conclusions are somewhat limited, because all the projects surveyed and data gathered pertain to a particular country. It is important to investigate the effect of cultural values on project team management and success. In addition, care should be practiced with generalization, as the sample included many software organizations that practiced relatively small projects, where organizational type and structure were not controlled.

Finally, findings of this study highlight the most effective team development practices to be utilized in various project contexts, and point to the need for the scholarly community to develop exclusive team development tools to be used by project managers in different project scenarios, such as different project types, and organizational structures.

References

AitSahlia, F., Johnson, F., Will, P., 1995. Is concurrent engineering always a sensible proposition? *IEEE Transactions on Engineering Management* 42, 166–170.

- Anderson, E.G., Joglekar, N.R., 2005. A hierarchical product development planning framework. *Production and Operations Management* 14 (3), 344–361.
- Baker, B.N., Murphy, D.C., Fisher, D., 1988. Factors affecting project success. In: Cleland, D.I., King, W.R. (Eds.), *Project Management Handbook*. Van Nostrand Reinhold, New York, pp. 902–919.
- Banker, R.D., Field, J.M., Schroeder, R.C., Sinha, K.K., 1996. Impact of work teams on manufacturing performance. A longitudinal field study. *Academy of Management Journal* 39, 867–890.
- Barczak, G., Wilemon, D., 1992. Successful new product team leaders. *Industrial Marketing Management* 21 (1), 61–68.
- Belout, A., Gauvreau, C., 2004. Factors influencing project success: the impact of human resource management. *International Journal of Project Management* 22 (1), 1–11.
- Bourne, L., Walker, D.H.T., 2005. Visualising and mapping stakeholder influence. *Management Decision* 43 (5/6), 649–660.
- Bryde, D.J., 2005. Methods for managing different perspectives of project success. *British Journal of Management* 16 (2), 119–131.
- Cannon-Bowers, J.A., Salas, E., 1998. Team performance and training in complex environments: Recent findings from applied research. *Current Directions in Psychological Science* 7 (3), 83–87.
- Chen, G., Donahue, L.M., Klimoski, R.J., 2004. Training undergraduates to work in organizational teams. *Academy of Management Learning and Education* 3 (1), 27–40.
- Cohen, S.G., Baily, D.E., 1997. What makes teams work: Group effectiveness research from the shop floor to the executive suite? *Journal of Management* 23, 239–290.
- Cronbach, L.J., 1951. Coefficient alpha and the internal structure of tests. *Psychometrika* 16 (3), 297–334.
- Cunningham, G.B., Chelladurai, P., 2004. Affective reactions to cross-functional teams: the impact of size, relative performance, and common in-group identity. *Group Dynamics: Theory, Research and Practice* 8 (2), 83–97.
- Dulebohn, J.H., Martocchio, J.J., 1998. Employee perceptions of the fairness of work group incentive pay plans. *Journal of Management* 24 (4), 469–488.
- Dvir, D., Lechler, T., 2004. Plans are nothing, changing plans is everything: the impact of changes on project success. *Research Policy* 33, 1–15.
- Dvir, D., Sadeh, A., Malach-Pines, A., 2006. Projects and project managers: the relationship between project managers' personality, project types, and project success. *Project Management Journal* 37 (5), 36–48.
- Ebtehaj, M., Afshari, H., 2006. The impact of HRM1 on project success: an empirical study in oil and gas construction industries of Iran. In: Paper Presented at the Third International Conference on Project Management (ProMAC2006), Sydney, Australia.
- Fortune, J., White, D., 2006. Framing of project critical success factors by a systems model. *International Journal of Project Management* 24 (1), 53–65.
- Foti, R., 2005. Team Building is a much a part of project success as technical skills. *Project Management Network*, pp. 44–51.
- Gardiner, P.D., Stewart, K., 2000. Revisiting the golden triangle of cost, time and quality: The role of NPV in project control, success and failure. *International Journal of Project Management* 18 (4), 251–256.
- Garmezy, N., Harlow, H.F., Jones, L.V., Stevenson, H.W., 1967. *Principles of General Psychology*. Ronald Press Co., New York.
- Globerson, S., Zwikael, O., 2002. Impact of the project manager on project management planning processes. *Project Management Journal* 31 (3), 58–64.
- Hackman, J.R., 1987. The design of teams. In: Lorsch, J. (Ed.), *Handbook of Organizational Behaviour*. Prentice-Hall, Englewood Cliffs, NJ, pp. 315–342.
- Hackman, J.R., 1990. Groups that work and those that do not: creating conditions for effective teamwork. Jossey-Bass, San Francisco.
- Hambrick, D.C., Cho, T.S., Chen, M.J., 1996. The influence of top management team heterogeneity on firms' competitive moves. *Administrative Science Quarterly* 41, 659–684.

- Herroelen, W., 2005. Project scheduling – theory and practice. *Production and Operations Management* 14 (4), 413–432.
- Huemann, M., Keegan, A., Turner, J.R., 2007. Human resource management in the project-oriented company: a review. *International Journal of Project Management* 25 (3), 315–323.
- Jassawalla, A.R., Sashittal, H.C., 1999. Building collaborative cross-functional new product teams. *Academy of Management Executive* 13 (3), 50–63.
- Jehn, K.A., 1997. A qualitative analysis of conflict types and dimensions in organization groups. *Administrative Science Quarterly* 42, 530–557.
- Jha, K.N., Iyer, K.C., 2007. Commitment, coordination, competence and the iron triangle. *International Journal of Project Management* 25 (5), 527–540.
- Johnson, J., Karen, D., Boucher, K.C., Robinson, J., 2001. Collaborating on project success. *Software Magazine*. February/March.
- Katzenbach, J.R., Smith, D.K., 1993. The discipline of teams. *Harvard Business Review* 71, 111–120.
- Kavadias, S., Loch, C.H., 2003. Optimal project sequencing with recourse at a scarce. *Resource Production and Operations Management* 12 (4), 433–444.
- Keller, R.T., 2001. Cross-functional project groups in research and new product development: diversity, communications, job stress, and outcomes. *Academy of Management Journal* 44, 547–555.
- Kerzner, H., 2009. *Project Management: A Systems Approach to Planning, Scheduling and Controlling*, 10th ed., John Wiley and Sons.
- Larson, E.W., Gobeli, D.H., 1989. Significance of project management structure on development success. *IEEE Transactions on Engineering Management* 36 (2), 119–125.
- Lim, C.S., Mohamed, M.Z., 1999. Criteria of project success: an exploratory re-examination. *International Journal of Project Management* 17 (4), 243–248.
- Lipovetsky, S., Tishler, A., Dvir, D., Shenhar, A., 1997. The relative importance of project success dimensions. *R&D Management* 27 (2), 97–106.
- Masters, B., Frazier, G.V., 2007. Project quality activities and goal setting in project performance assessment. *Quality Management Journal* 14 (3), 25–35.
- McClurg, L.N., 2001. Team rewards: how far have we come? *Human Resource Management* 377, 396. Spring.
- Meredith J.R., Mantel S.J., 2009. *Project management – A Managerial Approach*, seventh ed., John Wiley and Sons.
- Mohrman, S.A., Cohen, S.G., Mohrman, A.M., 1995. *Designing Team Based Organizations*. Jossey-Bass, San Francisco.
- Müller, R., Turner, R., 2007. The influence of project managers on project success criteria and project success by type of project. *European Management Journal* 25 (4), 298–309.
- Nemes, R.J., Lukas, J.A., 1996. Reengineering Kodak's capital process. *Transactions of AACE International* 21, 24. Morgantown, PM.
- 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, S43–S57.
- Ochi, M., 2006. A successful case of team building by motivating project member. In: *The Third International Conference on Project Management (ProMAC2006)*, Sydney, Australia.
- Pelled, L.H., Eisenhardt, K.M., Xin, K.R., 1999. Exploring the black box: an analysis of group diversity, conflict, and performance. *Administrative Science Quarterly* 44, 1–28.
- 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., 1988. Critical success factors across the project life cycle. *Project Management Journal* 19 (3), 67–75.
- Pinto, J.K., 2002. Project management. *Research Technology Management* 45 (2), 22–37.
- PMI Standards Committee, 2008. *A Guide to the Project Management Body of Knowledge*. Project Management Institute, Newtown Square, PA.
- Richards, T., Moger, S., 2000. Creative leadership processes in project team development: an alternative to Tuckman's stage model. *British Journal of Management* 11 (4), 273–290.
- Scott-Young, C., Samson, D., 2008. Project success and project team management: evidence from capital projects in the process industries. *Journal of Operations Management* 26 (6), 749–766.
- Simpson, N.C., 2006. Modeling of residential structure fire response: exploring the hyper-project. *Journal of Operations Management* 24 (5), 530–541.
- Stewart, G.L., Barrick, M.R., 2000. Team structure and performance. *Academy of Management Journal* 43 (3), 135–146.
- Stokes, S.L., 1990. Building effective project teams. *Journal of Information Systems Management* 7 (3), 38–45.
- Sundstrom, E., De Meuse, K.P., Futrell, D., 1990. Work Teams: Applications and Effectiveness. *American Psychologist* 45 (2), 120–133.
- Sundstrom, E., McIntire, M., Halfhill, T., Richards, H., 2000. Work groups: from Hawthorne studies to work teams of the 1990s and beyond. *Group Dynamics: Theory, Research and Practice* 4 (1), 44–67.
- Swink, M., Talluri, S., Pandepong, T., 2006. Faster, better, cheaper: a study of NPD project efficiency and performance tradeoffs. *Journal of Operations Management* 24 (5), 542–562.
- Tampoe, M., Thurloway, L., 1993. Project management: the use and abuse of techniques and teams (reflections from a motivation and environment study). *International Journal of Project Management* 11 (4), 245–250.
- Thamhain, H.J., Wilemon, D.L., 1987. Building high performance engineering project teams. *IEEE Transactions on Engineering Management* 34 (3), 130–137.
- Thamhain, H.J., 2004a. Team leadership effectiveness in technology-based project environments. *Project Management Journal* 35 (4), 35–46.
- Thamhain, H.J., 2004b. Linkages of project environment to performance lessons for team leadership. *International Journal of Project Management* 22, 533–544.
- Turner, R., Huemann, M., Keegan, A., 2008. Human resource management in the project-oriented organization: employee well-being and ethical treatment. *International Journal of Project Management* 26 (5), 577–585.
- Turner, R., Müller, R., 2006. *Choosing Appropriate Project Managers: Matching their Leadership Style to the Type of Project*. Project Management Institute, United States.
- Voetsch, R.J., 2004. The current state of project risk management practices among risk sensitive project management professionals. Ph.D. Dissertation, The George Washington University, 559 p., AAT 3112236.
- Weinkauff, K., Hoegl, M., 2002. Team leadership activities in different project phases. *Team Performance Management* 8 (7–8), 171–182.
- Williams, J., 2002. *Team development for high tech project managers*. Artech House, Norwood, MA.
- Wurst, K.M., Hoegl, M.M., Gemuenden, H.G., 2001. Collaboration within and between teams in multi-team R&D projects. In: *Proceedings of International Conference on Management of Engineering and Technology (PICMET)*, Portland, US, pp. 545–552.
- Zwikael, O., 2008. Top management involvement in project management – exclusive support practices for different project scenarios. *International Journal of Managing Projects in Business* 1 (3), 387–403.
- Zwikael, O., Globerson, S., 2004. Evaluating the quality of project planning: a model and field results. *International Journal of Production Research* 42 (8), 1545–1556.
- Zwikael, O., Globerson, S., 2006. From critical success factors to critical success processes. *International Journal of Production Research* 44 (17), 3433–3449.
- Zwikael, O., Sadeh, A., 2007. Planning effort as an effective risk management tool. *Journal of Operations Management* 25 (4), 755–767.



Factors influencing project success: the impact of human resource management

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Abstract

Today, human resource management (HRM) is being renewed in organizations and gradually affirming its strategic role. However, the results of an empirical study conducted by Pinto and Prescott [Journal of Management 14 (1988) 5] within a context of project management, contradict this trend. These authors concluded that the “Personnel factor” was the only factor in their research that was marginal for project success. This paper attempts to retest their conclusions in rethinking issues of validity of the measures used in their study. In line with research by Tsui [Human Resource Management 26 (1987) 35; Administrative Science Quarterly 35 (1990) 458] and some of Belout’s recommendation [International Journal of Project Management 16(1) (1998) 21], the construct validity of the human resources factor has been examined and a model proposed. Results show, first of all, that although there was a link between project success and the Personnel factor (based on the correlation analyses), this factor did not have a significant impact on project success. Our results tend also to confirm that the relationships between the independent variables and project success will vary according to life cycle stage. The results also show that for three distinct structures (functional, project-based and matrix), the Management Support and Trouble-shooting variables were significantly correlated with success. Finally, this study confirm a moderating effect between the independent variables and project success, depending on the sector studied. All in all, this research adds another step in conceptualizing HRM in project context which is still very rudimental. In this sense, researchers should, in the future, improve the construct validity of the Personnel variable by improving the psychometric properties of the questionnaires used in the project management context. This study also shows the problem of multicollinearity, which appears to be excessive in the use of PIP. Finally, a fundamental question is posed: does HRM in the context of project management have specific characteristics that make its role, social responsibility and operation different from the so-called traditional HRM?

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Keywords: Project success; Project life cycles; Human resource management

Nowadays, project management has become a key activity in most modern organisations. Projects usually have a wide variety of objectives, involve numerous internal and external actors, and are conducted in various activity sectors. Since 1980, many academics and practitioners have agreed that human resource management (HRM) is one of the most crucial elements of an organisation’s success [1,2]. Today, HRM is being renewed in organisations and gradually affirming its strategic role. However, the results of an empirical study

by Pinto and Prescott [3] contradict this trend. In a field study designed to test changes in the importance of ten critical success factors across four stages of the project life cycle, the authors concluded that the “personnel” factor is only a marginal variable in project success. These rather unexpected results were criticised extensively by Belout [4] who suggested that future research needs to retest Pinto and Prescott’s conclusions and address fundamental questions: (1) Is personnel a significant factor in project management success? (2) In the model used, is the relationship between the independent variables and project success affected by the four project life cycle stages? and (3) Do organisational structures and project activity sectors have a moderating effect on the relationship between critical success factors and project success?

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These questions motivated the present research. More specifically, our objectives were twofold: first, we wanted to address the lack of empirical data available on critical success factors, including the personnel factor, by re-testing, in a field study, the theoretical model used by Pinto and Prescott and developed by Slevin and Pinto [5]. This objective is in line with the findings of a literature review on project management which revealed that most models explaining project success are based on theory rather than on empirical proof and that few academic studies have concentrated on the critical factors affecting project success [6]. A second objective was to further investigate the impact of the life cycle stage, type and structure of a project on the relationship between the critical factors and project success (dependent variable).

1. Theoretical background

Projects usually involve attention to a variety of human, budgetary and technical variables. Although many definitions exist, most researchers agree that projects generally possess the following characteristics: limited budget, schedule, quality standards, and a series of complex and interrelated activities (generally project-based or matrix structure). With respect to project success, historically, projects have been managed as technical systems instead of behavioural systems. That is, there has been a tendency to use a mechanistic approach focused on results with the main objective of attaining target dates, achieving financial plans and controlling the quality of the final product [7].

In regard to critical success factors, numerous lists and models have been proposed in the literature [6]. For instance, one article suggested that the following four dimensions should be considered when determining project success: project efficiency, impact on the customer, direct and business success, and preparing for the future [8]. The perception of the various interest groups (e.g. stakeholders, management, customers, and employees) is also regarded as a key factor since different people will view success in different ways [9,10]. Morley [11] noted that the project management triangle based on schedule, cost and technical performance is the most useful in determining the success or failure of a project [12,13]. To these standards, we added the notion of the project's risk and the capacity to resolve problems encountered by the project team (management uncertainty), which appear to be major elements in the evaluation of a project's success. Couillard [14] classified these risks into three groups, that is, risks linked to technical performance, those linked to the budget and those linked to schedule.

To date, the most important empirical studies on the critical factors in project success have been conducted

by Pinto with coauthors Slevin [15], Prescott [3], Covin [16], and Mantel [10]. In 1987, Pinto and Slevin [15] developed a project model and identified 10 factors (Table 1). Their principal research question was: "Are project implementation critical success factors of equal and stable importance over the life of a project, or does their relative importance (weighting) change as the project moves through different stages of completion?" (p. 6). Regression analysis revealed that different factors were significantly related to project success in the four different stages. For instance, in the conceptual stage, project mission and client consultation were the two variables significantly linked to project success while in the termination stage, technical tasks, project mission, and client consultation explained 60% of the variance in project success. Surprisingly, the personnel factor "was the only factor not found to be significantly predictive of project success in at least one of the life cycle stages" (p. 13).

This latter finding contradicts a large body of organisational literature that suggests that organisational success can never be reached without qualified and motivated personnel [1]. In today's highly competitive environment, managing people effectively can also have a significant impact on the results of a project since, as Hubbard [17] noted, most major project failures are related to social issues. For instance, a study by Todryk [18] revealed that a well-trained project manager is a key factor linked with project success because as a team builder, he/she can create an effective team. This view is supported by other studies on project-team training [19,20].

2. A conceptual framework

Our model, which draws on Pinto and Prescott's [3] research, included 10 independent variables and three moderating variables (project life cycle, project organisational structure and project activity sector (Fig. 1). In reference to the importance of human resources in the organisations [2], we wanted to retest the impact of Pinto and Prescott's [3] 10 independent variables on the dependent variable of our model (Fig. 1). **Our general proposition (H1) was:** The Personnel factor will have a significant impact on the project's success.

The effect of life cycle stages on organisational effectiveness has long been recognised [21]. In project management, this concept has been investigated by numerous academics [22,23]. Each project cycle implies a different intensity of effort as well as different tasks and actors. Four stages are often identified: conceptualisation, planning, execution and completion). In line with Pinto and Prescott's [3] research suggesting that the effect of the critical factors on success varies as the project cycle stages change, we tested the effect of

Table 1
Pinto and Prescott's ten success factors [3]

Project mission	Initial clarity of objectives and general directions
Project Schedule	A detailed specification of the individual action steps required for project implementation
Client Consultation	Communication and consultation listening to all parties involved
Technical Tasks	Availability of the required technology and expertise to accomplish the specific technical action steps
Client Acceptance	The act of "selling" the final projects to their ultimate intended users
Monitoring and feed back	Timely provision of comprehensive control information at each stage in the implementation process
Communication	The provision of an appropriate network and necessary data to all key actors
Trouble-shooting	Ability to handle unexpected crises and deviations from plan
Management Support	Willingness of top management to provide the necessary resources and authority/power for project success
Personnel (recruitment, selection and training)	Recruitment, selection and training of the necessary personnel for the team

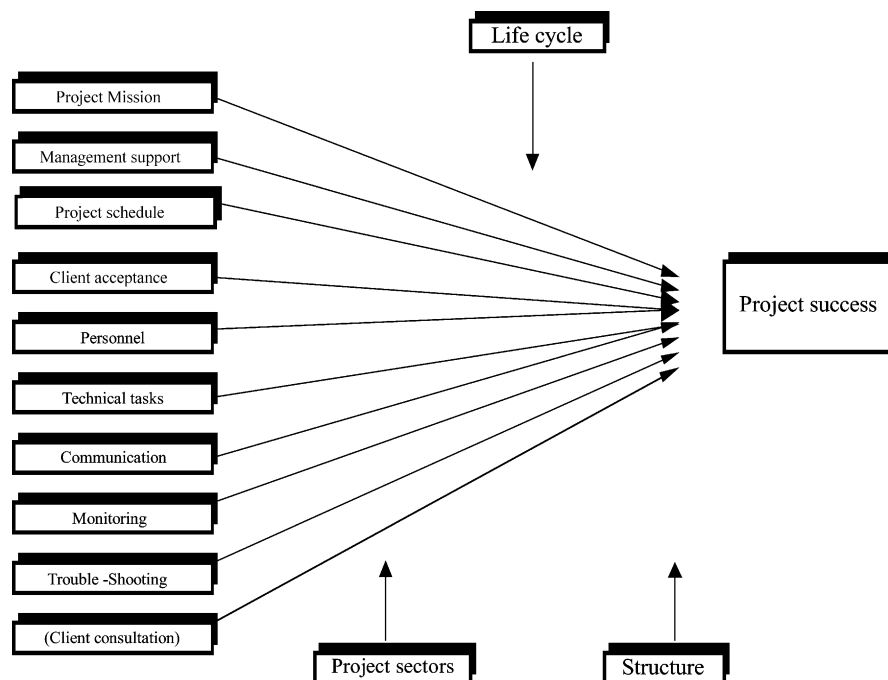


Fig. 1. The proposed model.

that variable on project success. **Our proposition (H2) was therefore:** the relationship between the independent variables and project success in the model will be affected by the four project life cycle stages.

In addition to the success factors proposed by Pinto and Prescott [3], we decided to investigate the impact of two other variables, that is, project structure and project activity sector, which we believe can affect the relationship between the critical factors identified above and project success. In fact, some authors have emphasised the importance of examining the impacts of organisational structures on effectiveness [24]. Applied to project management, one of the most interesting studies was carried out by Gobeli and Larson [13] who pointed out that each organisational structure in the project management context has its strengths and weakness. According to them, the type of structure chosen will significantly affect the success of the project. Their aim

was to assess the relative effectiveness of five structures: functional, functional matrix, balanced matrix, project matrix and project team. They found that the project matrix and the project team structures were rated as the most effective. These structures affect the project manager's roles [22,25], the co-ordination of activities and the intensity of conflicts [26], thereby indirectly amplifying or reducing the project's effectiveness. **Our proposition (H3) was therefore:** Project structure has a moderating effect on the relationship between the independent variables and project success.

In this research, we also wanted to take into consideration the impact of the project's activity sector (business area or industrial sectors where the project has been conducted), which has been identified in the literature as being a major factor of project success. In 1996, Belassi and Tukel [6] suggested that in addition to management control, there are many factors that can

determine the success or failure of a project. They noted that most of the lists of evaluation criteria included factors related to project management and to the organisation but seemed to ignore the characteristics of the project and team members as well as factors that are external to the project. It should be noted that Pinto and Slevin [3] acknowledged that these factors were not considered in their studies. The impact of the environment on the success of projects is, however, a very important limitation and, as a matter of fact, they suggested that there is a distinction between projects that fail because of external factors and ones that fail because of management mistakes. Pinto and Covin [16] also confirmed that the activity sector of projects influences the importance of different success factors in the life cycle of projects. **Thus, proposition (H4) was:** Project activity sectors will have a moderating effect on the relationship between the independent variables and project success.

3. Methodology

In this study, the measurement instrument used was an adapted version of Pinto and Prescott's [3] Project Implementation Profile (PIP). A pre-test was carried out with 15 project management experts in more than ten Canadian organisations. This exercise allowed us to validate this instrument in the Canadian context and to make a few modifications on the basis of Belout's [4] critique as well as comments made by Pinto and Prescott [3] regarding multicollinearity and the Personnel factor. In addition, some questions under the 10 success factors were deleted. Two success factors, Client Consultation and Communication, were merged into one factor, Communication with the Client. In addition, we noted that Pinto and Prescott [3] deleted the Communication factor as defined in their questionnaire. The adapted PIP represents only nine factors of success instead of 10. Finally, the construct of the Personnel factor was revised completely in the light of Belout's critique [4]. Drawing on the eight dimensions proposed by Tsui [27], the Personnel factor construct was completed by questions on project commitment and clarity of the job description. Most of Tsui's dimensions [27] (such as legal obligation, negotiation with unions, administration of work contracts, administration services, etc.) were deleted based on the experts' recommendations following the pre-test. In the two first sections of the questionnaire, the respondents specified their socio-demographic characteristics and then identified a project that they had carried out to completion. They had to choose one of four stages of the project's life cycle—conception, planning, execution or completion—and answer all the questions in respect of that particular stage. The respondents were also asked to

identify one of six activity sectors as well as one of three organisational structures (functional, project-based or matrix). The respondents had descriptions of these structural types and were asked to select the type that best matches with their organization.

The independent variables and the dependent variable were assessed in the third and the fourth sections of the questionnaire, which was divided into 10 subsections, each focusing on one of the 10 success factors finally identified. Each of the nine factors of success was made up of five to 11 indicators. For each factor, the participants had to rate their level of agreement for various statements on a seven-point Likert scale (from 1 strongly disagree to 7 strongly agree). For each question, it was also possible for the participants to choose "0," which meant that the question did not relate to the project situation the participant was evaluating. The dependent variable was measured through nine questions from the adapted PIP (Table 2). The candidates had to express their degree of agreement or disagreement with the statements on a similar seven-point scale (1 = strongly disagree and 7 = strongly agree).

To compare the different variables, we compiled the answers to the indicators for each of the dimensions, which gave us a score for each candidate for each variable. The stratified sample was not proportional. For the first stratum, project activity sector, the following project sectors were retained: information technology, engineering, construction, technological development, organisational development and so on. In each randomly-selected enterprise operating in project mode, the second stratification consisted of selecting a number of candidates for each of the four project stages (5, 10, or 20 questionnaires depending on the enterprise size). This stage was hard to control because the candidates did not know in advance which stage of their project they would retain. Finally, 212 questionnaires were distributed to project managers and 142 were returned, giving a response rate of 67%.

4. Results

The distribution of the respondents was as follows: 13% in the "conceptualisation" stage, 15% in the "planning" stage, 63% in the "execution" stage and, finally, 2% in the "completion" stage. As for the distribution by activity sector (Table 3), it can be seen that 27% of the projects examined were in the data processing sector, 17% were in engineering and 17% were in construction. Projects in the technological development and organisational sectors made up 10 and 6%, respectively, of our sample. The majority of our projects were "large scale" in that most of them had a value of over \$400,000; 26% had a value of between \$50,000 and \$400,000 dollars, and only 4% had a value of under \$50,000 dollars.

Table 2
Overall project success

Overall project success	Your degree of disagreement								
(1) Technical requirements specified at the beginning of the execution phase were met	0	1	2	3	4	5	6	7	
(2) Project schedules were adhered to	0	1	2	3	4	5	6	7	
(3) Project cost objectives were not met	0	1	2	3	4	5	6	7	
(4) Project clients and/or product users were satisfied with the project outputs	0	1	2	3	4	5	6	7	
(5) The project has not perturbed the culture or values of the organization that managed it	0	1	2	3	4	5	6	7	
(6) The project was not managed so as to satisfy the interests and challenges of the members of the project team	0	1	2	3	4	5	6	7	
(7) There were no quality problems related to project outputs	0	1	2	3	4	5	6	7	
(8) Technical problems were successfully identified and resolved	0	1	2	3	4	5	6	7	
(9) The project output could easily be manufactured and marketed	0	1	2	3	4	5	6	7	

Table 3
Distribution of project sectors in the sample

Project sector	N	%
Information technology	38	27
Engineering	24	17
Construction	24	17
Technological development	14	10
Organisational development	8	6
Others	32	23
Missed values	2	—
Total	142	100

The organisational structure was also an important element since it corresponded to our second hypothesis. Project-based and matrix organisational structures made up 38 and 37% respectively of our sample and functional structures represented 22%. In the matrix structure, 55% of the projects were matrix type projects, 11% were functional matrix type and 34% were balanced matrix type. So as to ensure the homogeneity of each construct, we calculated the Cronbach's alpha coefficients. This measure of internal consistency is recommended for the analysis of an appreciation scale like the Likert [28]. In our study, the alpha coefficients were all over 0.70 and therefore acceptable (Table 4). The alphas for five of the independent variables were between 0.80 and 0.90.

Table 4
Homogeneity measure of the construct

Variable	Alpha	Number of cases
Project success	0.7280	65
Project mission	0.7669	115
Management Support	0.8476	99
Project Schedule	0.8543	111
Client Acceptance	0.8079	122
Personnel	0.7615	46
Technical tasks	0.7953	84
Communication	0.9093	80
Monitoring-control	0.8796	108
Trouble-shooting	0.8563	113

4.1. Hypothesis 1: effect of the Personnel factor on project success

To test the first hypothesis, we conducted a Pearson correlation analysis of the independent variables and the dependent variable, project success. As shown in Table 5 below, all independent variables were significantly related ($P < 0.01$) with project success. There was a 0.377 ($P < 0.01$) correlation between the Personnel factor and project success, which confirms a link between these two variables.

Once we had established a correlation among the various independent variables and project success, we conducted a multiple regression analysis to evaluate the impact of each independent variable on the dependent variable. We first verified the degree of association between the independent variables. The Communication variable (5) showed the greatest colinearity, followed closely by Monitoring-Control, Trouble-shooting, Technical Tasks and Project Schedule, which each had a colinearity relation of 4 with the other variables. On the other hand, Monitoring-control had the highest coefficients. In this study, we removed the most highly correlated variables, such as Communication and Monitoring-control, from the analysis. It should be recalled that, after the Ridge regression, Pinto and Prescott [3] also removed the variables of communication and control (monitoring and feedback) from the regression analysis.

As shown in Table 6, the results from the multiple regression analysis indicated that both Management Support and Trouble-shooting were significant predictors of project success. We carried out this analysis for the two stages in which correlations exist (that is, the planning stage and the execution) and found that for the planning stage, Project Mission, Customer Acceptance and Management Support were significantly linked to the success of the project. For the execution stage, there was a significant relationship for Trouble-shooting and Customer Acceptance, with an R -squares of 0.34 and 0.39 respectively. It should be noted that, in the framework of this multiple regression analysis, the Personnel factor did not have an impact on the dependent variable

Table 5
Correlations between independent variables and project success

	Project success	Project mission	Management support	Project schedule	Client acceptance	Personnel	Technical tasks	Communication	Monitoring-control	Trouble shooting
Project success	0.530*** (90)									
Project mission	0.490*** (81)	0.696*** (90)								
Management Support	0.492*** (85)	0.279** (95)	0.319** (85)							
Project Schedule	0.502*** (93)	0.503*** (107)	0.415*** (92)	0.575*** (100)						
Client Acceptance	0.377** (62)	0.185 (69)	0.400** (68)	0.566***	0.470*** (71)					
Personnel	0.473*** (65)	0.365*** (74)	0.287*** (71)	0.649*** (71)	0.670*** (78)	0.550*** (58)				
Technical Tasks	0.529*** (68)	0.463*** (76)	0.450*** (73)	0.759*** (70)	0.693*** (78)	0.564*** (56)	0.656*** (65)			
Communication	0.517*** (85)	0.369*** (100)	0.359** (84)	0.662*** (99)	0.574*** (98)	0.446*** (70)	0.674*** (73)	0.757*** (74)		
Monitoring-control	0.573*** (86)	0.332** (102)	0.260* (88)	0.605*** (98)	0.607*** (103)	0.409*** (69)	0.578*** (76)	0.644*** (74)	0.729*** (99)	
Trouble shooting										

* $P < 0.05$.

** $P < 0.01$.

*** $P < 0.001$.

of project success. Thus, we conclude that the hypothesis H1 was rejected.

4.2. Hypothesis 2: moderating effect of project life cycle

To verify this hypothesis, we conducted a correlation analysis between the independent and dependent variables (Table 7) under the control of different life cycles. We used the Spearman correlation, which is known for its use in distributions that are not completely normal [28]. This coefficient appeared to be the most appropriate because of the fact that we subdivided our sample according to different stages, considerably decreasing the number of cases and the probability of obtaining a normal representative distribution. In the conceptualisation stage, there were no significant relationships between the factors and the success measure. This may perhaps be explained by the low number of candidates for this stage. Thus, the correlation analysis was carried out on a number of cases varying from 5 to 11. In the planning stage, all the factors except Personal and Trouble-shooting were correlated with the success measure ($P < 0.05$) with an “ n ” of 40–59. It should be noted that the “ n ” available for the execution stage was much higher than the other cases and therefore these results are more reliable. On the other hand, it was not possible to analyse the completion stage because there were only three candidates in the sample. Finally these results confirm that the relationship between the independent variables and project success will vary according to life cycle stage of projects.

4.3. Hypothesis 3: moderating effect of project structure

When we carried out a correlation analysis (Spearman) according to different types of organisational structure (Table 8), we found different results. Thus, for the matrix structure, there was a significant correlation between project success and the five independent variables of Project Mission, Management Support, Project Schedule, Monitoring-control and Trouble-shooting ($P < 0.05$). It was not possible to do a more detailed analysis for the matrix structure because “ n ” was too small. When project organisational structure was used as a control variable, almost all of the variables appeared to be significantly correlated ($P < 0.05$) with the exception of the Personnel variable. In the case of the functional structure, the five independent variables of Personnel, Management Support, Client Acceptance, Communication and Trouble-shooting were significantly correlated with success ($P < 0.05$). So it seems that the independent variables have differing importance depending on the organisational structure. Therefore, we concluded that the Personnel variable was significantly correlated with success only in the case of functional structure.

Table 6
Success factors according to the regression analysis (Stepwise method)

Project stages	N	Variables	R ²	F	Significance	Constant
All stages	141	Trouble-shooting	0.21	390.22	<0.001	0.000
		Management Support	0.31	320.62	<0.001	0.065
Planning only	20	Project Mission	0.58	290.19	<0.001	0.000
		Client Acceptance	0.67	200.99	<0.001	0.000
		Management support	0.72	180.24	<0.001	0.000
Executing only	89	Trouble-shooting	0.34	470.33	<0.001	0.000
		Client Acceptance	0.39	290.55	<0.001	0.005

Table 7
Correlations among the various independent variables and project success categorized by project phase

	Project mission	Management Support	Project Schedule	Client Acceptance	Personnel	Technical Tasks	Communication	Monitoring-control	Trouble Shooting
<i>Starting</i>									
Project success	0.268	0.605	0.444	0.539	0.406	0.462	0.494	0.502	0.299
<i>Planning</i>									
Project success	0.553*	0.566*	0.514*	0.763***	−0.173	0.666**	0.624*	0.619**	0.480
<i>Executing</i>									
Project success	0.438***	0.401*	0.519***	0.598***	0.528***	0.355*	0.465**	0.510***	0.593***
<i>Completion</i>									
Project success	Not enough data to conduct analysis.								

* $P < 0.05$.

** $P < 0.01$.

*** $P < 0.001$.

Table 8
Correlations among the various independent variables and project success categorised by project structure

	Project mission	Management Support	Project Schedule	Client Acceptance	Personnel	Technical Tasks	Communication	Monitoring-control	Trouble Shooting
<i>Matrix</i>									
Success	0.51***	0.42*	0.41*	0.31	0.32	0.31	0.21	0.53***	0.45**
<i>Project</i>									
Success	0.547***	0.480**	0.688***	0.704***	0.329	0.452*	0.613***	0.574***	0.632***
<i>Functional</i>									
Success	0.168	0.783***	0.353	0.504*	0.781	0.563	0.775*	0.314	0.606*

* $P < 0.05$.

** $P < 0.01$.

*** $P < 0.001$.

4.4. Hypothesis 4: moderating effect of project activity sectors

Based on the data collected, we were able to carry out an analysis according to three main project sectors: information technology, construction, and engineering (the others had too small an “n”). The data analysis showed that all the variables except Client Acceptance were significantly correlated ($P < 0.05$). For the engineering sector, only the variable of Project Mission and Client Acceptance seemed to be significantly linked to project

success (Table 9). The same was true of construction, for which only Client Acceptance and Monitoring-control were significantly correlated ($P < .01$). We concluded that our results seem to confirm this hypothesis (see details on discussion section).

5. Discussion

The results of this study show, first of all, that although there was a link between project success and

Table 9

Correlations among the various independent variables and project success categorised by project sector

	Project mission	Management Support	Project Schedule	Client Acceptance	Personnel	Technical Tasks	Communication	Monitoring-control	Trouble-shooting
<i>Information technology</i>									
Success	0.416*	0.522**	0.504**	0.252	0.622**	0.470*	0.509**	0.518*	0.583***
<i>Engineering</i>									
Success	0.536**	0.296	0.219	0.468*	0.103	0.293	0.110	0.239	0.373
<i>Construction</i>									
Success	0.387	0.413	0.041	0.761*	0.393	0.577	0.775*	0.825***	0.525

* $P < 0.05$.** $P < 0.01$.*** $P < 0.001$.

the Personnel factor (based on the correlation analyses), this factor did not have a significant impact on project success (H1 is rejected). In this sense, our results concur with those of Pinto and Prescott [3]. Thus, how do we explain that an administrative function which is described in the literature as fundamental to achieving success in organisations does not have an impact on project success? Does HRM in the context of project management have specific characteristics that make its role, social responsibility and operation different from so-called traditional HRM? Does the difficulty in measuring the impacts of HRM on organisational success (widely described in the HRM literature) explain this finding?

It is useful to recall that the measurement of the impact of personnel management on the effectiveness of organisations and projects is currently the subject of numerous studies [1,27]. Among scholars' general conclusions, it is reported that the lack of consensus on a common and coherent definition of effectiveness in HRM has fuelled an argument over the very definition of so-called effective personnel management. Thus, the problem that managers have in identifying the causes of a human activity's result has been brought out by several scholars. Moreover, the diffuse nature of HRM (a fragmented function within organisations, according to Ulrich [29], the vagueness of a number of HR objectives [30], the difficulty in interpreting the results of an HR practice [31], and the arbitrariness of evaluators make it very difficult to accurately measure the impact of HRM on organisational success. We believe that this problem is certainly magnified in the project management context due to the possible confusion between the various actors' roles (sometimes, in complex structures such as the matrix type), project-related risks, time constraints, and cost and quality constraints. Moreover, human resources are nowadays redefined in an increasingly strategic role [35] and their interventions tend to affect all levels of the organisation. It is thus difficult to establish a direct link between an HR department's actions and tangible results, in terms of their impact on

a specific programme or project [33,34]. This is all the more true in the case of matrix-type or project-based structures.

Our results tend to confirm that the relationships between the independent variables and project success will vary according to life cycle stage. The correlation analyses showed that in the execution stage, all the variables were significantly correlated with success whereas in the planning stage, the Personnel and Trouble-shooting variables were not correlated with success. It seems surprising that the Personnel variable was not correlated with project success in the planning stage given that several HR practices (including human resources selection and planning, performance standards, etc.) are carried out at that stage of a project's life. In a project planning stage, project leaders and their teams concentrate on breaking down projects into work packets (structural planning, or Work Breakdown Structure) in order to allocate the resources (including human resources) to the project before executing it. This is an essential operation since the human resources planning for the entire project is developed at this stage through simulated auditing using appropriate software. In this theoretically crucial stage for carrying on with subsequent operations and thus for making the project a success, project managers allocate human resources by work packets and audit them (among other things) in order to avoid human resource surpluses or shortages during the project's execution (levelling out of resources). This type of personnel management, which is based on the Charter of Responsibilities in project management, is certainly recognised as a key to success in this activity sector. From this perspective, the results of our study give rise to questions about the importance of traditional HRM practices in a project-based context and the way they should be measured. Should we perhaps consider using specific indicators which are adapted to HR practices during the different stages of a project's life cycle?

However, our regression analyses confirmed the importance of considering the life cycle when analysing

the factors of a project's success (Table 6). The results show that it is important to define and communicate the project's mission clearly during the planning stage. Furthermore, it is also essential at this stage to fully grasp clients' needs and establish with them the project's limits and priorities (expected quality standards, schedules, risk acceptance, method of project management to be adopted, monitoring conditions, communication methods between the different actors, etc.). Similarly, top management support is also important. It is during this planning stage that feasibility studies are completed and budgets by work packets are distributed in order to finalise the project's total budget. Moreover, negotiations are conducted with the various external and internal actors, including top management, on the formation of the project team and the determination of work processes (autonomy of the project cell, degree of formalisation, centralisation of decisions, roles of project-linked units, project interfaces, etc.). Thus, it is understood that top management support is a necessary condition for carrying on with subsequent operations in terms of the operating means to be implemented. These results concur with those of Pinto and Prescott [3] who also identified three critical factors of project success in the planning stage, that is, mission, top management support, and client acceptance.

It was found that Client Acceptance was an explanatory factor of success in the planning and execution stages of the project. This result confirms the importance of management approaches in which the client is at the centre of the organisational dynamic [35]. The Trouble-shooting variable was identified as the second factor that explains project success in the execution stage. When problems occur while the project is being executed, it is important that the project team rapidly identify the source and extent of the trouble and solve it. This demonstrates that it is important, to a certain degree, to have an adapted and flexible workforce and environment which can react rapidly and effectively to the problems that arise. It should be noted that Pinto and Mantel [10] also identified, in a study on the factors in project failure, trouble-shooting as an important explanatory factor for project failure or success. Moreover, the fact that this variable appears to be an explanatory factor for success lends credibility to studies that focus on project-related risk factors. A more risky project will probably encounter more troubles and will require greater Trouble-Shooting ability than less risky projects. This ability to react is mainly based on the skills of the project team and manager. In this sense, Couillard's study [14], which focused on the most appropriate management approaches based on risk profile, maintained that when a project-related risk is high, the project's success is significantly influenced by the degree of authority of the project manager, communication, team co-operation, and trouble-shooting.

With regard to organisational structures (hypothesis 3), the results showed that for three structures, the Management Support and Trouble-shooting variables were significantly correlated with success. Thus, regardless of the type of organisational structure, top management support and problem identification were linked with project success. Moreover, Mission, Project Schedule and Monitoring-control appeared to be significantly correlated with success in the case of matrix-type and project-based organisational structures, whereas this was not true of the functional structure. This might demonstrate that it is important to have clear objectives (mission), good planning, and an effective monitoring system in less structured organisations where the project cannot be developed on the basis of a functional organisation with pre-determined procedures. Moreover, it is noted that in the case of the project-based structure, the Technical Tasks variable appeared to be significantly correlated with success whereas this was not true of the other two structures. This highlights the importance for projects that operate with an autonomous and separate team to concentrate on the tasks and technical means needed for completing the project. This seems to be logical if we consider that a project team, which operates within a project-based organisational structure and cannot entirely rely on other departments without risking delays or conflicts, must possess all the necessary technical elements and skills in order to complete the tasks required for the project's success. Only in the functional organisational structure did the Personnel variable show a significant correlation with project success. This could be explained by the fact that in the functional structure, there is usually a well-established human resources department, which is not necessarily the case in the other structures.

Our last hypothesis referred to the existence of a moderating effect between the independent variables and project success, depending on the activity sector. Our results seem to confirm this hypothesis. Why is it that in the information technology sector, all the variables except Client Acceptance were significantly correlated with project success? How do we explain that in the engineering sector, only two variables were significantly correlated with project success (i.e. Project Mission and Client Acceptance)? Moreover, in the construction sector, Client Acceptance, Communication and Monitoring-control were significantly correlated with success. On the whole, it was found that each project was unique and its primary characteristic was fundamentally linked with the immediate environment of projects. Thus, it is understandable that in a context of great uncertainty and ongoing competition, all projects will impose different challenges on their teams. A comparison of this result with those in Pinto and Covin's study [16] shows that in the execution stage (construction), client consultation is an important variable that

accounts for project success (unlike the research and development sector in this same study). We believe that more in-depth research should be conducted in order to understand why, in the information technology sector, client needs are not correlated with project success. We might find out that in certain activity sectors—such as information technology, and research and development—client needs are considered and expressed in a different way (found, for example, mainly at the beginning of the contract and based on more standardised norms).

6. Conclusion

Today, many researchers agree that the human resource function is one of the most crucial elements in an organisation's success [2]. HRM is clearly being renewed in organisations and gradually affirming its strategic role. In its official definition of the Project Management Body of Knowledge, the Project Management Institute included HRM as one of the six fundamental functions of project management. In spite of this trend, however, the findings of the present study, like those of Pinto and Prescott's [3] research, are surprising. The results show that the Personnel factor is only a marginal variable in project success. We have presented a conceptual scheme that better operationalizes the PIP instrument. In line with research by Tsui [27,33] and some of Belout's recommendation [4], the construct validity of the human resources factor has been examined. For reasons of feasibility, we did not apply all the methodological recommendations of Belout's study [4]. Thus, essentially project managers have evaluated the personnel factor. In this sense, the P.I.P. instrument does not evaluate the motivation, the training, the experience, the commitment of the project managers as independent variables. This could be an important limit and a weakness in this research because the project managers are considered as a crucial and central actors for success and effectiveness.

Despite the obvious effort at conceptual development and methodological improvements made to complete the present research, the results relating to the impact of HRM remain surprising. Research on HRM in the project management context is as yet undeveloped. Publications are relatively rare and most research simply involves case studies or expert reports. Future research should concentrate on overcoming some of the shortcomings of the PIP instrument and continuing to build the theoretical foundations related to this topic. Researchers should attempt to improve the construct of the Personnel variable by validating questionnaires in the project management context and correcting the problem of multicollinearity, which appears to be excessive in the use of PIP. Future studies should be aimed at

redefining the HRM construct, taking into account the specificity of the project management context (constraints of cost, time and quality, risks, factors external to projects, etc.). It is recommended that future studies measure the impact of PIP factors (independent variables) while taking into account the combined effect of moderating factors on the project success variable. They should also measure project success from three viewpoints : sponsor's view, project manager's view and sponsor as project manager's view [4,36].

References

- [1] Cascio WF, Thacker JW, Blais R. La gestion des ressources humaines: productivité, qualité de vie au travail, profits. Montréal: Chenelière/McGraw-Hill; 1999.
- [2] Dolan Saba, Jackson Schuler. La gestion des ressources humaines. Montréal: ERPI; 2002.
- [3] Pinto JK, Prescott JE. Variations in critical success factors over the stages in the project life cycle. *Journal of Management* 1988; 14(1):5–18.
- [4] Belout A. Effect of human resource management on project effectiveness and success: toward a new conceptual framework. *International Journal of Project Management* 1998;16(1):21–6.
- [5] Slevin DP, Pinto JK. The project implementation profile: new tool for project managers. *Project Management Journal*, September 1986:57–70.
- [6] Belassi W, Tukel OI. A new framework for determining critical success/failure factors in project. *International Journal of Project Management* 1996;14(3):141–51.
- [7] McCollum JK, Sherman DJ. The effect of matrix organization size and number of project assignments on performance. *IEEE Transactions on Engineering Management* 1991;38(1):75–8.
- [8] Shenhar AJ, Levy O, Dvir D. Mapping the dimensions of project success. *Project Management Journal* 1997;3:5–13.
- [9] Baker J, Tjosvold D, Andrews R. Conflicts approaches of effective and ineffective project managers: a field study in a matrix organization. *Journal of Management Studies* 1988.
- [10] Pinto Jr JK, Mantel SJ. The causes of project failure. *IEEE Transactions on Engineering Management* 1990;37(4):269–76.
- [11] Morley C. Gestion d'un système d'information, principes, techniques, mise en œuvre. Paris: Inter Éditions; 1996.
- [12] Drapeau C. Face aux changements: un profil de compétence transverses pour gérer des projets représenté selon le cycle de vie d'un projet, Rapport d'activité présenté à l'Université à Montréal comme d'une maîtrise en gestion de projets; 1996.
- [13] Gobeli DH, Larson EW. Relative effectiveness of different project structures. *Project Management Journal* 1987;18(2):81–5.
- [14] Couillard J. The role of project risk in determining project management approach. *Project Management Journal* 1995;Décember:3–9.
- [15] Pinto JK, Slevin DP. Project success: definitions and measurement techniques. *Project Management Journal* 1988;19(3):67–73.
- [16] Pinto JK, Covin JG. Critical factors in project implementation a comparison of construction and R&D projects. *Technovation* 1989;9:49–62.
- [17] Hubbard D. Successful utility project management from lessons learned. *Project Management Journal* 1990;11(3):19–23.
- [18] Todryk L. The project manager as a team builder: creating an effective team. *Project Management Journal* 1990;16(4):17–21.
- [19] Thornberry NE. Training the engineers as project manager. *Training and Development Journal* 1987;4(10):60–2.

- [20] Rogers L. Project team training: a proven key to organizational teamwork and breakthrough in planning performance. *Project Management Journal* 1990;11(2):9–17.
- [21] Cameron KS, Whetten D. Organizational effectiveness : a comparison of multiple models. NY: Academic Press; 1983.
- [22] Adams JR, Barndt SE. Behavioral implication of the project life cycle. In: Cleland DI, King WR, editors. *Project management handbook*. New York: Van Nostrand Reinhold; 1983. p. 183–204.
- [23] Adams JR. The principles of project management. Collected handbooks from the Project Management Institute, Project Management Institute, 1997.
- [24] Mintzberg H. *Structure et Dynamique des Organisations*. Paris: d'Organisation; 1984.
- [25] Petersen DT, Malone RL. The personnel effectiveness GRID: a new tool for estimating personnel department system. *Human Resource Management* 1975;14:10–21.
- [26] Thamhain HJ, Wileman DL. Conflict management in project life cycles. *Sloan Management Review* 1975;17:31–50.
- [27] Tsui A. Defining the activities and effectiveness of the human resources department: a multiple constituency approach. *Human Resource Management* 1987;26(1):35–69.
- [28] Kaplan RM, Saccuzzo DP. *Psychological testing, principles, applications, and issues*. 3rd ed. Belmont, California: Brooks/Cole Publishing Company, a Division of Wadsworth; 1993.
- [29] Ulrich D. Assessing human resource effectiveness: stakeholder, and relationship approaches. *Human Resource Planning* 1989; 12(4).
- [30] Fitz-Enz J. *The ROI of human capital*. NY: Amacom; 2000.
- [31] Belout A, Dolan S. L'évaluation des directions des ressources humaines dans le secteur public Québécois par l'approche Multiple constituency: étude empirique et modélisation. *Relations Industrielles* 1996;51(4):726–54.
- [33] Tsui A. A multiple-constituency model of effectiveness: an empirical examination at the human resource subunit level. *Administrative Science Quarterly* 1990;35:458–83.
- [34] Fitz-Enz J. How to market the HR department. *Personnel* 1986; March:16–24.
- [35] Connolly T, Conlon EJ, Deutsch SJ. Organizational effectiveness: a multiple constituency approach. *Academy of Management Review* 1980;5(2):211–7.
- [36] Freeman M, Beale P. Measuring project success. *Project Management Journal* 1992;13(1):9–16.



HRM IN PROJECT-INTENSIVE FIRMS: CHANGES AND CHALLENGES

JONAS SÖDERLUND AND KARIN BREDIN

One of the most profound organizational changes currently under way is the application of project-based structures within and between firms. This change is happening in both growth and mature industries. Several management scholars have taken interest in the reasons why firms adopt project-based ways of working. However, the effect of project-based organizing on the firm's HRM is a recurrent problem and a challenge to many companies. We develop a framework for the analysis of HRM in project-intensive firms. Based on a study of four companies and the transformation of their organizational structures and processes, we identify four managerial issues and a number of questions that must be addressed to improve HRM in project-intensive firms. © 2006 Wiley Periodicals, Inc.

Project Intensification Under Way!

Projects are fundamental units for economic and industrial activity. Project work holds particular importance for both mature and growth industries in which firms are ad hoc, knowledge-intensive, and project-based. A number of industries seem to be especially project-intensive: pharmaceutical, automotive, advertising, entertainment, media, consulting, and IT. As research and development (R&D) and IT investments increase, it is likely that the project way of working will continue to prevail. Several studies have pointed to projects becoming

increasingly important for speeding up product development (Wheelwright & Clark, 1992) and for meeting new strategic challenges (Whittington, Pettigrew, Peck, Fenton, & Conyon, 1999).

A number of researchers, accordingly, have pointed to the importance of continuously developing the project operations of the firm in order to build and sustain competitive advantage (Davies & Brady, 2000; Söderlund, 2005). One important element for the improvement of project operations is the human resource management of the firm. In these work contexts, the ability to attract core talents and integrate their efforts with the firm's strategic processes and

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projects is critical for building long-term competitiveness.

A vital link exists between the structuring and design of project operations and the design of HRM (i.e., HR activities performed by managers and HR activities performed by HR departments and other HR specialists). However, we argue that the project way of working challenges much of conventional thinking about HRM. For instance, the work process is affected, the relationship between coworkers is changed, and relationships between subordinates are modified. Hence, projects must be considered at the center of the analysis of HRM in an increasing number of firms and industries. This argument is congruent with the conclusions of many recent studies of project-intensive firms that call for more in-depth analyses of the link between project intensification and the de-

sign of effective HRM (see, e.g., Engwall, Steinthórsson, & Söderholm, 2003, p. 129).

Given the importance of the organization and the management of projects for an increasing number of firms, how does this trend affect the HRM of the firm? What particular aspects of HRM should HR directors take into account when coping with the challenges of project intensification? What key managerial issues must be dealt with in order to improve HRM in project-intensive firms? These are the questions that we address and try to answer in the present article.

In the explorative study reported here, we examine how firms establish, change, and develop their HRM practices due to increased application of project-based structures. Such an analysis might also contribute to our understanding of the doubts raised by Ulrich (1998) about HR's contribution to or-

S I D E B A R A Multiple-Case-Study Approach

In several ways, our empirical study was guided by a multiple-case logic as suggested by Eisenhardt (1989). However, we were not only interested in getting snapshot views of the companies. Instead, we tried to balance the rich-story logic with that of a multiple-case study. In each of the case studies, we initially studied single projects and conducted interviews with managers to find out specific aspects of each company's project operations. The number of interviews in the prestudy phase varied among the companies. In the AstraZeneca case, we only did one prestudy interview, whereas in the Posten case we conducted more than ten. In all companies, we have made other types of inquiries in other research projects. We thus had a good view of the general management and organizational aspects of the firms that participated in the study.

In the second stage, we conducted interviews with key managers and HR personnel to find out about the specific aspects of the HR organization and the changes made in recent years. We also conducted interviews with project members and project managers. In the AstraZeneca case, we conducted five interviews; in the Posten case, we did twenty interviews; and in Saab and Volvo, ten and six interviews, respectively.

In the third stage of our research, we summarized our interviews and compiled case descriptions that were discussed with one or two contact persons at each company. Summaries of each of the cases have also been discussed with key HR personnel at the companies. We also presented our findings at management meetings in which personnel from several of the participating companies have taken part. These activities of our research, we believe, made it possible to both generate findings from each company in line with an exploratory design and summarize and test our framework against the empirical data to improve the trustworthiness of our research.

In the fourth stage of our research, the analysis process, we sorted and identified a number of changes observed in the companies. We distilled these changes and analyzed reasons why the change had occurred. Moreover, we listed various problems that the respondents had talked about during our semistructured interviews. In several ways, this analysis process follows the grounded theory approach presented by Glaser and Strauss (1967). This process gave us a list of 20 different problems and difficulties. For ease of presentation, we grouped the different problems and used previous literature to form both empirically grounded categories and theoretically solid issues to summarize our findings. Following the identification of four overall issues, we also summarized key questions raised by respondents during interviews and participants in workshop sessions.

ganizational performance. We describe four project-intensive companies and their efforts to improve HRM. This analysis may contribute to our understanding of the link between organizational structure and HRM—a link that is considered to be of increasing importance for HR to generate both relevance and value (see, e.g., Lawler & Mohrman, 2003).

Exploring HRM in Project-Intensive Firms

The research reported here is based on a multiple case study of four Swedish companies. The companies represent different technology bases and industries, but all are similar in one respect. All firms have emphasized the development of their project operations and have initiated programs to improve their way of organizing projects. For instance, company strategy documents and business plans state that projects are a key component of their daily operations and that project development is considered critical to competitive advantage. In striving to improve project competence, these companies have created various support systems, such as project management models and project manager careers.

Our study aims to clarify and analyze the changes these companies have implemented in their HRM systems to effectively meet the challenges of project intensification. We are particularly interested in the following questions: (1) how has project intensification affected the design and structure of the HRM practice? and (2) what challenges have HRM practices faced due to the project intensification?

The article is structured as follows. In the coming four sections, we present the experiences of the companies under study. In the analysis section, we develop a framework of four important managerial issues for improving HRM in project-intensive firms. We point to a number of important questions and four HR roles that must be elaborated in order to respond to the challenges of project intensification. In the concluding section, we discuss implications for managers.

Case Study 1: AstraZeneca

AstraZeneca is a global pharmaceutical company with more than 50,000 employees worldwide and an R&D unit occupying more than 10,000 scientists and engineers. R&D investments and the number of projects both have increased in recent years. Today, most of R&D is organized in relatively extensive projects, some lasting for more than ten years. The average duration of projects, however, is approximately five years. Top management of AstraZeneca has emphasized the importance of time to market, and as a consequence, competition between products and projects has boosted. Moreover, the company must keep its scientific knowledge at a world-class level. In several ways, AstraZeneca has to contend with the dual challenges of fast product development and deep knowledge development.

The R&D organization is divided into a number of competence areas. Each area manager is responsible for tracking competence development and the development of strategic efforts that can build new competence areas. Handling these competence development efforts successfully has been singled out as a critical issue for HRM within AstraZeneca.

Another important task for the HR staff concerns the merger launched in 1999 between the Swedish Astra and the English-based Zeneca. Realizing and implementing the synergies of the merger has been a difficult job for everyone involved. One of these important and expected synergies is the effectiveness of R&D activities. To realize this synergy, the company has implemented a new project management model. Today the development projects are to a greater extent performed in a number of global development projects. AstraZeneca has also adopted an organizational structure that emphasizes the project dimension. Important roles in this structure are the global product director

Our study aims to clarify and analyze the changes these companies have implemented in their HRM systems to effectively meet the challenges of project intensification.

(GPD) and the global project manager (GPM). The global product director has overall responsibility for the development of the product, including the project strategy and general development plans. Together with the global project manager, the GPD works full-time with a single project.

A core team coordinates each project along with an extended team of specialists associated with the project. The organization of the project is determined by the role structure, a system developed in recent years to facilitate and improve the organization of projects. Moreover, AstraZeneca has launched a project management support office (PMSO) to support the global product directors and project managers. The unit is responsible for the development of the many project managers and includes activities such as competence development and training. The unit is also in charge of the implementation of tools and methods for the management of projects. The PMSO has played a key role, together with the HR

unit, in improving the role structure of projects and the routines and procedures for recruiting members to the core teams.

The HR unit has lately changed its way of working in order to meet the dual challenges of deeply specialized knowledge and general project organization skills. This change in the HR unit is driven by a modified management structure where line managers are expected to assume increased responsibility for the development of employees. This role does not always come naturally to these scientists. An HR Business Partner expresses the problem:

We have somewhat of a problem with line managers. This has to do with the fact that line managers are normally recruited for their excellence in scientific areas, not for their knowledge in management and dealing with people.

AstraZeneca recognizes this problem, so the company developed a separate so-

called "specialist career" in order to provide excellent scientists and specialists with opportunities for development other than the traditional line-management and project-management paths. These demands, driven by the focus on projects, have furthermore led the HR unit to change its way of working.

Today we focus much more on the soft issues, so to speak. We work with project management, project teams, members of the projects and their competence. I believe that the requirements on continuous development and learning are much higher today than just a decade ago. (HR Business Partner)

The HR department also provides the organization with facilitators and coaches in order to improve project work in AstraZeneca.

The HR unit must be better in supporting the projects. We are involved in project start-ups, but I believe that we could improve this further. (HR Business Partner)

AstraZeneca has fierce competition for the best people, which at times creates conflicts that the individual project worker must manage. Apart from the work in projects, which normally is on a full-time basis, there are always line activities that have to be done. At times, this creates problems for the individual project member. Despite the fact that many aspects of the HRM practice are working well, there are continuous challenges in terms of knowledge and competence development, rotation and role structures in the project operations, and the support of the individual knowledge worker.

As it seems, the HRM of the firm has changed in several ways due to project intensification. The AstraZeneca case primarily illustrates the importance of competence development, building career paths for project managers and specialists, the role of HR specialists in managing change, and the need for an increased focus on HR for line managers.

Case Study 2: Posten

Posten is a state-owned postal services company, employing close to 40,000 people. In recent years, the company has invested heavily in research and development, and as a consequence has expanded its project operations considerably. The company has also recruited many software engineers to launch new technology-based products and services. The project profile of the company is rather complex, as some projects are very short-lived (three or four months), whereas others have durations of three or four years. Approximately 4,000 of its employees work on projects on a regular basis.

One recent large project was the major restructuring of the company's service network. Traditional post offices were shut down and replaced by partnership services provided by supermarkets. Other efforts have included a new enterprise resource planning (ERP) system and the launch of a modern platform for electronic services. These change efforts, along with the expansion of the internal IT development unit, led Posten to state that its corporate vision is to become a "network and project-based company." Furthermore, the management team has spent much time thinking of ways to support the project operations of the company.

During the '90s it became more and more obvious that we needed to change our way of working. We had a continuous need for people that could work on our projects. For instance, we invested a lot of resources in the development of IT systems, products, and services and we had some very large change programs to be carried out. The project way of working forced us to reconsider our way of working with our employees. (Senior Project Manager)

In order to meet these challenges, the management team implemented a new vision where projects hold a key role in the organizational structure. Posten created a new IT organization for the IT specialists, an internal consulting firm, and a project man-

agement support unit. The internal consulting firm, Unidas, employed 15 senior project managers assigned to strategic projects currently under way. The project management support unit, the Project Management Center, was to keep track of more than 200 project managers working in various divisions and regions throughout the company. Moreover, Posten changed its HR department.

We created a small, top HR team with an HR director and a few specialists and a network of so-called HR consultants that were to work together with line managers very much on a consultancy basis. (HR Director)

One of the specialists of the HR team was in charge of change management. This role was relatively autonomous, and much of his time was spent talking to senior project managers about the effect of projects on employees (e.g., how a specific project developed employee competence and how it affected the work situation). Furthermore, his responsibility was also to monitor the need for change efforts and report them directly to the CEO.

The new project-oriented organizational structure also expanded the responsibility of the employee.

The coworker is expected to take on a greater responsibility of her own development. She has to develop her personal networks and move among the organizational units within the company. In a project-based way of working, it is essential that the individual has a strong willingness to develop her competence and to take on new challenging assignments. (HR Director)

At Posten, mobility between projects was discussed in great detail. The main reason was that the company experienced problems

The project management support unit, the Project Management Center, was to keep track of more than 200 project managers working in various divisions and regions throughout the company.

with some key project members and observed high risks of burnout. Furthermore, the management team wanted to avoid the risk of creating specialist project teams that were not integrated with the rest of the organization. As the HR director expressed it, this was very much related to the trust among the employees and members of the projects.

The risk is that you will have project teams that are not the best ones, but the most comfortable ones or the safest ones. If you don't trust the organization, you will be likely to work with the same people over and over again. I think that this is bad for long-run development and competence development of the employees.

Overall, Posten transformed its organization drastically and dramatically.

Furthermore, Posten changed its way of working and launched strategic alliances with a few selected key suppliers (e.g., in strategic development teams). This transformation has affected the work of the HR department.

We had some problems in one of the projects where the key role was played by a consulting firm. In that case I had to arrange a meeting and talk to the head of that company in order to solve the personnel problems. Their consultants were responsible for important parts of our human resource practice. In a sense, outsiders are running important projects for us, and this requires a new way of working, also for the HR department. (HR Director)

Overall, Posten transformed its organization drastically and dramatically. The HRM challenges revolve around the building of knowledge in a project-intensive environment. In order to create viable project operations, HR measures were aimed at stimulating mobility among project workers while building long-term relationships with con-

sulting firms. Mobility among project workers was considered a key issue, and the HR director worked closely with some of the consulting firms to make this happen. Furthermore, the role of HR specialists in managing change was considered to be increasingly important for identifying opportunities and detecting problems in the project operations of the firm.

Case Study 3: Saab

Saab Aerospace (henceforth Saab) is a Swedish-based high-technology firm with its primary operations focusing on defense, aviation, and space. Saab has a long history of working with development projects. The company employs around 5,000 engineers. More than 2,000 of them regularly work on various development and business projects. The average duration of projects is between four and five years, although many development programs have a duration of up to ten years.

The company has become somewhat of a pioneer within the aircraft industry, developing a number of technology-edge products, such as the aircraft Gripen. However, the company is undergoing major changes due to political and defense changes. These changes have increased the number of projects and forced the firm to rethink its approach to project work. Additionally, the firm needed to increase R&D effectiveness. One top-management solution to this requirement was to emphasize project-based structures. Top management wanted senior managers and well-educated project leaders, as well as program managers, to take on many of the overall duties of the project portfolio. Saab, therefore, launched an organizational structure where project offices and program managers play key roles. Today, senior project managers are part of the project-office structure, and the line managers have greater responsibility for people issues.

Before, we tended to transfer everything to the HR department. If we had a problem with an employee, we said that this is the job of the HR depart-

ment. That is no longer the case, or at least, we are trying to change our way of working. However, this also requires a new breed of line managers, which takes some time to change. It is both a cultural and a competence transformation. (Line Manager)

One recurring problem is the responsibility and authority of project managers. The management team's assumption is that the new organizational structure will bring about improvements in the management and organization of projects. In order to meet the requirements of the line managers and the project organization, the HR department had to change.

We have a history of, in my opinion, a too passive HR department. We must be much more integrated in the operations of the company and be able to reach out with our knowledge and support the rest of the organization. (HR Director)

One important effort recently carried out by the HR department was the development of the project manager role in order to improve the balance between the projects and the line units. Furthermore, the HR department has responsibility for overseeing and improving the role descriptions of key members of the project-management teams and the set-up process of projects.

As a way of preparing the organization for the new challenges, the competence areas of the company were modified and, in some cases, even completely restructured. Some competence areas were considered obsolete and required the company to lay off a number of highly skilled engineers. For other areas, competence areas were merged in order to create larger and new lines of competence.

The HR department played a key role in this process. HR enhanced the business acumen of the engineers within the R&D organization. Furthermore, the management agenda now includes improving the strategy behind the hiring of consultants, an issue directly

driven by the HR department. The strategy for hiring consultants has not been spelled out, which from time to time has created problems for the company. The new HR initiative is aimed at handling these problems.

The HR unit has also taken responsibility for increasing employee mobility within the company, another way in which Saab will be able to transform its competence areas.

We need a new way of looking at our coworkers. The line managers must view the coworkers as something that they borrow for a limited period of time, and then let go. Almost like a coach of a football team. You should be proud of the players that move on to other leagues and other teams. (HR Director)

In order to meet the requirements of these line managers and the project organization, the HR department had to change.

In order to facilitate this mobility, the HR unit has launched the concept of "The Opportunities of Saab" to get people to know more about alternative jobs and career opportunities within the company. Furthermore, the management team has stressed the importance of getting employees that keep themselves "employable" and "updated." This work is carried out by the HR unit under the label "Co-creating Coworkers." The management team believes that this campaign will stimulate the project way of working. One interviewed manager emphasized that project work requires individuals who are more outgoing and more active in creating their own careers.

A coworker must ask herself what she should do after a project is completed. In a project-intensive firm, it should be easier to move around because you have such a clear birth and death process. A project finishes and then you have an opportunity to look for new challenges. (HR Director)

One problem frequently raised in interviews had to do with the difficulties of proj-

ect members in setting priorities between projects. It is not unusual for project members to have more than three bosses, including line managers and different project managers. In addition to prioritization problems, this situation also leads to problems in determining the performance of the individual coworker.

<p><i>The importance of employee mobility and improving the role structures and set-up procedures for improving project efficiency was frequently mentioned during interviews.</i></p>	<p>From time to time I talk to the engineers about their frustration about monitoring their performance. They think it's a bit strange how a manager that knows nothing about their work and performance in projects is responsible for determining their salary. I believe that the project structure creates difficulties in these matters. (HR Director)</p>
	<p>Looking at the Saab case, the transformation of competence areas seems to be a critical area for HR. Moreover, the strategy for hiring consultants was singled out as an important measure for building a viable firm.</p>

Other important HR matters revolve around the changed role of line managers and the general preparation for increased project intensification in the company. The importance of employee mobility and improving the role structures and set-up procedures for improving project efficiency was frequently mentioned during interviews.

Case Study 4: Volvo

Volvo Car Corporation (henceforth Volvo), a niche player in the automotive industry, is owned by Ford Motor Company. Volvo has close to 30,000 employees. More than 5,000 employees work in various types of research and development projects. The average duration of the standard development project is between three and five years. Several shorter, more focused projects are also initiated, and some longer technology-de-

velopment projects are carried out on a regular basis.

Volvo has the ambition to swiftly integrate new technology and security solutions. These developments and ambitions have led the company to a situation where projects have a paramount place in the organizational structure. For instance, the number of project managers has increased rapidly along with the number of company demands (e.g., on time to market) emphasized by top management. In recent years, the company has had some problems with an overemphasis on the project dimension. Some changes have been made in order to handle the dual challenge of time to market and deep knowledge development.

Project managers play a key role in product development. Each project manager has total responsibility for the business case and the technological aspects of the project. In the team surrounding the project manager, the technical project leader focuses specifically on the technological aspects, and, additionally, a commercial project leader has responsibility for marketing and product launch. The creation of the role of project manager and the technical project leader was a way to emphasize the project dimension within the company.

The project managers belong to an organizational unit called the Project Management Unit. The manager of the Project Management Unit—the project director—has overall responsibility for projects in the firm. In this sense, the company has elaborated on an organizational structure with a relatively strong focus on the project dimension. However, in other areas, such as HR, the focus on projects is not that strong.

The HR unit is very line-oriented. When coworkers have problems with their projects or with the working climate in a specific project, the HR personnel do not seem to understand the problems. This is a big problem and something that we need to handle. We have started but we're not there yet. (HR Manager)

One recent threat to deep knowledge within the firm is the high dependency on consultants. In several technological areas, Volvo is working with strategic consulting partners that are highly integrated into the product-development projects. Despite this integration, the company has launched a program to build new knowledge in order to decrease reliance on consultants. Furthermore, Volvo has launched a specialist career program to create more opportunities for engineers aside from traditional line-management and project-management paths. Competence development is, however, something that has become a major problem within the company.

In many ways, we have a bad schedule for people who work in our projects. It is very difficult for them to make room for reflection time between the projects. They rush into new things, new projects, sometimes even before they have completed the old project. (HR Consultant)

The HR unit has spent much time on the integration process with Ford, in order to improve the Volvo engineers' capability to work in international projects. The HR unit has also developed and implemented a number of new tools to improve the product-development process. One such tool is the "HR Gates" included in the project model. These gates ensure that there are fixed evaluation points for HR issues, just as for other issues in the product-development process. Furthermore, the unit has developed a method to speed up the initial phase of the projects (e.g., by improving team roles and team profiles). Moreover, in the last three years, the HR unit has completed a project to handle the problem of engineer stress and burnout. In this project, all engineers were grouped in various risk categories, and people in the high-risk categories were suggested to participate in a program to improve the work situation.

In the Volvo case, the organizational structure has changed in several ways. More

leadership capacity has been added to the project dimension, but at the same time, the need for long-term knowledge development within technological areas has been emphasized. The importance of line managers in overseeing competence development has been stressed. From an HRM point of view, important measures taken to improve project operations have been the development of HR Gates and the establishment of roles and procedures for setting up projects.

Four Challenges Facing HRM

As seen in the case studies, these firms all have spent extensive resources on the development and enhancement of the project dimension. Projects are today a key part of the organizational structure and a determining factor for other supporting processes and systems—human resource management being one of the most important ones. It is also clear that the firms consider well-functioning HRM to be essential for efficient and effective project operations. In analyzing the cases, we have identified four challenges that seem to be of importance in developing HRM to meet the requirements of project operations. These managerial challenges will provide the platform for our analytical framework proposed to further our understanding of the changes and challenges of human resource management in project-intensive firms. These challenges are as follows:

- the competence issue,
- the trust issue,
- the change issue, and
- the people issue.

Our observations are summarized in Table I. In the following sections, we analyze our cases in more detail and link our observations to the stated managerial issues. In conjunction with each issue, we describe key

The HR unit has also developed and implemented a number of new tools to improve the product-development process.

activities and key roles of HRM in improving project operations. We then put forth a number of questions that must be addressed in order to further improve HRM in project-intensive firms.

The Competence Issue

As seen from these cases, capacities such as competence tracking and competence development are considered the core of HRM. In

TABLE I Comparison of HRM Practice: Four Managerial Issues

	Competence	Trust	Change	People
AstraZeneca	Keeping track of strategic competences needed for future development projects. Setting up competence development programs to meet future requirements. Balancing general project organization skills with deep technological skills.	Establishing role structures for development projects. Implementing a corporatewide project model. Improving the project process to facilitate the setup of projects. Launching programs to improve the organization of international projects.	Identifying needs for organizational change throughout the organization. Initiating separate change projects to improve the product development organization.	Developing career plans and models to meet individual requirements. Establishment of project manager careers and specialist careers. Continuous dialogue about the needs of the individual employee.
Posten	Changing the competence profile of the firm. Developing competence information bases. Line management as knowledge containers.	Establishing a new organizational unit to improve the project network and project process. Assigning a freestanding HR director to improve the cooperation with strategic partners. Improving the internal mobility of employees.	Developing the HR unit as the one responsible for the change competence of the firm. Providing HR competence to major development projects. Identifying needs for organizational changes and improvements.	Developing career ladders. Establishing various types of new managerial roles to support the individual. Integrating the needs of the individual with future projects.
Saab	Keeping track of strategic competences. Changing the competence areas of the firm. Developing new competences to meet a changed competitive environment.	Stimulating mobility within the firm. Initiating discussions about the role of consultants. Developing an improved strategy for hiring consultants.	HR unit responsible for change competence and developing the change competence of line managers. Detecting needs for organizational change.	Initiating a continuous dialogue with engineers in order to develop necessary support programs. Continuous dialogue about challenging engineering projects.
Volvo	Keeping track of strategic competences. Balancing the need for general project management capabilities and deep technological skills.	Programs to improve cooperation within projects and ability to work in international projects with partners. Supporting the organization with training in international projects. Initiating discussions about the role of consultants.	Launching and implementing change projects in order to improve the product-development organization. Continuous dialogue about needs for organizational improvement.	Designing support programs for individual engineers. Continuous discussions about the needs of individual employees and future projects.

the Posten case, for instance, these capacities were at the top of the HR director's agenda. In many ways, the focus on competence is closely linked to the project intensification of the firm. These two factors are linked for the reasons that (1) work in projects is generally more knowledge-intensive and (2) work in projects is more difficult to track and monitor compared to traditional line assignments. These factors create a situation that requires HRM to emphasize competence management.

Competence issues within human resource management have been stressed in the literature (e.g., Barney & Wright, 1998; Lengnick-Hall & Lengnick-Hall, 2003). Furthermore, the issues and problems of knowledge management in project-intensive firms have been put at the fore in such contexts (e.g., Gann & Salter, 2001; Lindkvist, 2004). Literature on project-based learning has also pointed to the important role of projects for learning and building knowledge in the firm (DeFillippi, 2001). It should thus not come as a surprise that competence and knowledge management are emerging as important facets for understanding HRM in the companies under study. Still, we would argue, only modest attempts have been made to understand the competence issue of HRM.

In the knowledge-based theory of the firm as proposed by Grant (1996), HRM should be directed toward supporting the adaptation, integration, and reconfiguration of internal and external organizational competences to match the changing environment. It appears that within project-intensive firms, this process is becoming increasingly important but also gradually more troublesome. The firms under study have emphasized the competence issue as key for top management. The standard response has been to delegate responsibility to line managers that focus on assuming the role of knowledge carriers or knowledge containers. In a dispersed project-intensive firm, however, this is not an easy task. Our analysis of the human resource management competence issue points to projects as the basis for learning and, accordingly, the HRM practice oriented toward knowledge integration

and competence development on both the organizational and individual levels.

Based on this analysis, a number of questions must be considered in order to provide a platform for the development of HRM in project-intensive firms (cf. Barney & Wright, 1998). We especially want to stress the following ones:

- What are the core competencies of the firm? What will the core competencies be in five and ten years?
- Which of the employees, or groups of employees, have the greatest potential to differentiate the firm from its competitors?
- What kinds of employees are needed in order to be competitive in five and ten years?
- What unique qualities can the firm offer for the development and maintenance of the employee competencies?
- How do HRM practices and the HR organization support the development of the firm's core competencies?
- What kind of HRM practices are needed to build a firm that stays competitive in the future?

The firms under study have emphasized the competence issue as key for top management.

The Trust Issue

Trust is another core theme of our analysis, as indicated in the case studies. A strong link appears to exist between loose organizational structures and the flexibility of the employer-employee relationship. Although not as self-evident as the competence issues, trust seems to be at the core of understanding HRM in project-intensive firms.

A chief HRM practice in a project-intensive firm from a trust perspective would be that of building trust and keeping track of individual reputation. As pointed out by Grabher (2001, p. 1329), "project business is reputation business." In several ways, various networks play a key role in this process. Moreover, networks provide the firm and participants with the necessary stability and sense of permanence that is paramount in

economic activities. As put by Sydow and Staber (2002, p. 216), "Network stability provides the context within which the kind of trust, commitment, and reciprocity norms can develop that support project coordination."

HRM should work to become a provider for systems and processes that facilitate the building of swift trust and curb the risks of opportunistic behaviors of the actors involved. Based on our case-study findings, much HRM work revolves around employee mobility, setting up project teams, designing role structures (cf. Ancona, Bresman, & Kaeufer, 2002), and facilitating personal networks among employees and consultants to support well-functioning communities of practice (cf. Brown & Duguid, 1991).

In a project-intensive firm, solving the trust issue of HRM is important for improving the project operations of the firm.

Such an image portrays the firm as loosely integrated teams consisting of people who have not worked together before and who will not work together again in the future. In the case studies, we observed that the HR units during the last few years have spent time improving the role structures and set-up procedures of projects. We see these HRM practices as directed toward handling the trust issue within project-intensive firms.

In the Posten case, the HR director referred to the lack of mobility as a sign of a "low trust atmosphere." The HR unit had therefore initiated a program for improving trust among project workers in order to stimulate mobility within the firm. Similar measures have been taken in the other firms. Another solution linked to the trust issue is the set of measures taken to improve cooperation with consultants. In the firms under study, HRM activities centered on the hiring of consultants, building long-term cooperation, and improving coordination with key consultants who were performing important work in ongoing development projects. In a project-intensive firm, solving the trust issue of HRM is important for improving the project operations of the firm.

Once again, several questions must be posed in order to understand the role of HRM in project-intensive firms. Based on our empirical studies, the following questions seem to be of special importance:

- What elements are essential for building trust between and among our project workers (both employees and consultants)?
- Which external networks are central for carrying out our projects?
- What image do project workers have of us as their assigner/collaborator in the project?
- What reputation do we have as an assigner?
- What role structures are essential for carrying out our projects?
- How do HRM practices and the HR organization support the development of routines for project work and for temporary assignments to our projects?

The Change Issue

In many writings on HRM, change management is considered to be of great importance (see, e.g., Hendry & Pettigrew, 1992). Some authors argue that the HR department should be looked upon as specialists in organizational change (Ulrich, 1997). In our case-study firms, change has played a key role in recent years, and there are no evident signs that organizational change will decrease in importance in the near future. Rather, the contrary is true in project-intensive firms. In the case of AstraZeneca and Volvo, we saw that both the merger and integration processes are priority HR concerns. In the Posten and the Saab cases, change focused primarily on the ability to transform and meet new competitive challenges (e.g., the change of competence areas). As it seems, HRM from a change perspective is about the identification of change possibilities and needs, the facilitation of change, and the stimulation of change in the various projects. In a project-intensive setting, many of these needs are identified in close cooperation with project managers and project members.

Why would change be more important for HRM in project-intensive firms than in other firms? As stated earlier, the issues identified in our analysis are not unique, but they illustrate core HRM changes and challenges in project-intensive firms. We suggest that the specific problems of HRM in project-intensive firms can be addressed and analyzed by looking deeper into these managerial issues. Our argument is that change, in the same way as competence, takes on different characteristics in project-intensive firms than in other firms.

In project-intensive firms, change is often carried out directly within the projects, usually in one of two ways. Either change occurs separately by project or it is integrated into change processes during the implementation of projects. The HR unit has a paramount role in both cases. Accordingly, as witnessed by several of our interviewees, the HR unit work for dealing with the change issue could be viewed upon as, on the one hand, the initiation, support, and management of change projects and, on the other hand, as the supply of change expertise in other ongoing projects. In either way, HRM must be increasingly integrated in the everyday activities of the firm. As stated in our case studies, this is an important challenge for successful HRM.

Based on this analysis, a number of questions must be dealt with in order to provide a good platform for the development of HRM in project-intensive firms. We would especially like to point out the following questions in handling the change issue in project-intensive firms:

- What change initiatives are needed to strengthen the firm's competitiveness?
- What change initiatives are needed to improve the situation of the employees?
- How should these change initiatives be carried out?
- What role should the HR department have in the implementation of change initiatives?
- What is the content of organizational development/change in the regular projects of the firm (e.g., change of work practice)?

- What HR support should be offered to project management when carrying out regular projects (e.g., training, competence development)?

The People Issue

The people issue has been highlighted by numerous writers within HRM and within the area of innovative forms of organizing (e.g., Pfeffer, 1994). In our case studies, we have observed a strong emphasis on the individual, although primarily in terms of requirements and expectations for the professional, project-oriented employee. It is said that the individual in a project-intensive organization must have a "strong drive," be able to "market herself" on the internal labor market, and handle the continuous competence development to meet the requirements and challenges of new projects. Several interviewees stated that it is necessary to have "project-oriented people" in a project-intensive firm. As it seems, much responsibility is put on the individual for the creation of viable project operations. It is also clear that the individual must change her view on the employer and colleagues. Operating in a project-intensive environment leads to a new organizational dynamic with increasingly temporary work environments and arrangements.

In many ways, we see here a traditional rhetoric about the requirements of the professional knowledge worker. However, as suggested by the HRM literature, the firm also has a key role in supporting the professionalization and development of the individual project worker. As stated by some of the respondents, core engineers and other project workers have high expectations about the support and possibilities of making a career. From an HRM perspective, becoming an attractive employer would thus be a matter of winning the battle of individual support and development, to be able to arrange for systems and processes that help the individual to assume the responsibilities

*HRM must be
increasingly
integrated in the
everyday activities
of the firm.*

for keeping her/him “employable and updated.”

Is this challenge more accentuated in project-intensive firms than in other firms? There are reasons for us to believe that this is at least one of the key HRM issues observed in our case studies. For instance, the firms experienced problems with relationships between management and individuals, with competence development and career programs, and with setting priorities between projects and malfunctioning workplans (e.g., new projects start before earlier projects have been finalized).

...the role of projects is primarily one of offering employees the opportunity to move along their project-based careers.

In sum, in project-intensive firms, line managers have problems grasping the work and emotional situation of the individual project worker. Moreover, our observations suggest that the role of projects is primarily one of offering employees the opportunity to move along their project-based careers. HRM in such a context, it seems, would thus be a matter of supporting and counseling, very much like an artist agency that

identifies individual needs and problems, and of helping the individual to find a balance between high- and low-intensive periods of work.

Based on this analysis, a number of questions must be dealt with in order to provide a good platform for the development of HRM in project-intensive firms. We especially want to stress the following ones:

- What does the individual require in order to improve his/her work performance? Which problems are the most critical?
- What systems and processes are needed in order to identify problems at the individual level?
- What systems and processes are needed in order to develop the individual in the most appropriate way?
- How is the balance in the individual's work situation (i.e., between work and private life)?

- How do the projects contribute to the development of the individual?

HRM in Project-Intensive Firms: Changes and Challenges

This article has offered an empirical, explorative study of the experiences of four project-intensive firms and their efforts in adjusting and developing their HRM. We argued that previous research on project-intensive firms has emphasized and highlighted the importance of HRM, but, so far, has paid limited attention to the actual study of the role and function of HRM and particularly how to understand the major challenges for HRM in project-intensive firms. In this article, we addressed a few important challenges given the project intensification observed in a number of industries, sectors, and firms. For instance, in what way must the HRM practice be adjusted to fit the project-based operations of the firm? What HRM challenges are firms facing when projects become a fundamental part of the organization? What are the key roles of HRM in the project-intensive firms?

In this study, we stressed the intimate relationship of the development of the firm's project operations and the transformation and development of its HRM practice. For instance, many of the observed organizational problems in project-intensive firms are becoming HRM issues and must be solved by more sophisticated and fine-grained HRM practices. Successful project operations require effective and adaptive HRM. This finding was apparent in our case analyses. They all struggled with the dual challenges of speedy projects and knowledge development, with line managers assuming new roles (often more HR-oriented roles) and with HR departments trying to find their way toward improving their support of the firm's project operations. Designing effective HRM, it seems, is very much a successful interplay between a range of actors: HR departments, line managers, project managers, and project workers.

We subsequently described the following four managerial issues of particular impor-

tance for the development of successful HRM: the competence issue, the trust issue, the change issue, and the people issue. Each managerial issue points to one important aspect of HRM of project-intensive firms. The managerial issues illustrated also emphasize the critical role of a few key activities. It should also be noted that we believe that well-founded HRM is developed by addressing all these issues and by creating a fruitful interplay between each role. In Table II, we summarize our main findings. We also illustrate the key activities of the HRM practice and a summarizing role metaphor for each managerial issue.

The competence issue becomes increasingly important as more employees work on short-term projects. Line managers, together with HR specialists, must address several questions about required competence and knowledge, the competence currently found inside the firm, and the core competencies of the firm in order to design effective HRM. We pointed to the HRM practice of acting as a knowledge broker within the firm, emphasizing its role in integrating knowledge from various disciplines and identifying the needs of competence development among employees. This role for the HRM practice, we believe, is particularly important in fast-chang-

ing, project-intensive settings where key competencies are distributed in various types of local projects.

The trust issue is another dimension of our conception of HRM in project-intensive firms. The trust issue summarizes many of the challenges associated with project-intensive work. Employee mobility and meeting new people on a continuous basis is not only a prerequisite for well-functioning, project-intensive organizations, but also a troublesome consequence of project intensification. In responding to this challenge, HRM must be adjusted; it needs to be oriented toward the building of trust. A number of important avenues should be mentioned: the stimulation of social networks and the building of role structures are of special importance for designing an HRM practice that fosters swift trust in project teams. In this sense, the HRM practice is important for handling many of the social weaknesses of project-intensive work. In a context where people move between temporary projects, the HRM practice can provide the necessary element of permanence.

The change issue was the third dimension in our analytical framework. We illustrated two important ways that the HRM practice can work as a change agent: (1) to

TABLE II HRM and Project Intensification: Four Managerial Issues

	HRM Practice	Key Activities of the HRM Practice
Competence issue	Knowledge developer and integrator	Identify knowledge potential. Identify and develop strategies for core competence and competence development. Manage competence shifts. Develop systems for the development of project workers' development
Trust issue	Trust builder	Establish the rules of the game for cooperation and coordination. Define and maintain role structures. Develop HRM as a "brand" to facilitate trust processes. Identify conflicts of interest. Develop the individuals' and the company's social networks. Identify new projects. Participate in the staffing of projects and stimulate networking for the "dedicated project worker."
Change issue	Change agent	Identify change needs. Implement and participate in change initiatives. Develop and support the development of change competence and expertise. Identify, analyze, and manage resistance to change.
People issue	Artist agency	Identify individual needs, wants, and problems. Promote career development and balance between work and private life, balance between intense and low intense periods of work. Filter the performance anxiety and support the personal and professional development of the project worker.

initiate change projects and programs that improve the efficiency of the firm on a general level and (2) to assume an HRM perspective on regular project work. Many of our respondents emphasized the need for the HR unit to identify change opportunities and to implement change initiatives.

The fourth and final issue was labeled "the people issue." The people issue, it seems, is very difficult in project-intensive firms. Our analysis points to project intensification as a key explanatory variable for these problems. Employees face several challenges, such as prioritizing between projects, taking care of their reputation, developing their competence, and staying employable. Several of the firms highlighted the need for project-oriented people in project-intensive organizations. At the same time, many respondents also observed that too much responsibility and too much pressure are being put on project workers. This factor, in addition to the increased employee distance from line managers, sometimes created difficulties. In our conception, firms must acknowledge the importance of "artist agencies" that

oversee the long-term development of individuals. Such agencies should have a paramount place when it comes to improving project operations and making internal (and external) labor markets work more efficiently. They also are necessary to help project workers build and maintain unique qualities and a healthy balance in life.

The roles and key activities of HRM identified in our research point to the importance of knowledge brokers, trust builders, change agents, and artist agencies. The questions suggested for reflection should provide food for thought in the continuous development of HRM in project-oriented firms. Continuous discussion about the key questions involved and the performance of each of the above roles are considered critical for the development of effective HRM systems and processes in the project-intensive firm. For HR directors aiming to configure successful HRM in these companies, the managerial issues identified in this article and the roles developed to handle them should provide avenues for new ideas and improved practice.

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References

Ancona, D., Bresman, H., & Kaeufer, K. (2002). The comparative advantage of X-teams. *Sloan Management Review*, 43(3), 33–39.

Barney, J. B., & Wright, P. M. (1998). On becoming a strategic partner: The role of human resources in gaining competitive advantage. *Human Resource Management*, 37, 31–46.

- Brown, J. S., & Duguid, P. (1991). Organizational learning and communities-of-practice: Toward a unified view of working, learning, and innovation. *Organization Science*, 2, 40–57.
- Davies, A., & Brady, T. (2000). Organizational capabilities and learning in complex product systems: Towards repeatable solutions, *Research Policy*, 29, 931–953.
- DeFillippi, R. J. (2001). Introduction: Project-based learning, reflective practices and learning outcomes. *Management Learning*, 32, 5–10.
- Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of Management Review*, 14, 532–550.
- Engwall, M., Steinhórsson, R., & Söderholm, A. (2003). Temporary organizing: A Viking approach to project management research. In B. Czarniawska & G. Sévon (Eds.), *Northern lights: Organization theory in Scandinavia* (pp. 111–130). Malmö: Liber Abstrakt.
- Gann, D., & Salter, A. (2001). Innovation in project-based, service-enhanced firms: The construction of complex products and systems. *Research Policy*, 29, 955–972.
- Glaser, B. G., & Strauss, A. L. (1967). *The discovery of grounded theory: Strategies for qualitative research*. New York: Aldine de Gruyter.
- Grabher, G. (2001). Ecologies of creativity: The village, the group, and the heterarchic organization of the British advertising industry. *Environment Planning*, 33, 351–374.
- Grant, R. M. (1996). Toward a knowledge-based theory of the firm. *Strategic Management Journal*, 17, 109–122.
- Hendry, C., & Pettigrew, A. (1992). Patterns of strategic change in the development of human resource management. *British Journal of Management*, 3, 137–156.
- Lawler, E. E., & Mohrman, S. A. (2003). *Creating a strategic human resources organization: An assessment of trends and new directions*. Palo Alto, CA: Stanford University Press.
- Lengnick-Hall, M. L., & Lengnick-Hall, C. A. (2003). *Human resource management in the knowledge economy: New challenges, new roles, new capabilities*. San Francisco: Berrett-Koehler.
- Lindkvist, L. (2004). Governing project-based firms: Promoting market-like processes within hierarchies. *Journal of Management and Governance*, 8, 3–25.
- Pfeffer, J. (1994). *Competitive advantage through people: Unleashing the power of the workforce*. Boston: Harvard Business School Press.
- Söderlund, J. (2005). Developing project competence: Empirical regularities in competitive project operations. *International Journal of Innovation Management*, 9(4), 451–480.
- Sydow, J., & Staber, U. (2002). The institutional embeddedness of project networks: The case of content production in German television. *Regional Studies*, 36, 215–227.
- Ulrich, D. (1997). *Human resource champions—The next agenda for adding value and delivering results*. Boston: Harvard Business School Press.
- Ulrich, D. (1998). A new mandate for human resources. *Harvard Business Review*, 76(1), 124–134.
- Wheelwright, S. C., & Clark, K. B. (1992). *Revolutionizing product development—Quantum leaps in speed, efficiency and quality*. New York: Free Press.
- Whittington, R., Pettigrew, A., Peck, S., Fenton, E., & Conyon, M. (1999). Change and complementarities in the new competitive landscape: A European panel study, 1992–1996. *Organization Science*, 10, 583–600.

Clause 5.8 Personnel-related processes ISO 10006:1997(E)

Clause 5.8.1 Definition of project organisational structure ISO 10006:1997(E)

Checklist Questionnaire		Document Identification	Document Result [C/N/P/A/X]	Implementation/ Observation/ Comments	Document Result [C/N/P/A/X]	Findings Report Reference
1.	Has a project organisational structure been established?					
2.	Is the project organisational structure encouraging for communication and co-operation between the project participants?					
3.	Is the project organisational structure appropriate for project scope, size and local conditions?					
4.	Does the project organisational structure identify customer/ stakeholders?					
5.	Are accountability, authority, responsibility and job descriptions defined and documented?					
6.	How often is the project organisational structure reviewed for validity and adequacy?					

Clause 5.8.2 Staff allocation ISO 10006:1997(E)						
Checklist Questionnaire		Document Identification	Document Result [C/N/P/A/X]	Implementation/ Observation/ Comments	Document Result [C/N/P/A/X]	Findings Report Reference
1.	Was selection criteria prepared for staff allocation?					
2.	Has education, knowledge and experience been accounted for allocation of project staff?					
3.	Has the project manager been involved in the appointment of key team members?					
4.	Is project staff efficiency and effectiveness being monitored (subcontractor's or not)?					

Clause 5.8.3 Team Development ISO 10006:1997(E)						
Checklist Questionnaire		Document Identification	Document Result [C/N/P/A/X]	Implementation/ Observation/ Comments	Document Result [C/N/P/A/X]	Findings Report Reference
1.	Is the project team being recognized and rewarded?					
2.	Does the project environment encourage excellence, good working relationships, trust, respect and open communication?					

Leadership competency profiles of successful project managers

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Abstract

This study examines the leadership competency profiles of successful project managers in different types of projects. Four hundred responses to the Leadership Development Questionnaire (LDQ) were used to profile the intellectual, managerial and emotional competences (IQ, MQ and EQ, respectively) of project managers of successful projects. Differences by project type were accounted for through categorization of projects by their application type (engineering & construction, information & telecommunication technology, organizational change), complexity, importance and contract type. Results indicate high expressions of one IQ sub-dimension (i.e. critical thinking) and three EQ sub-dimensions (i.e. influence, motivation and conscientiousness) in successful managers in all types of projects. Other sub-dimensions varied by project type. Comparison was made to existing profiles for goal oriented, involving and engaging leadership styles. Implications derived are the need for practitioners to be trained in the soft factors of leadership, particular for their types of projects. Theoretical implications include the need for more transactional styles in relatively simple projects and more transformational leadership styles in complex projects.

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1. Introduction

Managers are more likely to perform better or to stay longer in their position if their personal characteristics meet the requirements of the position (Mumford et al., 2000). A popular way to identify these characteristics is by profiling the personalities of successful managers.

Profiling provides the idiosyncratic combination of behavioral, temperamental, emotional and mental attributes of a leader, in order to derive a person's particular leadership style. Profiles are often used to relate the profile dimensions to success or failure in a person's leadership position, or alternatively select or develop managers from the match between existing profiles of successful managers and those of candidates for appointment to management

positions. We conducted the present study to identify the leadership profiles of successful managers of projects of different type, which can then be used in the way described above.

Profiling has been popular for leadership roles in political science, to predict presidents' performance over time, such as Simonton's (2006) profiling of 42 US Presidents to forecast George W. Bush's leadership performance, or Immelman's (1998) comparison of Bill Clinton and Bob Dole. Other profiling focuses on individuals, such as Steinberg's (2005) profile of Indira Ghandi or Kunich and Lester's (1994) profile of the Swedish senator Raoul Wallenberg.

Some studies profile cultural differences, such as Kowske and Anthony (2007) profiling mid-level managers in twelve countries, or the Globe study with its attempt to profile managers in particular regions (Javidan et al., 2006). Others profile leadership differences by gender (e.g. Robinson and Lipman-Blumen, 2003). Yet others profile managers by geographical region (Hetland and Sandal,

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2003), industry (e.g. Egri and Herman, 2000 for the North American environment sector) or role in a company, such as Dahlgaard et al. (1997) study on leaders in Total Quality Management (TQM).

Throughout these studies a variety of dimensions were used for measuring and assessing correlations of leadership dimensions with performance indicators, and profiling of leaders and their leadership styles. Reference to particular leadership theories is infrequently done. However, if done, then transformational leadership style appears to be the dominant theoretical perspective.

1.1. Leadership theories

Reviewing the leadership theories of the last 80 years shows that early theories started from a focus on the individual leader and his or her traits. Subsequently leadership theory developed:

- (a) First by taking into account the context of the leadership situation.
- (b) Then by shifting focus from the observable behavior of personal attributes to the intellectual exchange and interpersonal relationships.

Several authors present this development as stages of Schools of Leadership (Partington, 2007; Turner and Müller, 2005). Historically they started in the 1930–1940s, by focusing on leaders' traits, such as their physical appearance, capabilities and personalities. These studies are often categorized as the *trait school* of leadership. Representatives of this school in recent times include Kirkpatrick and Locke (1991) for general leadership, as well as Turner (1999) for leadership in project management. The 1940s brought the *behavior school* of studies, which emphasized the styles adopted by leaders for their particular leadership task. The new underlying assumption of this school was that leadership can be learned, and is not a trait people are born with. The popular 2×2 matrices by Blake and Mouton (1978) or Hersey and Blanchard (1988) are among the representative models of that school. They emphasized leadership differences in concern for people versus concern for production. In the 1960s the *contingency school* was developed, which was concerned with the appropriateness of different leadership styles in different leadership situations by matching the personal characteristics of a leader to the leadership situation. Representative for this school is, for example Robbins' (1997) with the four styles of directive, supportive, participative and achievement oriented leadership, contingent on the personality of the person being led and the situational ambiguity. The *visionary and charismatic school* came in the 1980s, developed with a focus on organizational change. Representative of that school is the distinction between transformational and transactional leadership styles (Bass 1990). Here the former emphasizes follower rewards contingent on meeting specified performance targets, while the latter emphasizes the

development of visions, presence of charisma, respect and trust. Following this move towards ever more soft factors in leadership the *emotional intelligence school* emerged shortly before the year 2000. This school focuses on self management and interaction management. Daniel Goleman (1995) as the most prominent representative of this school hypothesized that emotional capabilities are more important for leadership than intellectual capabilities. Together with Boyatzis and McKee (2002) he identified six leadership styles, namely visionary, coaching, affiliative, democratic, pacesetter, and commanding. This order of styles moves from very democratic via supportive to authoritative. Pacesetter and commanding is only suggested in cases of emergency, because of their inherent threat for long-term relationship between leader and follower (Goleman et al., 2002). Most recently the *competence school* emerged, which encompasses all the earlier schools. Competence is hereby meant as a specific combination of knowledge, skills and personal characteristics (Boyatzis, 1982; Crawford, 2003). Representative for that school are Dulewicz and Higgs (2005) who did an extensive review of existing theories and their assessment tools, and identified 15 leadership dimensions, which they then clustered under three competences of intellectual (IQ), emotional (EQ) and managerial (MQ). These dimensions are listed in Table 1 and described in the Appendix A.

Using these 15 dimensions they identified three leadership profiles for organizational change projects (Table 1), which they call goal oriented, involving and engaging, and which are appropriate depending on the level of change to be achieved within an organization (p. 114):

Table 1
Fifteen leadership competencies and three styles of leadership after Dulewicz and Higgs (2003).

Group	Competency	Goal oriented	Involving	Engaging
Intellectual (IQ)	1. Critical analysis & judgment	High	Medium	Medium
	2. Vision and imagination	High	High	Medium
	3. Strategic perspective	High	Medium	Medium
Managerial (MQ)	4. Engaging communication	Medium	Medium	High
	5. Managing resources	High	Medium	Low
	6. Empowering	Low	Medium	High
	7. Developing	Medium	Medium	High
Emotional (EQ)	8. Achieving	High	Medium	Medium
	9. Self-awareness	Medium	High	High
	10. Emotional resilience	High	High	High
	11. Motivation	High	High	High
	12. Sensitivity	Medium	Medium	High
	13. Influence	Medium	High	High
	14. Intuitiveness	Medium	Medium	High
	15. Conscientiousness	High	High	High

- *Engaging* being a style based on empowerment and involvement in highly transformational context. This leadership style is focused on producing radical change through engagement and commitment.
- *Involving* being a style for transitional organizations which face significant, but not necessarily radical change of their business model or way of work.
- *Goal oriented* being a style focused on delivery of clearly understood results in a relatively stable context.

If different leadership styles are appropriate in organizational change projects, then we should expect it to be the same for other types of projects (Müller and Turner, 2007). This study extends the work of Dulewicz and Higgs (2005) by going beyond organizational change projects and defining leadership profiles also for engineering & construction projects, as well as information & telecommunication technology projects. Through that a framework of leadership profiles of successful project managers is developed, which serves as a template for the development of project managers in their particular type of projects. With the competence school originating from research in permanent organizations, the present paper also attempts to assess which leadership profile comes closest to leadership in projects.

That leads to our research question:

What leadership competency profiles are exhibited by the project managers of successful projects of different type?

1.2. Leadership in projects

Traditionally project management is understood as using the right tools and techniques for being successful, regardless of a project manager's match of personality with project type (PMI, 2004). This is contrary to the results of the studies mentioned earlier and the chronological development of leadership theories. Parts of the project management literature used the well known team roles tests like Myers-Briggs (Briggs-Myers, 1987), or Belbin (1986), etc. as measures of leadership. However, these measures are not leadership measures in terms of project managers' leadership capabilities. Research has shown that these tests are only weakly related to leadership performance (Dulewicz and Higgs, 2003; Higgs, 2001). This group of literature was therefore excluded.

Earlier investigations on project managers' leadership were done using case studies. Holt (1989) mapped the leadership principles of Peters and Waterman's (1982) "In search of Excellence" against leadership attributes identified through interviews and found that some, but not all of the principles are required for leadership in projects. Another case study used the Blake and Mouton (1978) grid to identify low task and high relationship attitude as appropriate leadership style in Asia (Walker and Kalinowski, 1994). The importance of vision for leadership was outlined by Christenson and Walker (2004), and the

importance of creating a supportive environment was shown by Thamhain (2004). The importance of transformational leadership style for project managers was shown by Prabhakar (2005). Along the same line of research Kegan and den Hartog (2004) hypothesized a dominance of transformational leadership style among project managers, but could not statistically proof it.

Research on matching project managers to project types includes Hauschildt et al. (2000) study which categorized project managers as either project star, promising newcomer, focused creative expert, uncreative decision-maker, or thick-skinned pragmatist. For each of these categories they showed the fit to particular combinations of large or small project budgets, high or low project priority, extent of information access and provision, need for technology skills, and level of participation in goal formation. By looking at the construction industry only, Dainty et al. (2004) developed a competency-based framework for performance in projects. Their results reveal some of the variables also found in the competency school of leadership, such as achievement orientation, analytical thinking, as well as impact and influence. It is only recently that the project management literature has acknowledged that projects different from the construction industry may require different approaches to their management, and that both the project management procedures used (Crawford et al., 2005), and the project manager's competence should be selected to meet the needs of the particular type of project. Examples include Turner and Müller (2006) who showed the correlation of specific leadership dimension of the competency school with project success in different types of projects. A number of studies based on the competence school and using the Leadership Development Questionnaire (LDQ) showed the particular leadership competences that relate with success in leadership in general, for example, at the Royal Airforce (Wren and Dulewicz, 2005), the Royal Navy (Young and Dulewicz, 2006), the British Police (Hawkins and Dulewicz, 2007), and in project management in particular, for example, in agile projects (Porthouse and Dulewicz, 2007) or projects in the financial industry (Geoghegan and Dulewicz, 2008). Common across all these studies is that different leadership competences relate to leadership success in different contents. These findings are supported by studies which showed the general importance for emotional competences in projects, such as Dvir et al. (2006). Most recently Turner et al. (2009) compared the leadership profiles of line managers and project managers and identified an even stronger relationship between emotional competences and success in line managers than in project managers. This is line with Goleman's theory that higher levels in the organizational hierarchy require higher levels of EQ.

The late acknowledgement of leadership in the project management literature is in stark contrast to the general leadership literature, where for almost 80 years people have tried to identify the traits, behaviors or competencies of leaders, and to determine which traits, behaviors or compe-

tencies are required in different circumstances for leaders to be successful. But what constitutes success in projects?

1.3. Project success

Project success is not a fixed target. Jugdev and Müller (2005) reviewed our changing understanding of what constitutes project success. In the 1980s there was a heavy focus on the use of the correct tools and techniques. In a classic and still widely quoted paper, Pinto and Slevin (1988) listed what they found as the ten most important factors for project success, regardless of project type. In accordance with the understanding of project management by that time, the list did not include the project manager's competence or fit to the project. Wateridge (1995) did suggest that in deciding how to manage their projects, project managers should first identify the important success criteria for their projects, and then identify success factors that will help them deliver those criteria, and then choose tools and techniques associated with those factors. One of the most significant pieces of work from the current decade was developed by Cooke-Davies (2002) who differentiated between project success and project management success, with the former relating to the achievement of planned business results using the project's outcome (typically a new product or service) and the latter to the achievement of time, cost, quality or other goals set for the management of the project. However, the factors identified through the study did not include the project manager's competence, focusing instead on risk management, program and portfolio management and benefits management, and again the one list was offered as being appropriate for all projects.

Müller and Turner (2007) identified the correlations between success and project managers' leadership competences, using the LDQ and a composite measure of project success. Ten different success criteria measured on 7 point Likert scales were used to assess project managers' level of achievement in their projects. The criteria are shown in Table 2.

1.4. Project types

Several project classification systems exist, such as those by Shenhar (2001) or Turner and Cochrane (1993). They classify projects in 2×2 or 3×3 matrices along dimensions of increasing technical uncertainty and project scope (Shenhar) or increasing understanding of the projects goals and methods needed to achieve these goals (Turner and Cochrane). Recently a comprehensive study on project categorization systems was done by Crawford et al. (2005). They categorized projects by their attributes, and defined project types by each attribute type. Their list of possible categorizations is almost infinite, however, some categories are more often found than others. They are listed in Table 3. In their study they suggested that different project management procedures, competency profiles and leadership styles might be appropriate for different types of project.

Table 2

Success criteria used for this study.

Success criteria
End-user satisfaction with the project's product or service
Suppliers' satisfaction
Project team's satisfaction
Other stakeholders' satisfaction
Meeting project's overall performance (functionality, budget and timing)
Meeting user requirements
Meeting the project's purpose
Client satisfaction with the project results
Reoccurring business with the client
Meeting the respondent's self-defined success factor

Table 3

Model of project categorization used in this study.

Project attribute	Project types by attribute
Application area	Organizational change Information & telecommunication technology Engineering & construction
Complexity	High Medium Low
Strategic importance	Mandatory Repositioning Renewal
Contract type	Fixed price Remeasurement Alliance

The aim with the present study is to develop suitable leadership profiles for the managers of different types of projects, similar to those derived by Dulewicz and Higgs (2005) for different levels of organizational change. In particular, we aim to

- Identify the *extent* different leadership competencies are present in project managers in successful projects of different type.
- Develop project manager leadership competencies profiles related to successful projects.

We derived the following hypothesis from the literature reviewed:

H₁. *There are differences in project manager leadership competency profiles in successful projects of different type.*

In the following sections we describe the methodology used, the analysis done on the data, and then we discuss the results and provide conclusions.

2. Methodology

In order to develop leadership profiles of successful project managers in different types of projects we adopted the competency school perspective as the currently most

advanced understanding of leadership. The concepts were operationalized for

- *Leadership profiles*: by use of the Leadership Development Questionnaire (LDQ). This assessment tool for the competency school of leadership is frequently used in recent studies on leadership in project management (e.g. by Geoghegan and Dulewicz (2008), Müller and Turner (2007), Turner et al. (2009), Young and Dulewicz (2006), Wren and Dulewicz (2005)).
- *Success*: by use of the 10 dimensional project success measure (Table 2) developed by Turner and Müller (2005), based on the Project Excellence Model (Westerfeld, 2003).
- *Project types*: by use of the Crawford et al. (2005) categorization system, limited to the most often used categories (Table 3).

2.1. Questions

We used two questionnaires, each with two sets of questions. The first questionnaire asked the respondent to judge on their last project's success and identify the project's type.

2.1.1. Project success

We asked the respondents to judge the success of their last project against the ten dimensions (Table 2) on a five point Likert scale from *disagree* to *agree*. From this we determined a composite measure of the success of that project.

2.1.2. Project type

We asked the respondents to categorize their last project using the four attribute areas and twelve project types in Table 3. Respondents could categorize their project against several attribute area, but choose only one project type in each area.

The second questionnaire was the LDQ developed by Dulewicz and Higgs (2005), which assessed the respondents' leadership style and gathered demographic data:

2.1.3. Leadership questions

This questionnaire contained 189 questions on the fifteen competency dimensions shown in Table 1. A five point Likert scale from *never* to *always* was used to identify respondents' behavior in respect to the fifteen competency dimensions, and its organizational context.

2.1.4. Demographic questions

We also asked the respondents about their job function, level of education, nationality, age, and gender.

2.2. Respondents

A worldwide, web-based questionnaire was used to collect data. To ensure quality in responses, the aim was to make

the questionnaire global, sending it to professionals in project management worldwide. Members of professional organizations in project management were targeted. An introductory email, together with a web-link to the online questionnaire was sent to Presidents of the PMI® (Project Management Institute) Chapters and Special Interest Groups, and to all country representatives of IPMA (International Project Management Association) and the Presidents of APM (Association of Project Management) and ASAPM (American Society for the Advancement of Project Management). They were asked to forward the questionnaire to their members. The questionnaire was also sent to masters students on project management programs at universities in the UK, Ireland, Australia, New Zealand, the US and Canada. Altogether 400 usable responses were obtained. A conventional response rate can not be calculated due to the snowball approach to sampling.

The sample demographics showed 65% were male and 34% female (1% did not answer the question); 21% were from Europe, 56% from North America, 12% from Australia/New Zealand, and 12% from other parts of the world. Age distribution showed that 12% were 35 years old or younger, 14% between 36 and 40, 21% between 41 and 45, 23% between 46 and 50, 15% between 51 and 55, 14% older than 55 years. Sixty-seven percent worked in the private sector, 28% in the public sector, and 5% in not-for-profit organizations. Occupation distribution showed that 43% worked in a technical job role, 18% in general management, 6% in R&D, 5% in marketing, Human Resources, or Finance, and 5% in manufacturing, 21% worked in other roles. Educationally, 38% had a professional qualification, 32% a higher degree, 24% a first degree, and the remaining 16% a different education.

The validity of the LDQ as assessment tool was repeatedly shown, for example in Dulewicz and Higgs (2004, 2005). Minimization of mono-source bias, due to self rated performance, was addressed in several ways, through a variation of Podsakoff et al. (2003) suggestions. The introductory text confirmed anonymity of the respondents and that there are no right or wrong answers. Two different surveys with different layout and scales were used. The first survey resided on a server in Sweden and asked for project characteristics and success, the second survey (LDQ) resided on a server in the UK and assessed the leadership competencies of the respondent. An unrotated factor analysis of the 15 leadership competencies variables and the ten success variables showed that leadership variables loaded on the first factor and success measures on the second factor (at cut-off = .5), except for *Intuitiveness* (a leadership competency) and the success measure *Reoccurring Business*, which both loaded on their own factor, see Table 4. Mono source bias was therefore assumed not to be an issue.

3. Analysis

We selected the best performing projects to identify the leadership competencies of the most successful project

Table 4
Unrotated factor analysis.

	Component matrix ^a				
	Component				
	1	2	3	4	5
MQ-managing resources	0.818	−0.182	−0.024	−0.005	−0.044
IQ-critical analysis	0.782	−0.246	0.076	−0.116	0.163
MQ-communication	0.767	−0.213	0.035	−0.028	−0.062
IQ-strategic perspective	0.755	−0.289	0.177	−0.098	0.220
MQ-empowerment	0.753	−0.217	0.096	−0.266	0.047
EQ-self-awareness	0.722	−0.259	−0.272	0.179	−0.229
EQ-sensitivity	0.722	−0.144	−0.031	−0.229	0.243
IQ-vision	0.702	−0.294	0.175	0.069	0.042
MQ-developing	0.696	−0.302	0.090	−0.019	−0.030
EQ-motivation	0.673	−0.235	−0.145	0.133	−0.201
EQ-conscientiousness	0.667	−0.198	0.031	−0.234	0.141
EQ-influence	0.647	−0.131	−0.191	0.322	−0.376
EQ-emotional resilience	0.613	−0.237	−0.461	0.154	−0.228
MQ-achieving	0.584	−0.316	0.321	0.053	0.185
Projres_customer satisfaction	0.428	0.697	0.110	0.246	0.014
Projres_achieving purpose	0.382	0.684	0.045	0.087	0.142
Projres_achieving user requirement	0.447	0.681	0.072	0.005	−0.072
Projres_enduser satisfaction	0.422	0.644	−0.084	0.028	−0.051
Projres_team satisfaction	0.333	0.611	0.138	−0.325	−0.228
Projres_overall results (time, cost, quality)	0.350	0.601	0.254	−0.025	−0.077
Projres_stakeholder satisfaction	0.461	0.565	−0.047	−0.262	−0.228
Projres_self defined criterion	0.466	0.539	0.202	0.123	−0.071
Projres_supplier satisfaction	0.340	0.411	−0.363	−0.002	0.384
EQ-intuition	0.079	−0.139	0.540	0.670	0.056
Projres_reoccurring business	0.296	0.363	−0.446	0.340	0.508

Extraction method: principal component analysis.

^a Five components extracted.

managers. For that we first calculated a performance level by project, which was the mean of the ten success questions. The top, average, and low performing projects were found by dividing the sample at the top 30% ($n = 133$) and bottom 30% ($n = 118$) of the mean of the performance level variable. We were then able to determine the extent the 15 leadership competencies are present in project managers in various types of successful projects. For that we followed a six step explorative process:

- (1) Identification of leadership competencies which are significantly stronger in project managers of top performing projects (top 30% in performance).
- (2) Identification of competencies which differ significantly in strength between the different types of projects.
- (3) Normalization of the measures of the fifteen dimensions and comparison of the sample with a control group.
- (4) Categorizing the scores of the fifteen competencies into high, medium or low.
- (5) Identifying the leadership profile of the managers of top performing projects for different project types.
- (6) Comparing the identified leadership competency profiles with the three leadership style profiles defined by Dulewicz and Higgs (2003) to validate the results for

organizational change projects and to identify the closest fit of the three styles to the project types used within this study.

3.1. Identifying differences in competencies

Differences in competencies by performance level were tested using ANOVA. Top performing projects scored significantly higher than low performing projects in all leadership competencies ($p = .000$, $n = 400$), except intuitiveness which was insignificantly different.

3.2. Comparing project types

Further analysis focused only on the top performing projects. Here ANOVA was used to assess competency differences by project types. ANOVA analysis by project application area, (engineering & construction, information & communication technology, and organizational change projects respectively) showed no differences in competency strengths. Similarly, an ANOVA analysis on leadership competencies by project importance, (mandatory, repositioning and renewal respectively) showed no differences.

Table 5 shows the differences in the strength of competencies of project managers in successful projects of

Table 5
Competence differences by project type.

ANOVA Competences	Posthoc Scheffe Group differences	Group coding
<i>Differences by complexity</i>		
EQ-influence*	1 > 2*	1 = high
EQ-motivation**	1 > 2*	2 = medium
	1 > 3*	3 = low
IQ-vision**	1 > 2**	n = 133
<i>Differences by contract type</i>		
IQ-critical analysis*	1 > 2*	1 = fixed price
IQ-strategic perspective*	1 > 2 (p .055)	2 = remeasurement
MQ-developing others**	1 > 3*	3 = alliance
MQ-empowerment**	1 > 2*	n = 109

* Significant: <.05.

** Significant: <.01.

- *High, medium and low complexity.* Vision (an IQ competence), influence and motivation (both EQ competencies) are significantly higher among managers of high complexity projects than in those of medium complexity projects and motivation higher in high complexity projects than in low complexity projects.
- *Fixed price, remeasurement, and alliance contracts.* Critical thinking (IQ), strategic perspective (IQ), and empowering (MQ) are higher in managers of fixed price than in remeasurement contracts with strategic perspective being at the borderline to insignificance. The developing competency was also significantly higher in fixed price contracts than in alliance contracts.

The results partly support hypothesis H_1 : there are differences in project manager leadership competency profiles in some different types of successful projects.

3.3. Normalizing scores

The first step in identifying the profiles of project managers in different types of successful projects was to normalize the sample data and compare it with the control group of the normalized sample of managers, developed by Dulewicz and Higgs (2005).

The normalized control group sample has a range of 1–10 for each competency, with a mean of 5.5, and standard deviation of 2. Normalized scores are called *sten codes*. The control group consists of data from 1009 managers and senior officers. Data are collected with the questionnaire described above. The sample comprises data from 772 males and 237 females, with 483 being managers from the private sector and 526 senior officers working in the public and not-for-profit sectors (Dulewicz and Higgs, 2004).

The *sten codes* in Table 6 shows project managers as a relatively homogeneous group of managers, with a lower standard deviation in each competency compared to the control group. Among the project managers communication (MQ) and developing (MQ) scored lowest, and consci-

Table 6
Sten scores.

Competence	Sten scores			
	Min	Max	Mean	Standard deviation
EQ-conscientiousness	1	10	6.09	1.73
EQ-emotional resilience	1	10	5.37	1.77
EQ-influencing	1	10	5.46	1.68
EQ-intuitiveness	1	10	5.54	1.86
EQ-motivation	1	10	5.44	1.71
EQ-self-awareness	1	9	5.46	1.70
EQ-sensitivity	1	10	5.73	1.70
IQ-critical analysis	1	10	5.75	1.70
IQ-strategic perspective	1	10	5.49	1.75
IQ-vision	1	10	5.36	1.79
MQ-achieving	1	10	5.52	1.55
MQ-communication	1	9	5.21	1.84
MQ-developing	1	9	5.27	1.85
MQ-empowering	1	10	5.61	1.78
MQ-managing resources	1	9	5.40	1.73

entiousness (EQ), critical analysis (IQ), and sensitivity (EQ) scored highest. Thus, project managers appear to be slightly more analytical, sensitive and conscientious, and less communicative and developing, when compared with the control group of other managers.

3.4. Individual profiles

For the identification of project manager profiles in different types of successful projects the sub-sample of high performing projects ($n = 133$) was used. Responses in the fifteen competencies were categorized in high, medium and low in accordance with Dulewicz and Higgs (2005). For that:

- Sten code values between 1 and 4 were categorized as Low, those between 5 or 6 as Medium, and 7 or higher as High.
- Project manager profiles per project type were identified through identification of the particular strength in each competency, by calculating the percentage of sten codes being categorized as Low, Medium or High for each competency in each project type.
- The profile for a set of competencies in a project type was then determined by assigning a profile level of Low, Medium or High. This was done by taking Medium (sten code levels 5 and 6) as a basis (because it's the mean of sten codes for all dimensions) and assigning levels the following way:
 - If less than 25% of the responses were in each of the categories Low or High, the assigned profile level was Medium.
 - If more than 25% of the sten codes in a competency were classified as High then the overall profile level assigned was High (and Low if more than 25% were in the low category).

- If both Low and High categories had more than 25%, but were less than 5% points apart, the profile level assigned was Medium. Otherwise the more populated of the two categories was taken to assign a respective profile level of either Low or High.

Results are shown in Table 7, with all profiles of project managers, the expression of the leadership competencies in successful project managers of the different project types, and the associated sample sizes.

4. Results

4.1. Profiles by project application area

This identified the different leadership profiles of engineering & construction, information & telecommunication technology, and organizational change projects, see Table 7. This industry related distinction has been found important by researchers who identified differences in project management approaches or maturity between different industries (e.g. Ibbs and Kwak, 1997). The results from this analysis are therefore of interest for organizations with a cross-industry portfolio of projects, when training or assigning project managers to different types of projects.

Project managers of most successful engineering projects show strong competencies in critical thinking (IQ), developing (MQ), as well as influence, motivation, and conscientiousness (three EQ competencies). Their competencies in the human resource management related dimensions rank medium.

Project managers of the most successful information & telecommunication technology projects are strong in all competencies, except vision (IQ), which is at a medium strength.

Project managers of the most successful organizational change projects are strong in all competencies but developing, achieving (both MQ), and intuitiveness (EQ).

4.2. Profiles by complexity

This analysis focused on the differences in leadership profile by complexity of projects (Table 7). The results should be of interest for organizations with a relatively homogeneous set of projects (in terms if industry or application type), but variation in terms of perceived project complexity. Profiles of project managers of most successful projects having low complexity were not developed because of the small sample size of only 6 responses.

Managers of the most successful projects having medium complexity are strong in critical thinking (IQ), managing resources, empowering, and developing (three MQ competencies), as well as self-awareness, sensitivity, influence, and conscientiousness (four EQ competencies).

Table 7
Project manager profiles for importance and strengths in leadership competencies in different types of top performing projects.

n		Application type			Complexity			Importance			Contract type		
		Engineering & construction	Information & telecommunication technology	Organizational change	Low	Medium	High	Mandatory	Renewal	Repositioning	Fixed price	Remeasurement	Alliance
IQ	Critical thinking	High	High	High	High	High	High	High	High	High	High	High	High
	Vision	Low	Medium	High	Low	Medium	High	Medium	Low	Medium	Low	Low	Medium
	Strategic perspective	Medium	High	High	Medium	High	High	Medium	High	Medium	Low	Low	Low
MQ	Managing resources	Medium	High	High	High	High	High	High	High	High	High	High	High
	Communication	Medium	High	High	Medium	High	High	Medium	High	High	Medium	Medium	High
	Empowering	Low	High	High	High	High	High	High	High	High	High	High	High
	Developing	High	High	Medium	High	High	High	High	High	High	High	High	Low
EQ	Achieving	Medium	High	Medium	Medium	High	High	Medium	High	Medium	Low	Low	High
	Self awareness	Medium	High	High	High	High	High	Medium	High	Medium	High	High	High
	Emotional resilience	Low	High	High	Medium	Medium	High	Medium	High	High	High	High	Medium
	Intuitiveness	Low	Medium	Medium	Medium	Medium	High	Medium	Medium	High	Medium	Medium	Low
	Sensitivity	Medium	High	High	High	High	High	High	High	High	High	High	High
	Influence	High	High	High	High	High	High	High	High	High	High	High	High
	Motivation	High	High	High	Medium	High	High	High	Medium	High	High	High	High
	Conscientiousness	High	High	High	High	High	High	High	High	High	High	High	High

Managers of the most successful projects with high complexity scored high in all dimensions.

4.3. Profiles by importance

This analysis focused on the differences in leadership profiles by strategic importance of a project, that is, whether it is a mandatory project that has to be done, often for legal reasons, or a renewal project for further development of an existing product or service, or a repositioning project to move the product or service within an existing or into a new market segment (see Table 7). Results of this analysis should be of interest for organizations with a homogenous application area of their projects, but variance in project importance.

Managers of most successful projects that are mandatory are strong in critical thinking (IQ), managing resources, empowering, developing (three MQ competencies), sensitivity, influence, motivation, and conscientiousness (four EQ competencies).

Most successful projects of the renewal type are led by managers being strong in all competencies, except vision (IQ) and intuition (EQ).

Managers of most successful projects of repositioning type are strong in all competencies, except vision and strategic perspective (both IQ), achieving (MQ), and self-awareness (EQ).

4.4. Profiles by contracts

This analysis focused on the differences in leadership profiles by fix-price, remeasurement, or alliance contract for a project (Table 7). The results should be of interest for managers assigning project managers from a governance perspective of transaction costs economics or agency theory (Müller and Turner, 2005), thus organizations with relatively homogenous portfolios of projects in terms of application area, but variance in the types of contracts used with their clients.

Managers of most successful projects and fixed-price contracts show strength in all competencies, except intuitiveness (EQ).

Managers in most successful projects with remeasurement contracts show strength in most competencies, but not in vision and strategic perspective (both IQ), communication, empowering, achieving (three MQ competencies), and intuitiveness (EQ).

Managers of most successful projects with alliance contracts show also strength in most of the competencies. Only vision and strategic perspective (both IQ), empowering, developing (both MQ competencies), emotional resilience and intuitiveness (both EQ competencies) were lower than 3. The results for these projects are, however, based on a small sample size of only 12 responses.

4.5. Validation and comparison of leadership competency profiles

Differences in measuring EQ, IQ and MQ in studies which are based on other schools than the competence school, or even the use of team roles instead of leadership measures does not allow to compare the results of the present studies with studies using other definitions and data collection tools. Most of the studies in the competence school of leadership, however, look at the importance of individual leadership dimension for leadership success. That leads to a scarcity in studies that look at the expression of leadership competences in project managers, that is, the relation among the leadership competences, thus the leadership profiles. So far only Dulewicz and Higgs (2005) developed a set of profiles, and only for organizational change projects.

The following step in this study validated the findings by (a) comparing the leadership competency profiles of successful project managers from organizational change projects with the leadership profile identified by Dulewicz and Higgs (2005) for these types of project, then (b) comparing the leadership competency profiles of all project types with those defined by Dulewicz and Higgs in order to identify the leadership profile that comes closest to leadership in projects.

We calculated the differences between the three leadership profiles defined by Dulewicz and Higgs (goal oriented, involving, engaging) and the leadership profiles of the 11 different project types shown in Table 7 by grading each of the 15 leadership sub-dimensions as 1 for low, 2 for medium and 3 for high for each leadership profile. For each of the 11 project types we calculated their difference with the goal oriented, involving, and engaging profile by calculating the differences by each of the 15 leadership competencies, and then summated the differences for each sub-dimension. The span of differences lies between 0 (no difference) to 30 (maximum difference of 2 in all 15 sub-dimensions). From that we defined a summated difference between 0 and 9 as being a good fit between a project type's leadership profile and the Dulewicz and Higgs defined profiles, a difference between 10 and 19 as a mediocre fit, and between 20 and 30 as no fit. Table 8 shows the results. The three leadership profiles of Dulewicz and Higgs for organizational change projects are validated as they all fall into the "good fit" category (<10).

Results indicate the *engaging* leadership profile as the most suitable profile for project work through a good fit with almost all leadership profiles for the different project types, except for engineering and construction projects, where an *involving* profile might be slightly better suited.

The profile of the *engaging* style shows high expression of all EQ and some MQ sub-dimensions (Table 1). This is supported by research results from Müller and Turner (2007), which showed a strong correlation between EQ competences and project results, except for engineering and construction projects.

Table 8
Distance between successful project managers' leadership profile and the three styles defined by Dulewicz and Higgs (2003).

	Goal oriented	Involving	Engaging
Engineering & construction	12	11	12
Information & telecommunication Technology	10	11	6
Organizational change	9	8	7
Medium complexity	14	9	6
High complexity	8	9	6
Mandatory	13	10	5
Renewal	10	11	8
Repositioning	10	9	4
Fixed price	9	10	7
Remeasurement	15	10	7
Alliance	13	12	11
Sum of all differences	123	110	79
Mean	11	10	7

5. Conclusions

The study used a worldwide, web-based questionnaire to identify the leadership competency profiles of successful project managers in projects of different type. By focusing on the leadership profiles of successful managers only, we identified differences in the strength and presence of leadership competencies of managers in different types of projects. The results support the hypothesis that project manager leadership competency profiles differ in some project types in order to be successful. A profiling method was used to identify the most eligible leadership profile of project managers of different project types. Results indicate high expressions of one IQ sub-dimension (i.e. critical thinking) and three EQ sub-dimensions (i.e. influence, motivation and conscientiousness) in successful managers in all types of projects. Expression of other sub-dimensions differs by project type. The results support and validate those of Dulewicz and Higgs (2005), who identified different profiles of leadership competence in organizational change projects of different complexity. The present study extends these findings to engineering & construction, information & telecommunication technology projects (Table 7). The leadership styles of successful project managers resemble the Engaging style as defined by Dulewicz and Higgs (2005), which builds on empowerment and involvement in highly transformational contexts.

5.1. Practical implications

The practical implications of the results are

- (1) Leadership competencies should be taken into account when assigning project managers to projects. Aim is a fit of the individual project manager's competencies with those shown in the Table 7 for different project types.

- (2) Project manager training and development should focus not only on technical and management skills, but also on development of leadership competencies.

Therefore we suggest organizations to adopt a five step process:

Step 1: Recognize the types of project the organization undertakes, and the appropriate leadership styles for your types of projects.

Step 2: Assess the leadership styles of the project managers. Tools such as Leadership Development Questionnaire (LDQ), developed at Henley Management College, UK, by Dulewicz and Higgs (2005) can be used to assess leadership styles.

Step 3: Develop these leadership areas in accordance with the projects leadership profile of successful managers. This can be achieved through training and experience.

Step 4: Where the organization undertakes several types of project, then the profiles of individual project managers needs to be maintained centrally and appropriate project managers chosen when projects are resourced.

Step 5: Value your project managers.

5.2. Theoretical implications

With increasing project requirements, however measured (complexity, project type, duration, etc.), there is an increasing need for emotional competencies in the manager. Thus transactional leadership, and concern for process, is more important on relatively simple projects, but transformational leadership, and concern for people, is necessary on more-demanding projects.

Project performance can be impaired on some types of project if project managers don't adapt their leadership style to the type of project. Project managers progressing from a junior level to a middle, and then to a senior level will manage projects of different type as part of their career development. As they progress they will need to enhance their leadership competencies, particularly developing the emotional dimensions.

The present study's strength lies in its focus on high performing projects and its managers, which allows identifying the leadership profile most likely successful in a given type of project. Improvements can be done in further studies by using larger sample sizes in order to investigate low complexity projects and those with alliance contracts projects in more detail.

Future studies could build on and validate the current results by assessing the role of organizational or national culture in the different profiles, as well as the interaction of managers with different profiles with their teams and stakeholders in the project.

We showed that profiling is frequently used to identify a most suitable person for a role or position in an organiza-

tion. In this paper we presented the leadership profiles of successful project managers. This provides managers of project managers with a target profile for their project managers in projects of different type. Developing the project managers' leadership styles towards these target profiles will contribute to better project results and personal success of the individuals.

Appendix A. Fifteen leadership competencies, after Dulewicz and Higgs (2005)

This appendix contains a brief description of the fifteen competency dimensions of Dulewicz and Higgs (2005), as listed in Table 1.

A.1. Intellectual competence

They suggest there are three intellectual components of leadership competence:

1. *Critical analysis and judgment*: the leader gathers relevant information from a wide range of sources, probing the facts, identifying advantages and disadvantages. Sound judgements and decisions making, awareness of the impact of any assumptions made.
2. *Vision and imagination*: the leader is imaginative and innovative. He or she has a clear vision of the future and foresee the impact of changes on implementation issues and business realities.
3. *Strategic perspective*: the leader is aware of the wider issues and broader implications. He or she balances short and long-term considerations and identifies opportunities and threats.

A.2. Managerial competences

They suggest there are five managerial dimensions to leadership competence:

4. *Resource management*: the leader organizes resources and co-ordinates them efficiently and effectively. He or she establishes clear objectives and converts long term goals into action plans.
5. *Engaging communication*: the leader engages others and wins their support through communication tailored for each audience. He or she is approachable and accessible.
6. *Empowering*: the leader gives direct reports autonomy and encourages them to take on challenges, to solve problems and develop their own accountability.
7. *Developing*: the leader encourages others to take on ever more-demanding tasks, roles and accountabilities. He or she develops others' competencies and invests time and effort in coaching them.

8. *Achieving*: the leader shows an unwavering determination to achieve objectives and implement decisions.

A.3. Emotional competencies

Finally they suggest there are seven emotional dimensions to leadership competence:

9. *Self-awareness*: the leader is aware of his or her own feelings and able to recognize and control them.
10. *Emotional resilience*: the leader is able to maintain consistent performance in a range of situations. He or she retains focus on a course of action or the need to obtain certain results in the face of personal challenge or criticism.
11. *Intuitiveness*: the leader arrives at clear decisions and is able to drive their implementation in the face of incomplete or ambiguous information by using both rational and 'emotional' perceptions.
12. *Interpersonal sensitivity*: the leader is aware of, and takes account of, the needs and perceptions of others in arriving at decisions and proposing solutions to problems and challenges.
13. *Influence*: the leader can persuade others to change a viewpoint based on the understanding of their position and the recognition of the need to listen to this perspective and provide a rationale for change.
14. *Motivation*: the leader has drive and energy to achieve clear results and make an impact.
15. *Conscientiousness*: the leader displays clear commitment to a course of action in the face of challenge and matches 'words and deeds' in encouraging others to support the chosen direction.

References

- Bass, B.M., 1990. Handbook of Leadership: Theory, Research and Applications. Free Press, New York.
- Belbin, R.M., 1986. Management Teams. Heinemann, London, UK.
- Blake, R.R., Mouton, S.J., 1978. The Managerial Grid. Gulf, Houston, TX.
- Boyatzis, R., 1982. The Competent Manager – A Model for Effective Performance. Wiley, New York.
- Briggs-Myers, I., 1987. Introduction to Type. Psychologists Press, Oxford.
- Cooke-Davies, T., 2002. The 'real' success factors on projects. International Journal of Project Management 20, 185–190.
- Crawford, L.H., 2003. Assessing and developing the project management competence of individuals. In: Turner, J.R., (Ed.), People in Project Management, Gower, UK.
- Crawford, L.H., Hobbs, J.B., Turner, J.R., 2005. Project Categorization Systems. PMI, Newton Square, PA, USA.
- Christenson, D., Walker, D.H.T., 2004. Understanding the role of "vision" in project success. Project Management Journal 35 (3), 39–52.
- Dahlgard, J.J., Larsen, H.Z., Nørgaard, A., 1997. Leadership profiles in quality management: a Danish perspective. Total Quality Management 8 (2), 16–30.

- Dainty, A.R.J., Cheng, M., Moore, D.R., 2004. A competency-based performance model for construction project managers. *Construction Management and Economics* 22 (October), 877–886.
- Dulewicz, V., Higgs, M., 2003. Design of a new instrument to assess leadership dimensions & styles. In: Henley Working Paper HWP 0311. Henley Management College, Henley-On-Thames, UK.
- Dulewicz, V., Higgs, M.J., 2004. Leadership dimensions questionnaire: organization context, leader performance follower commitment. In: Henley Working Paper Research Note. Henley Management College, Henley-on-Thames, UK.
- Dulewicz, V., Higgs, M.J., 2005. Assessing leadership styles and organizational context. *Journal of Managerial Psychology* 20, 105–123.
- Dvir, D., Sadeh, A., Malach-Pines, A., 2006. Projects and project managers: the relationship between project manager's personality, project, project types, and project success. *Project Management Journal* 37 (5), 36–48.
- Egri, C.P., Herman, S., 2000. Leadership in the North American environmental sector: values, leadership styles, and contexts of environmental leaders and their organizations. *Academy of Management Journal* 43 (4), 571–604.
- Geoghegan, L., Dulewicz, V., 2008. Do project managers' leadership competencies contribute to project success? *Project Management Journal* 39 (4), 58–67.
- Goleman, D., 1995. *Emotional Intelligence*. Bantam Books, New York, NY.
- Goleman, D., Boyatzis, R., McKee, A., 2002. *Primal Leadership: Learning to Lead with Emotional Intelligence*. Harvard Business School Press, Boston, MA, USA.
- Hauschildt, J., Keim, G., Medcof, J.W., 2000. Realistic criteria for project manager selection and development. *Project Management Journal* 31 (3), 23–32.
- Hawkins, J., Dulewicz, V., 2007. The relationship between performance as a leader and emotional intelligence, intellectual and managerial competences. *Journal of General Management* 33 (2), 57–78.
- Hersey, P., Blanchard, K.H., 1988. *Management of Organizational Behaviour*. Prentice Hall, Englewood Cliffs, NJ.
- Hetland, H., Sandal, G.M., 2003. Transformational leadership in Norway: outcomes and personality correlates. *European Journal of Work and Organizational Psychology* 12 (2), 147–170.
- Higgs, M., 2001. Is there a relationship between the Myers-Briggs type indicator and emotional intelligence? *Journal of Managerial Psychology* 16 (7), 509–533.
- Holt, L., 1989. Project management excellence: the Shell Stanney case. *Construction Management and Economics* 7, 217–234.
- Ibbs, W.C., Kwak, Y.H., 1997. *The Benefits of Project Management*. Project Management Institute, USA.
- Immelman, A., 1998. The political personalities of 1996 US presidential candidates Bill Clinton and Bob Dole. *Leadership Quarterly* 9 (3), 335–366.
- Javidan, M., Dorfman, P.W., de Luque, M.S., House, R.J., 2006. In the eye of the beholder: cross cultural lessons in leadership from project GLOBE. *Academy of Management Perspectives* 20 (1), 67–90.
- Jugdev, K., Müller, R., 2005. A retrospective look at our evolving understanding of project success. *Project Management Journal* 36, 19–31.
- Keegan, A., 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), 609–618.
- Kirkpatrick, S.A., Locke, J.A., 1991. Leadership: do traits matter? *Academy of Management Executive* 5 (2), 48–60.
- Kowske, B.J., Anthony, K., 2007. Towards defining leadership competence around the world: what mid-level managers need to know in twelve countries. *Human Resource Development International* 10 (1), 21–41.
- Kunich, J.C., Lester, R.I., 1994. Profile of a leader: the Wallenberg effect. *Journal of Leadership Studies* 1 (2), 94–107.
- Müller, R., Turner, J.R., 2005. The impact of principal-agent relationship and contract type on communication between project owner and manager. *International Journal of Project Management* 23 (5), 398–403.
- 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.
- Mumford, A., Zaccaro, S.J., Johnson, J.F., Diana, M., Gilbert, J.A., Threlfall, K.V., 2000. Patterns of leader characteristics: implications for performance and development. *Leadership Quarterly* 11 (1), 115–133.
- PMI, 2004. *Guide to the Project Management Body of Knowledge*, third ed. Project Management Institute, Newton Square, USA.
- Partington, D., 2007. Leadership. In: Turner, J.R. (Ed.), *Handbook of Project Management*, vol. 4. Gower Publishing, Aldershot, UK, pp. 739–756.
- Peters, T., Waterman, R., 1982. *In Search of Excellence*. Harper Collins Publisher, New York, NY, USA.
- Pinto, J.K., Slevin, D.P., 1988. Project success: definitions and measurement techniques. *Project Management Journal* 19, 67–73.
- Podsakoff, P.M., MacKenzie, S.B., Lee, J.Y., Podsakoff, N.P., 2003. Common method biases in behavioral research: a critical review of the literature and recommended remedies. *Journal of Applied Psychology* 88, 879–903.
- Porthouse, M., Dulewicz, C., 2007. Agile project managers' leadership competencies. In: Henley Management College Working Paper Series HWP 0714, Henley Management College, Henley-on-Thames, UK.
- Prabhakar, G.P., 2005. Switch leadership in projects: an empirical study reflecting the importance of transformational leadership on project success across twenty-eight nations. *Project Management Journal* 36 (4), 53–60.
- Robbins, S.P., 1997. *Essentials of Organizational Behaviour*. Prentice Hall, Englewood Cliffs, NJ.
- Robinson, J.L., Lipman-Blumen, J., 2003. Leadership behavior of male and female managers, 1984–2002. *Journal of Education for Business* 79 (1), 28–33.
- Shenhar, A., 2001. One size does not fit all projects: exploring classical contingency domains. *Management Science* 47 (3), 394–414.
- Simonton, D.K., 2006. Presidential IQ, openness, intellectual brilliance, and leadership: estimates and correlations for 42 US chief executives. *Political Psychology* 27 (4), 511–526.
- Steinberg, B.S., 2005. Indira Gandhi: the relationship between personality profile and leadership style. *Political Psychology* 26 (5), 755–789.
- Thamhain, H., 2004. Team leadership effectiveness in technology-based project environments. *Project Management Journal* 35 (4), 35–46.
- Turner, J.R., 1999. *Handbook of Project-Based Management: Improving the Process for Achieving Strategic Objectives*. McGraw-Hill, UK.
- 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., 2005. The project manager's leadership style as a success factor on projects: a literature review. *Project Management Journal* 36, 49–61.
- Turner, J.R., Müller, R., 2006. *Choosing Appropriate Project Managers: Matching Their Leadership Style to the Type of Project*. Project Management Institute, Newtown Square, USA.
- Turner, J.R., Müller, R., Dulewicz, V., 2009. Comparing the leadership styles of functional and project managers. *International Journal of Managing Projects in Business* 2 (2), 198–216.
- Walker, A., Kalinowski, M., 1994. An anatomy of a Hong Kong project – organization, environment and leadership. *Construction Management and Economics* 12, 191–202.
- Wateridge, J.H., 1995. IT projects: a basis for success. *International Journal of Project Management* 13, 169–172.
- Westerveld, E., 2003. The Project Excellence Model: linking success criteria and critical success factors. *International Journal of Project Management* 21 (6), 411–418.
- Wren, J., Dulewicz, V., 2005. Leader competencies, activities and the successful change in the royal airforce. *Journal of Change Management* 5 (3), 295–306.
- Young, M., Dulewicz, V., 2006. Leadership styles, change context and leader performance in the Royal Navy. *Journal of Change Management* 6 (4), 383–396.

Authentic leadership for 21st century project delivery

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Abstract

Project leadership has to adapt to meet changing needs of this 21st century if it is to remain relevant. The 21st century world has changed from that of the previous century with the global financial crisis (GFC) marking a point of inflection in this change. At the same time generational change and particularly in Australia, a move to project alliance contracting, combine to require a re-examination of project leadership. Results of a pilot study and preliminary results of research into characteristics required for successful alliance project leadership are presented.

Characteristics identified by this research relate closely to those of authentic leadership. A capability maturity model (CMM) to track the development of authentic leadership attributes in project leaders is proposed. Research by others in a range of project based environments would further test the usefulness of this CMM for project managers and leaders.

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Keywords: Authentic leadership; Project management (PM); Capability maturity model; Alliance project management

1. Introduction

Managing projects in the 21st century will require a different approach and therefore different attributes, knowledge and skills of project managers; a new leadership style will be required (Toor and Ofori, 2008). Accordingly, the focus of this paper is on the characteristics of authentic leadership and how this new leadership style may fit the needs of successful project leaders in the 21st century. Team virtues to be developed by project leaders have for some time included ethics, trust and respect for others, honesty and using power responsibly (Kloppenborg and Petrick, 1999). Authenticity in leadership is described by George (2003) as being true to yourself; of being the person that you are rather than developing an image or persona of a leader. Authentic leadership incorporates transformational leadership and ethical leadership (Avolio et al., 2004), or could be seen to add ethical leadership qualities to the established transformational leadership style. An authentic leader is self-aware, and guided by a set of values, or high moral standards; is viewed as honest and as possessing integrity

demonstrated through transparency in their actions, resulting in fair and balanced decisions, or ‘doing “what is right and fair” for’ both ‘the leader and their followers’ (Avolio et al., 2004: 807). Given the changing values and factors underpinned by trust and commitment of project participants, especially in alliance project management, the distinguishing features of authentic leadership, components that set it apart from transformational and other leadership styles: leader self awareness and self-regulation; emotional contagion, and commitment to enabling follower success through supporting their development (Avolio and Gardner, 2005), address the need identified by Toor and Ofori (2008: 628) for ‘authentic leaders’ who ‘successfully operate in the increasingly complex working environment’.

Alliancing has increased in importance as a procurement method in Australia for infrastructure and construction projects. Expenditure on infrastructure alliance projects in Australia grew from A\$12 billion per annum in the 2003/04 financial year to \$32 billion per annum in the 2008/09 financial year (Wood and Duffield, 2009). Project alliances have distinct features as compared to the business alliances referred to by Doz and Hamel (1998). Parties to a project alliance agreement work as a collaborative team, acting with integrity and making unanimous decisions relating to key

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project delivery issues. Risk is shared through group gain-share or pain-share arrangements and “best-for-project decisions” require the alliance partners to work together to provide innovative solutions to problems (Department of Treasury and Finance Victoria, 2010). This new approach to project management highlights the need for collaborative skills and demonstrates that trust building and higher levels of communication and dialogue to facilitate innovation are required. The move to project alliance contracting in Australia requires an increased emphasis on soft skills for project leadership success. Based on research currently in progress, we discuss the needs of project managers in alliance contracting environments. Hence, this paper will also draw upon results of a recent study conducted by the authors of alliancing in Australasia to report on the knowledge, skills and attributes required for successful alliance project management. The paper culminates with a capability maturity model (CMM) which is suggested as a means of tracking authentic leadership development of alliance project leaders.

Thus the aim of this paper is to address the identified need for a new project leadership style to suit project environments of today and the future. This new environment, especially in Australia where this research was based, includes a move to project alliancing. Hence we will discuss the attributes of authentic leadership to identify whether this leadership style would provide the leadership required for successful future projects. We then draw on results of recent research to demonstrate how authentic leadership attributes might be measured and developed to support improved project leadership.

This paper is structured as follows. The next section discusses past, present and future project leadership then explores the broad concept ‘leadership style’ concentrating on two approaches: Transactional and Transformational, popularly espoused in the 20th century and a third style Authentic, that had its origins during the 1990s but has gained growing attention during the first decade of the 21st century. This is followed by a brief discussion of PM and programme management in terms of the expectations of followers, gaining commitment from project participants, and the different emphasis placed on leadership by project and programme leaders. The next section focuses on leadership as a value alignment and brings in elements of ethics, intergenerational values, and matching values with the chosen leadership approach. This then leads to a discussion section. This section provides some findings from research on successful projects, including those completed under alliance contracting. These findings illustrate the importance placed upon fitting values with leadership style when nurturing future leaders, and the increased need for communication and relationship skills to aid the development of trust within alliance project teams. Insights presented in this section support the argument for authentic leadership in a construction PM context, but we argue from our analysis of the literature that this position can be supported for other PM sectors. We then provide a model of authentic leadership that can be used to assess and evaluate the maturity of leadership authenticity that we propose could be the subject of useful further research. Our paper concludes with an

indication of what future research could flow from this largely conceptual paper and we summarise our paper.

2. Project leadership past, present, future

Much of 20th century PM leadership was focussed upon return on investment (ROI) and iron triangle results (within time, cost budget and to acceptable quality). In many ways the widespread 20th century PM thinking was captured by a major PM study reported upon by Thomas and Mullaly (2008) which had its roots in a previous study (Thomas et al., 2002a, b). However, the 2008 study does reveal a shift in viewpoints from a primary focus upon ROI (see Chapter 2 in: Thomas and Mullaly, 2008) to a more general benefits stance, with value being measured using balanced scorecard (BSC) tools and organisational competency tools, such as capability maturity models for adding value to the project participant organisations.

Another way in which PM leadership is changing in unison with all other disciplines is that a generational change in leadership is occurring, with the Baby Boomers handing over the responsibility for PM leadership to generation X (Gen X) and generation Y (Gen Y) people. These three groups have shaped their world view, values and aspirations in very different contexts. Conditions that shaped the world view and management style of Baby Boomers and which enabled them to be effective in leading projects in their era are not necessarily effective in an emerging era that will be dominated by Gen X and Gen Y project managers. Sirias et al. (2007) undertook a study of 434 people in a general management context using factor analysis to examine the generational effects on teamwork within a changing workforce. They argue that the analogy of the ‘melting pot’ organisational values (where teams subsume much of their values to that of the organisation), needs to change to one of a ‘salad bowl’ analogy (based upon each person maintaining their individuality yet making a valued contribution to teams). This need was based upon demographic changes and values held by Baby-Boomers and Gen X knowledge workers. Some Gen Y workers are already managing project teams — the oldest members of the generation are now turning thirty. Suffice to say that value change is afoot, be that generational or based on an evolutionary context. This dynamic, as for other generations throughout the evolutionary process, must shape leadership approaches in gaining commitment from project team members, other project participants and stakeholders. As Twenge and Campbell (2008: 873) conclude, “The profits of the twenty first century will go to businesses that can harness the unique traits of Generation Me to their benefit and that of their company.”

2.1. Leadership

Theories of leadership are extensive in content and in the period of time that leadership has been written about in terms of approaches or styles. It is beyond the scope of this paper to enter into an extensive history of the evolution of leadership theory, hence discussions will concentrate on those theories that were

dominant at the closing decades of the 20th century and that are now emerging during the 21st century.

2.2. Three categories of leadership

A recent paper on authentic leadership in a construction PM sector context attracted our attention (Toor and Ofori, 2008) as a good starting point to explore how authentic leadership may not only apply to the construction PM sector but to other PM areas. Toor and Ofori (2008: 622–624) provide a sound general review of literature relevant to their paper; that review is relevant to this paper. Readers may wish to refer to that paper for the broader discussion of leadership styles particularly relevant to construction PM.

Toor and Ofori (2008) argued the need for a new project leadership style in the construction industry. Today an increasing amount of work is completed across a range of industries in teams organised to deliver distinct, though often inter-related, projects (see next section for more discussion on this aspect). It is for this reason that we advocate that it is not only project leaders in the construction industry but all project leaders that need to adopt a new leadership style. This new style would deliver projects that are not only successful when measured against the traditional iron triangle success factors of on time and on budget to specified quality, but which result in sharing and retention of knowledge, ethical behaviour that supports future and not only immediate success, and accordingly contributes to organisational sustainability. This concept of project success is about leading organisations to a sustainable future (Maltz et al., 2003). Walker and Nogeste (2008: 183) adapted Shenhar et al.'s (2001: 717), model of success. This adapted model is presented in Fig. 1.

Fig. 1 indicates that PM success in terms of project efficiency is insufficient for long term business sustainability. Stakeholders are now demanding more than the traditional measures of organisational success; impact on customers as well as other team participants is important. The purpose of undertaking projects is to deliver benefits (Thiry, 2005; Bradley, 2006) this means that

not only should customers appreciate a benefit but that the base business or commissioning organisation should also gain benefits from projects be that directly or a by-product through learning or building competencies (Cooper et al., 2002; Sense, 2003; Maqsood et al., 2004). Another purpose of projects, particularly vanguard projects where new learning can be harvested, is to prepare the organisation for the future (Brady and Davies, 2004). Clearly, Fig. 1 suggests that sustainable project leadership extends beyond efficiency and even customer impact thus the kind of leadership discussed by Toor and Ofori (2008) centred on the construction sector that extends to many types of projects. PM leadership in other areas including information technology (IT) needs to persuade, influence and inspire a diverse group of beneficiaries of projects to be able to count on their cooperation, commitment and support (Hartman and Ashrafi, 2002).

Avolio (1996) outlines a progression of leadership approaches, commencing with laissez faire in which by abdicating responsibility a leader takes an 'anything goes' stance; managing by exception through either only passively being concerned with fixing mistakes after they happen or more actively looking at what went wrong and ignoring what went right. The constructive transactional leadership style develops well defined roles and expectations to achieve desired outcomes; and the transformational leadership style contains evidence of what Avolio calls the 4 I's (Avolio et al., 1991). These are: Individual consideration (stimulating motivation mainly through performance and rewards that meet the individual's value proposition); Intellectual stimulation (questioning the status quo and seeking innovation and continuous improvement); Inspirational motivation (articulating a desired future and how to achieve it); and Idealised influence (gaining trust, respect and confidence with high standards of conduct to be a role model).

Leadership approaches can be generally seen as being categorised as non-leadership (dereliction of duty through a laissez faire approach), transactional leadership (where there is a 'give and take' between leader and follower) and transformational leadership (where intrinsic motivation is coaxed or encouraged in some way from followers by leaders). This was

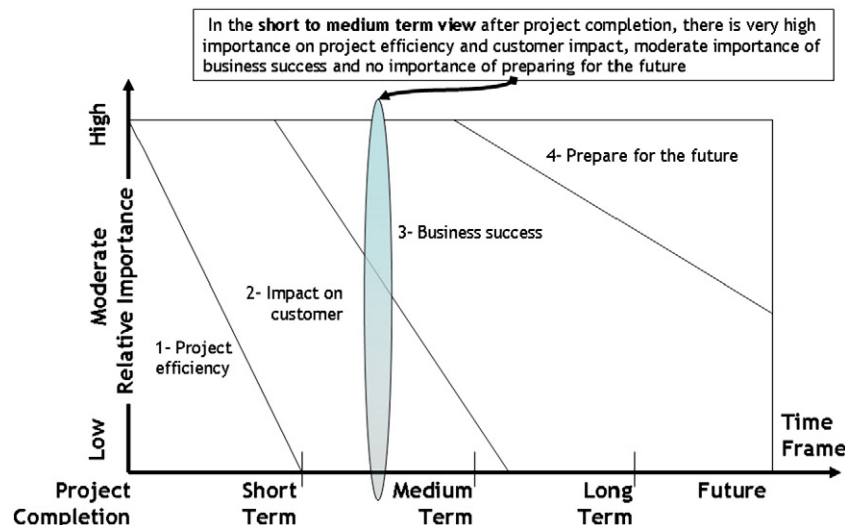


Fig. 1. Project long term success.

essentially the model of development of leadership though through the 21st century. Transactional leadership was the norm in the earlier part of the century and may still be seen as appropriate for highly process-oriented projects where following standard methodologies and getting the job done by the rule book is valued by the organisation and its project participants. However, Price (2003: 68) points to weaknesses in a transactional leadership approach: “transactional leadership adopts a markedly uncritical view of the selves engaged in these exchanges. This form of leadership appeals to us simply as we are, whatever our desires and preferences might be and regardless of their perhaps questionable normative force.” However, in the 1990s evidence of a trend towards acceptance that transformational approaches better resonated with the change from manual work to skilled knowledge work occurred. Skilled knowledge workers cannot be effective when treated as machines and programmed precisely what to do. They need to be engaged in dialogue to make sense of situations they confront so they may choose wisely from a wide repertoire of possible responses. Transformational leadership appeals to high levels of motivational reasoning (see Section 2.3 for further discussion on this aspect).

At the beginning of the new century, Avolio and others extended the final ‘I’ in their transformational model into the concept of authentic leadership (Avolio, et al., 2004; Avolio and Gardner, 2005; Avolio and Luthans, 2006; George et al., 2007). George et al. (2007: 130) state that “Authentic leaders demonstrate a passion for their purpose, practise their values consistently, and lead with their hearts as well as their heads. They establish long-term, meaningful relationships and have the self-discipline to get results. They know who they are.” At the core of this view of leadership behaviour is consistency between espoused practise and practise in action. Key elements of Avolio et al.’s (2004) model of authentic leadership behaviours and espoused values also include hope, trust and positive emotions.

Avolio et al. (2004) maintain that followers can identify with the leader at a personal and social level. This requires that followers identify with leaders through their demonstrated hope, trust and positive emotions. This influences followers’ optimism which leads to commitment, job satisfaction, meaningfulness and engagement. The expected outcome of this is desirable follower behaviours. Authentic leadership, according to Avolio et al.’s (2004) model, requires leaders to have confidence, optimism, hope, self-efficacy and resilience (Luthans and Youssef, 2004). These leaders are aware of how they think and act and are true to themselves, and they are conscious of how they are perceived by others. Self-awareness and awareness of others are the recurring theme within authentic leadership. Authentic leaders are clear about their own values and moral perspectives, knowledge and strengths and are equally aware of these attributes within others. They are confident, hold a positive view of the future, are resilient and are perceived by others to be of high moral character and place a high importance on the development of employees as leaders. As a result, they lead from their own personal point of view (Shamir and Eilam, 2005). This is also consistent with the

concept of emotional intelligence (EI) and the need for project managers to have not only good general intelligence (IQ) but also managerial competencies and intelligence (MQ) as well as having emotional intelligence so that they can select an appropriate leadership style based on context and their perception of the most effective leadership style to gain the desired response from their team (Müller and Turner, 2007).

The change to an authentic leadership style that Toor and Ofori (2008) recommended for construction PM is a change which is generally supported. Authentic leadership attributes impact organisations in a variety of ways. The positive psychological capacities of authentic leaders mean that they are open to development and change (Avolio and Gardner, 2005); such leaders develop individuals, teams and the organisation or the community in which they operate to ensure their success and prosperity. Authentic leaders help followers recognise their leadership potential and provide a role model for the development of authentic leadership skills. Authentic followership is viewed by Gardner et al. (2005: 346) to be ‘an integral component and consequence of authentic leadership development’. Unlike transformational leadership, charisma is not necessarily a component or an attribute of authentic leadership (George, 2003). It is the authentic leader’s ability to establish and maintain relationships and to lead with purpose based on values that leads to them being perceived as desirable leaders and contributes to their success. Successful project leaders develop and grow their team. They build strong relationships with and between team members, leading to positive social exchanges. These project leaders demonstrate authentic leadership capabilities and thus will be viewed as possessing personal integrity and to be living values that lead to followers behaving in a manner consistent with the leader’s values (Avolio and Gardner, 2005).

In Alliances, the alliance leadership team (ALT), and team members, all have high level expertise in their respective areas, but all will also need to possess attributes commonly attributed to transformational leadership with the additional attributes of authentic leadership supporting yet higher levels of success and team member satisfaction: they are being collaborative, demonstrating attributes that build trust, and encouraging communication and dialogue that facilitate team building and commitment. Group, or team, leadership skills are required in this environment. Some have suggested that globalisation has led to convergence of leadership and management ideologies; however Holmberg and Åkerblom (2006) questioned the validity of this view. They found that a Swedish leadership style could still be used to better understand leadership in cross-cultural interaction. Leadership in alliancing in Australasia may be another example of culture influencing ‘shared leadership ideals’. Holmberg and Åkerblom (2006: 3) acknowledge, though, that ‘a shared vocabulary and set of norms’ may still exist. Authentic leadership, and alliance team leadership, use vocabulary and norms established in the general leadership literature. Thus the possible ‘shared leadership ideals’ make applying authentic leadership attributes and team leadership within alliances to other cultures possible. In particular, Holmberg and Åkerblom (2006) refer to the Global Leadership

and Organizational Behaviour Effectiveness (GLOBE) Research Programme which found that the Swedish leadership style includes consultation of all relevant team participants. This is the case in alliances, and is an attribute of authentic leaders.

2.3. Foundations of authentic leadership, trust and commitment

The theoretical link between authentic leadership and trust and commitment requires consideration because it is this link that adds so much validity to the argument that authentic leadership is essential in the turbulent environments and situations that project managers find themselves in today. Mayer et al. (1995) developed a useful model of the antecedents of trust that are highly relevant to our argument. Mayer et al. (1995) present three factors that build trust—ability, benevolence, and integrity. A person considering trusting another person or organisation needs to have confidence on the delivery of the ‘promise’ made. This ability is active at the personal or group level (that they can do the job) as well as the organisational or systemic level (that the context, resources etc. allow the job to be done). Benevolence refers to goodwill; it can be seen as aligned to shared values. Integrity means that the person, group or organisation does what it says. Trust involves incremental tests by parties to ensure that the demonstrated action of the three elements is consistent with the level of ‘trust’ that was promised. It is possible for both trust and distrust to co-exist (Lewicki et al., 1998). When this happens each party allows open communication and, for example, probity measures to be part of a system that allows the level of trust to be questioned and ascertained. Having such measures does not mean that trust is absent. In alliance contracting projects, for example, the inclusion of probity measures is part of the alliance agreement to ensure that transparency in words and actions establishes and maintains trust (Walker and Hampson, 2003).

The other linking concept is commitment. Authentic leadership enhances the chance that dialogue and discussion can lead to mutual goals and aspirations being realised. This is the basis of a ‘good project leader’; being able to positively influence project participants in an upward direction (project manager to sponsor), downwards (to the project team members reporting to the project manager) and sideways to the project supply chains as well as inwards to the self as reflection (Briner et al., 1996; Walker et al., 2008a). This conversation between the project and its major influencing stakeholders who can have significant impact, to the advantage or detriment of the project goals, has been described as ‘stakeholder engagement’ and has recently been advanced to a more prominent position in a project manager’s repertoire of skills (Bourne, 2009).

Effectively engaging and influencing others require different skills and competencies than those envisaged even during the 1980s and early 1990s (Goleman, 1998; Goleman, 1999; Goleman, 2000; Goleman et al., 2002). The competencies, often called emotional intelligence (EI), were recognised as leadership competence and are now believed to be a key project management competence (Dulewicz and Higgs, 2000; Müller and Turner, 2007) through a number of recent studies in PM across industry sectors (Turner et al., 2009) and in specific

sectors such as defence (Turner and Lloyd-Walker, 2008) and construction (Dainty et al., 2004, 2005). EI often encompasses self-reflective capabilities as well as the ability to empathise and tone down power asymmetries that can hamper genuine dialogue.

2.4. Links between authentic leadership and ethical behaviour

There are, of course, dangers in authentic leadership being seen as a model where being true to oneself is sufficient. The leader’s view of what is just, moral, ulterior or ethical is entirely self referential. What if the leader is totally mistaken in his/her beliefs? Price (2003) cautions against viewing the ethical validity of authentic leadership as a model to be slavishly adhered to. Using a two dimensional matrix of altruism and egoism on a vertical ‘values’ axis against a horizontal axis of congruent and incongruent behaviour Price (2003) developed four sectors: Quadrant 1 with congruent behaviour and altruistic values represents authentic transformational leadership; Quadrant 2 with altruistic values but incongruent behaviour is referred to as ‘incontinent pseudo-transformational leadership’; Quadrant 3 is characterised by egoist values and congruent behaviour and is termed ‘base pseudo-transformational leadership’; and Quadrant 4 has egoist values with incongruent behaviour and is described as ‘opportunistic pseudo-transformational leadership’. This framework is useful in understanding the difference between transformational and pseudo-transformational leadership values and behaviour combinations.

Leaders may mislead followers; they may mislead themselves as moral chameleons (Walker et al., 2008b) by either cunningly adopting a ‘politically correct’ stance or deceiving themselves that they are adopting an ethical stance when they are in fact not. That behaviour falls into either quadrant 4, opportunistic pseudo-transformational leadership or quadrant 2, incontinent pseudo-transformational leadership in Fig. 3. This can happen when the ‘ends justifies the means’ or ‘greater good’ utilitarian ethical argument (Velasquez, 1998) is used. Alternatively if a rights approach to ethics is taken where the focus is on due process being undertaken then similar problems may arise where agreed processes result in unintended consequences that turn out bad for the intended aims and benefits. Authentic leadership also is about actual behaviour being congruent with stated intentions. This may be seen to include egoism in a culture where leaders and followers agree that ‘greed is good’ or at least effective for generating the greatest good (according to their beliefs). This is illustrated as quadrant 3 in Fig. 3. Clearly this view of authentic leadership, as was shown with the GFC of 2007–2009 and scandals such as Enron (Gitlow, 1991; Knights and O’Leary, 2005), is a mirage.

Corporate social responsibility (CSR) was a rising issue before the GFC (Carroll, 1999; Williams and Zinkin, 2008), but the push to demand a more ethical and long-term view of organisational effectiveness has increased in the last two years as people consider the causes, and lasting impact, of the GFC. Corporate social responsibility relates to the way that leaders in organisations take an interest in the wider group of stakeholders, the general community, so that their business is sustainable

through considering the social impact of decisions they make. Social responsibility and corporate sustainability (Ingleby et al., 2008) are now being demanded of organisations by a range of stakeholders: shareholders and the community at large as the effects of the GFC were felt by all. This also links to triple bottom line (3BL) concepts (Elkington, 1997) where not only the financial bottom line is considered but also social and environmental impacts. Authentic leaders who wish to be able to demonstrate their 3BL credentials will be expected to measure up to an increasingly sophisticated set of stakeholders who voice their values in 3BL terms. Increasingly, CSR is being set at the core of business strategy to achieve organisational sustainability.

The link between corporate strategy and project management and success has been established (Morris and Jamieson, 2004; Morris, 2009). There is also a need to link project outcomes, or suites of projects through programme and portfolio management, to corporate strategy (Cooke-Davies, 2002) if projects are to be perceived to be successful, going beyond traditional iron triangle measures to foster business success and preparation for the future (see Fig. 1). Linking project strategy to corporate strategy will support buy-in by all major stakeholders (Hartman and Ashrafi, 2002). For all organisations that use projects to achieve their goals, but especially for those which are project-based or project-oriented, the post-GFC environment will require that their project leaders, vital players in achievement of strategy and in ensuring CSR and sustainability, possess the leadership capabilities to satisfy the increasing demands of a range of stakeholders. With the increasing use of teams across industries, organisation type and size, responsibility for achieving organisational objectives falls on the shoulders of this broad range of project leaders from a diverse range of backgrounds.

In proving their credentials as illustrated as necessary in Section 2.2, project managers as authentic leaders will need to take a broader perspective than the simple 'iron triangle' cost time and acceptable quality performance measure. They need to inspire, positively influence, and lead by example.

2.5. People management and leadership skills

Cooke-Davies (2002) quoting findings that human factors were not amongst the 12 critical project success factors identified, went on to explain that there was a 'human dimension' within all the 12 critical factors. Whilst this is recognised, the focus of PM research has remained on the tasks performed rather than on the people who performed those tasks and the qualities they require for successful PM and leadership. Cooke-Davies (2002:189) quoted Lechler (1998) who said 'when it comes to projects, it's the people that count'. Indeed, project managers' human skills have been found to have the greatest influence on project management practises and technical skills have the least impact (El-Sabaa 2001).

Control has always been considered a part of all managers roles, including that of the project manager, but much of the project manager's role involves acting more as an influencer than a controller, thus requiring of them interpersonal relationship and political skills (Leban and Zulauf, 2004) in

addition to their traditional business and technical skills. Although this is increasingly acknowledged to be the case, training of project managers still concentrates on hard skills when the need for soft or human skills for successful project management has been demonstrated (Pant and Baroudi, 2008). Thus, the importance of people to project success requires project managers to develop the skills to manage people.

3. Project management and programme management values

This section focuses on PM and programme management in terms of the expectation of followers, gaining commitment from project participants, and the different emphasis placed on leadership by project and programme leaders.

3.1. A difference emphasis on leading

Project management has for a long time been seen as a purely technical competence area. Project managers are good at 'cracking the whip' to ensure that iron triangle performance is achieved. Turner et al. (2009) studied Intellectual (IQ) competencies, managerial (MQ) competencies and emotional and social (EQ) programme management competencies that explain the leadership performance of project managers. They concluded that results showed the need for clear distinction between leadership performance and follower commitment, and their different expressions in different managerial roles and industries. They state that their results "support Goleman's (1995) theory that EQ+IQ=success, and extends it into MQ competences" (Turner, et al. 2009:213). They found that whilst EQ is very important to PM and that project managers require a strong MQ and IQ as well. They explain this as being associated with a strategic and design/plan/act approach to PM as opposed to more emergent strategies that are being shown as relevant in programme management where the balance of projects within a strategic programme may be in a constant state of flux. This thinking relates to data gathered from those with predominant PM experience of the later stages of the 20th century and so we may expect some change in this view of project managers as technicians. Indeed, at least one paper, (Crawford et al., 2006) extols project managers to become reflective practitioners in order to position themselves to better influence upwards to sponsors as well as to be better performers in the eyes of the general community. For project managers to aspire to move to roles in which they are responsible for delivery of programmes of projects they need to move beyond the iron triangle to embrace a more holistic view of what PM entails. Project sponsors or project champions are generally situated at board level to oversee and ensure adequate project definition, project benefit explication and that project support is evident (Hall et al., 2003; Crawford and Cooke-Davies, 2006; Crawford et al., 2008; Morris, 2009). These requirements are aligned with the need for authentic leadership because the stakeholder group faced by project sponsors and champions is wide requiring project managers to adopt authentic leadership characteristics.

The values espoused by project managers increasingly, particularly if those project managers aspire to become

programme managers, needing to be extended beyond PM success of individual projects to a concern for the benefits generated toward the portfolio of projects of which their particular project is just one part. This also fits in with a need for PM to clearly open a channel for aspiring programme managers to see how they might progress their career and how they should perform at a portfolio benefit contribution level. We argue that an authentic leadership style prepares project managers for that career move. Moreover we will later argue that inter-generational value systems also provide a pressing need to consider how authentic leadership can be facilitated.

3.2. *Projects from a leadership perspective*

Hobday noted ten years ago (Hobday, 2000) that projects are being undertaken by firms across all types of industries. These may be project-based organisations, such as film or theatre productions (Lindgren and Packendorff, 2007), or events management activities (Thiry and Deguire, 2007), where the major activities of the organisation are carried out by groups organised into temporary project teams. Here, the traditional functional organisational structure is either non-existent or less distinct. As a result, employees in project-based organisations spend the majority of their time working in a variety of different temporary project teams (Bredin, 2008). Others have referred to this type of organisation as a project-led organisation because they use projects as a mechanism to lead and direct their organisations (Clark and Coiling, 2005); they tend to see the *raison d'être* of the organisation as delivering projects. Hence, for this type of organisation the use of vanguard (totally new ventures) projects provides value potential bottom-up lessons for learning (Brady and Davies, 2004) as opposed to use of PM tools and techniques being diffused through an organisation by a central expert PM group (often referred as the PMO or project management office) via its projects (Light and Berg, 2000; Hobbs and Aubry, 2007; Aubry et al., 2008). Project-oriented organisations are still structured around the traditional functional areas of an organisation, but they use temporary work processes, in the form of project teams, to deliver products or services to their clients (Huemann et al., 2007). Alternatively, these organisations purposely establish projects and project teams to solve complex benefit delivery problems (Gareis, 1989) such as instigating organisational change or developing a new product or service or complex product and service (Davies and Hobday, 2005). Many people who would call themselves 'a manager' in non-project oriented contexts are indeed managing projects as part of their functional management role (Huemann et al., 2007). Project leadership is involving an increasingly diverse range of people, and they are managing budgets, resources, and people whose cooperation is vital to the success of the organisation.

3.3. *Broadening expectations*

This brief section reiterates the change in performance expectations of projects within portfolios and its leadership expectations.

Section 2.3 linked project realisation expectations and ethical leadership behaviour. That section discussed 3BL and CSR. The key concept here is benefits realisation. The wider community (in terms of projects that are aimed to deliver social benefits) and the business community (in terms of projects that deliver business success or business preparation for the future) expect that PM shifts its focus from a profit maximisation (ROI) stance to encompass wider value generation as outlined earlier by Thomas and Mullaly (see Chapter 2 in Thomas and Mullaly, 2008). This stance also aligns with that of Winter et al. (2006) whose 'rethinking PM direction 3' is stated as moving from a product creation focus to a value generation focus. Their direction 4 is about moving towards projects having contestable parameters and being open to negotiation between the project manager or sponsor and beneficiaries and their direction 5 is for reflective PM practitioners. These all require a broader scope of effort to manage wider project interfaces, cope with diversity in expectations and commitment by project participants and to cope with changing inter-generational expectations of the nature of work, commitment and reward. Clearly, transactional leadership is now incapable of delivering on these new expectations and that transformational leadership needs to be demonstrably authentic to meet the more critical expectations of the 21st century.

4. Leadership as value-orientation

Previous sections have comprehensively established the need for an ethical values-based leadership to deliver benefits to project stakeholders. Section 2.3 and 3.3, above, have stressed the expanding project beneficiaries' expectations. This section will now discuss the impact that intergenerational values have on PM and nurturing the next crop of professionals that will deliver projects and programmes of projects. It will be argued that different generations of project management participants have different expectations and values to the current dominant group leading projects. This status quo cannot be assumed to prevail into the 21st century.

4.1. *Integrating values between generational groups*

The first question that needs to be answered is "Does a gap exist between generations of project managers that requires different leadership approaches because of potential different value systems of these groups?"

Kyles (2005) stated that Baby Boomers remained the largest group in the workforce and they held the greatest number of positions of influence. Over the next 10 years, the scales will tip and Gen X will dominate the workforce, becoming the most powerful group in organisations through both their numbers and their decision making roles. Fig. 2 illustrates the intergenerational cross over. This new group of leaders has different expectations, values and ways of working to those of the Baby Boomers (Sirias et al., 2007). They are a group that sees their work as a series of projects.

Gen X is the group that will need to develop authentic leadership capabilities to lead projects in the future so that the

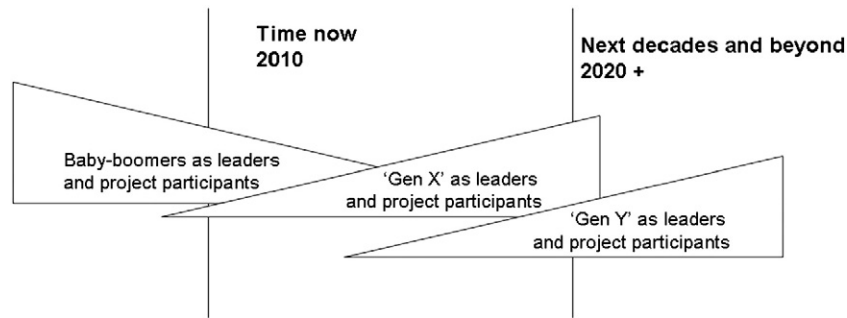


Fig. 2. Generational handover of leadership.

concerns of all stakeholders are addressed to support the development of socially responsible organisations and to achieve corporate sustainability. Capabilities of an authentic leader include developing those they supervise so that they may achieve their leadership potential. If Baby Boomers can commence the process and hand on this capability to Gen X employees, they, in turn, will ensure that Gen Y employees, who are now moving into middle management roles, are prepared to take on PM leadership roles in the future.

4.2. The changing PM environment

There is a marked change occurring in project management in Australia. Alliance contracting is a sophisticated development in the way that major infrastructure projects are delivered. Although far more common in the public sector than in the private sector, since 1996 the value of projects undertaken in Australia using alliance contracting has increased dramatically from nil in 1996 to A\$12,000 million in 2009 (Department of Treasury and Finance Victoria, 2010). Governments in Australia are now contracting for the procurement and delivery of services and infrastructure through the alliancing model. This means that as providers of services to the public sector private companies are conducting, at times, the major part of their business activities within this new alliance project environment. This has resulted in changed business environments which demands different relationships between the players in the project process.

Alliancing has been described as ‘a method of procuring major capital assets, where’ the owner, commonly a state agency, ‘works collaboratively with private sector parties’ (Department of Treasury and Finance Victoria, 2010: 9). A distinguishing feature of alliancing is that all alliance parties jointly share the risks and rewards, ‘to an agreed formula’ (Walker and Hampson 2003: 53). A consequence of this shared burden of risk and of opportunities, or rewards, is that all stakeholders seek to cooperate to ensure the mutually agreed outcome is achieved. For this to occur, along with this risk sharing the other common features of alliances include a commitment to no disputes; unanimous decision making processes aligned to ‘best for project’ objectives; a culture of no fault/no blame; good faith; open book documentation and reporting which ensures transparency, and a joint or shared

management structure involving all stakeholders (Department of Treasury and Finance Victoria, 2010).

A report commissioned by the Department of Finance and Treasury (Wood and Duffield, 2009: viii) confirms that “... alliancing can provide real benefits in the delivery of public infrastructure and has a place in the suite of other established procurement methods that are available to governments”. That report indicated that in 2009 alliancing provided value for money (VfM) within Australia. Walker and Hampson (2003) describe several case studies of alliances from the engineering and hydrocarbon industry sectors drawing upon reputable sources (KPMG, 1998; ACA, 1999) as well as providing details about the National Museum of Australia (NMA) which was the first project alliance undertaken on a building, rather than engineering, project in Australia (Walker and Hampson 2003).

Compared with traditional PM approaches to procurement and delivery such as the lump sum, fixed cost and time or design and construct approaches, with alliance PM the level of risk carried by the contractor is greatly decreased, whilst the construction risk carried by the owner increases (Walker and Hampson 2003; Department of Treasury and Finance Victoria, 2010). This can be seen to ensure that the risk is thus managed by those best placed to do so, avoiding the need to build in a large or unrealistic margin for contingencies. Importantly, what this change in PM means for participants in the project is that they will now be working closely together in a cooperative and collaborative manner with people from a range of organisations; those who have come together to design and deliver a project. In the construction environment, this means that site managers whose contact in the past with the original designers of the construction would have been limited, are now working closely with the designers, architects, planners, engineers and others. Those who have worked in isolation, or within their closed common group of professionals on the discreet area of the project for which they were held responsible, are now working throughout the project with those who plan and design the construction and those who will perform a range of activities beyond where their traditional involvement ended. Suddenly, engineers, planners, architects, trades people and site managers are required to consider the input and considerations of others; they need to find a way of communicating with a range of project participants and this is to be done in a culture of openness where unanimous decisions are arrived to support the shared desire of delivering the stated outcome. These

participants will come from a range of employing organisations, but form a separate entity – a named alliance – for the duration of the project, thus they will, at times, be working alongside people who in other circumstances would be employees of a competitor organisation.

Alliancing changes the relationship between stakeholders. Those working on alliance projects now need to relate to all people involved in ensuring the desired outcome is achieved. Whereas in the past a construction manager and their direct reports, for instances, could work almost in isolation, they must now work with those managing the social, environmental and other issues within the project. A construction manager that moves ahead without considering other issues will cause problems in another area of the project, perhaps even requiring the work that was completed to be re-worked. Soft skills as identified by [Humphreys \(2001\)](#) and [Stevenson and Starkweather \(2010\)](#) are required. Alliance team members must communicate with other team members at a variety of levels and move forward in unison, thus an environment of changed relationships exists on an alliance when compared to a traditional project. Added to this is the tendency for alliance projects to incorporate a new range of key result or performance expectations, including social and environmental benefits and sustainability. A broad range of technical and professional participants is confronted with the need to develop and use a sophisticated range of communication and relationship skills, a range of skills not commonly included in their professional training or required of them in the competitive, hard money project environment in which they learned their project skills.

Project leadership and management have been researched and written about, but this has predominately centred on the role of the project leader and manager, and project team members, in a traditional cost-driven project environment. We contend that this change in the way in which projects are being delivered requires a re-examination of the knowledge, skills and attributes which the PM professional will require for success in the future. Soft skills, communication and relationship skills and those skills linked to emotional intelligence that are also present in authentic leadership.

5. Discussion

A short pilot study and preliminary results of a larger study within the project alliance contracting environment are introduced in this section. Findings from both studies demonstrate a link between authentic leadership characteristics and those required for PM success. The pilot study unearths a number of salient themes relevant to this paper. The pilot study was part of a broader research project relating to the identification, recruitment, retention of key talent within construction contracting organisations and the way that these individuals create value for their project based companies. The larger study within project alliance contracting organisations thus followed the pilot study. The themes identified within the preliminary and larger study are followed by the presentation of a proposed capability maturity model that measures authentic leadership maturity level.

5.1. Pilot study insights

During 2008 we undertook a pilot study that entailed interviewing the chief executive officer (CEO) of an Australian-based global construction contracting company that is privately owned by its directors and has been in existence in this form for over 25 years. The CEO has been a project manager, programme manager (general manager of a division) and CEO for well over a decade. This research explored how key talent is identified and developed. It was found that it was largely the leadership style of those supervising recent graduates, or new starts which led to successful selection and preparation of future leaders in the research organisation. Further analysis revealed that these leaders possessed many, if not all, of the attributes of authentic leadership.

That this leadership style has benefited the organisation can be supported by the fact that this company has successfully weathered the GFC storm with committed employees and supply chain partners. A recent short discussion with a director of the company in early 2010 revealed that continuing high levels of trust and commitment had helped to ‘rally employees around’ to put in that bit more to steer the organisation through the economic downturn. No employees were made redundant during the recent GFC, despite the organisation’s activities extending into areas more severely affected than was Australia, and they have in fact recently recruited new talent.

5.2. Preliminary alliance PM research study results

Interviews were conducted with 10 experienced alliance project leaders and three unit managers who have alliance project leaders reporting to them. All participants commented on the need for increased communication and relationship skills. For instance: *... communication is one of the most important aspects. Making the relationship better ... providing the opportunity for further work down the track. (alliance leader participant 2 [ALP2]); ... relationship management has become very important for this alliance (ALP1); ... there is a need to build good rapport and communicate well with people; it's essential for this role (ALP5); in alliancing you're communicating with a more diverse team, then communication skills are a higher requirement of an alliance project (ALP7).* Alliance members collaborate and co-operate in an honest and transparent way ([Department of Treasury and Finance Victoria, 2010](#)), hence there is a need to develop trust between alliance partners, people who may in other situations be competitors. The link between relationship building and trust was highlighted by one participant: *... it is the most important aspect of it because if you don't develop a relationship, you can't develop trust (ALP2).*

Long term benefits for the owner and other stakeholders form part of the key performance indicators (KPIs) developed within the project alliance agreement. These incorporate an ethical approach to the way the project alliance team will work together and the agreed outcomes include a commitment to ‘best for project’ decision making. However, as one participant explained: *... best for project doesn't necessarily mean the cheapest price.*

There are also measurable benefits to the client ... getting a safer workplace (ALP5.) Another commented that ethics and corporate social responsibility, sustainability and environmental issues were very important to their alliance relationship stating *... sustainability is one of the five key result areas in their agreement with a number of KPIs under that ... (ALP8)*, And another commented that: *in the alliance every decision we make, every major decision we make, has a triple bottom line assessment ... (ALP7)*. The process of agreeing on the ethical framework within which a project will be conducted was explained by one participant: *We had a workshop for the day and what we did is we looked at the alliance principles and we said, okay, to live that principle what are five acceptable behaviours and what five unacceptable behaviours? And then I got those printed up and actually got them posted in front of everyone (ALP9)*. This was seen as an extremely important component for establishing the desired work environment, one in which all members of the alliance team would communicate openly and honestly with their fellow team members within an ethical framework that all team members had contributed to shaping.

Preliminary analysis of the data exploring the attributes identified as required by alliance project managers and leaders demonstrates that characteristics of an authentic leader are required by alliance team leaders. [Toor and Ofori \(2008: 621\)](#) stated that there was a need ‘to develop leaders who possess positive values and practise high levels of moral and ethical standards.’ The project leaders establishing the ethical principles that will guide the way that all alliance team members conduct their interactions with one another will require these values and standards. Ethical alliance project leaders will need to operate in a confident and transparent manner to meet the requirements of the alliance agreement and by ‘being true to self and others’ ([Bass and Steidelmeirer, 1999:191](#)), they will consistently demonstrate the values they hold and ethical standards they work to. This consistency is important. Followers – other team members – may not agree with all of the values and ethical standards held by their leader, but if they are lived by the leader and perceived to be not only based on self interest, but on values and ethical standards which will benefit the larger community, the leader will be viewed as an authentic transformational leader.

5.3. The authentic leadership conceptual model

We are proposing a model in this paper and a capability maturity models (CMM) that can be fine tuned and developed in future research. Our aim is to propose how this model and CMM may look and ‘feel’ and we intend to test it though further research.

The development of CMMs has been seen as a useful research outcome with CMMs being developed for IT maturity ([Paulk et al., 1993](#)), building social capital ([Manu and Walker, 2006](#)), knowledge management ([Walker et al., 2005](#)) and PM maturity, ([Ibbs and Kwak, 2000](#); [PMI, 2003](#)). The basis of such models is a conceptual model that can describe some form of (usually best) practise that is converted into a tool or template that describes the levels of maturity. Users of the tool can then

assess where they currently stand and then make an assessment of where they would like to be in a future time. This provides a visualisation of the gap and a change management strategy can be developed from that information that can provide a road map to achieve the desired maturity level.

As a first step the model is developed as illustrated in [Fig. 3](#).

[Fig. 3](#) illustrates authentic leadership as being developed from the argument presented thus far. Trust, shared values and affective commitment provide the engine at the heart of the model which develops support for authentic leadership behaviours. The model provides dimensions that can in turn be used to develop a CMM.

Adapting the approach taken by [Paulk et al., \(1993\)](#) and [Walker et al., \(2005\)](#), we propose a similar format. Based on research already conducted, and further refined as required based on more in-depth planned future research, levels of maturity will be developed for each dimension of authentic project leadership identified. This will result in a CMM which clearly describes each of the attributes of authentic project leadership (e.g., trust, integrity) and the levels of maturity from Foundational, to Recent, Developing and Mature, the highest level. How this is expected to develop is summarised in [Table 1](#).

Current research findings suggest four levels of maturity. A brief explanation will be provided to describe the generic state of each of these and a set of measured dimensions that best describe the capability maturity required. Each cell from level 1 to 4 is then filled in with a short description that helps a user of the CMM to identify the CMM level for that dimension. In this way authentic leadership can be de-constructed into elements that can form dimensions that can be measured in a course grained way. [Neeley \(1997; 2002\)](#) suggests that only ‘the significant few’ KPIs should form the basis of a useful performance measurement tool. This means that much of the work in developing a CMM such as that proposed in [Table 1](#) involves deciding on what critical dimensions and measures should be chosen. The aim or use of this model is to provide a visualisation of authentic leadership performance so that concerned individuals or groups can appreciate what are the most important factors and behaviours that develop authentic leadership. This can then be used in a similar way to any other management performance tool and could be used in concert with, for example, 360 degree feedback and other standard human resource management tools.

There would be dimensions relating to supportive behaviours, coaching or mentoring, for example. These may be either separately identified or subsumed in a more general EI competency characteristic. The results of our work thus far have centred on exploring the elements and characteristics of authentic leadership in a PM context. We acknowledge that there is much yet to be done but we argue that the work presented in this paper and other work presently underway by our research team is heading us in this direction and that a useful outcome will be achieved.

6. Conclusions

This paper had as its stated focus in our Introduction the investigation of ‘characteristics of authentic leadership and how

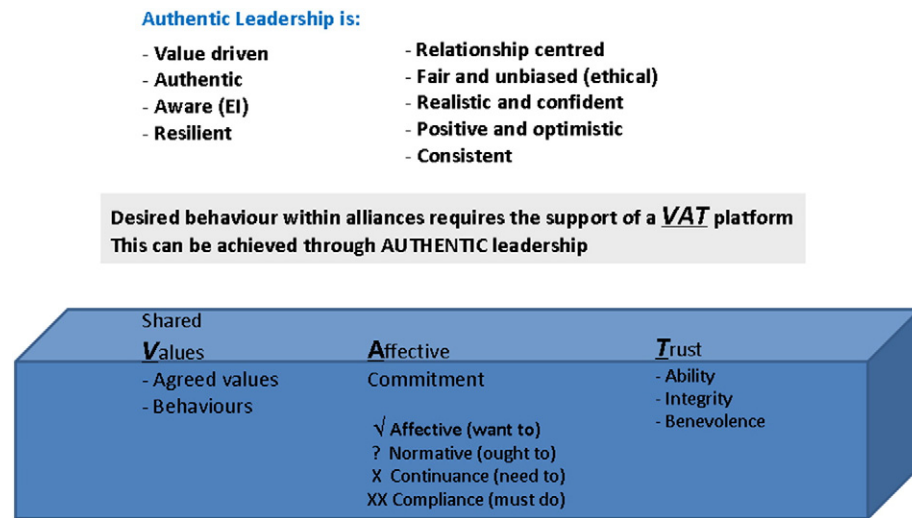


Fig. 3. Authentic leadership conceptual model.

this may fit the needs of better managing projects in the 21st century given the changing values and factors underpinned by trust and commitment of project participants that shape an affective leadership style.” These characteristics were explored, described and used to present a model (Fig. 3) that enabled us to suggest and propose a CMM template that could be used to measure maturity of authentic leadership.

Our exploration of authentic leadership led us into reviewing literatures on intergenerational attitudes and behaviours and how these may allow us to better understand authentic leadership. We conclude that the labels ‘Baby Boomers’, ‘Gen X’ and ‘Gen Y’ are useful as a guide but the important issue that underpins this form of stereotyping is that it is the lived context of individuals that shapes their values, attitudes, and actions and thus the culture that they create. We also investigated literature relating to CSR and ethics in general as it applies to authentic leadership. All this literature is useful in deciding upon which dimensions a CMM, such as that presented in Table 1, could be adopted in a template.

We also described how a CMM model could be used to encourage enhancement of authentic leadership skills and we suggest that this could be useful in the PM world, especially within project alliance contracting.

It is clear from Section 5 that there is much more research needed to advance the work presented and we do not pretend to be at a stage where we can present a CMM tool that can be

applied. We have taken an incremental approach and linked this into other work we are involved in relating to the recruitment, retention and development of key PM talent and we see this as a valuable part of that work.

Specifically, we identify the following strands of further research required:

- Further exploration of the additional elements that authentic leadership adds to transformational leadership within the context of project management in general. Is it the new leadership style which Toor and Ofori (2008) suggested is required?
- Development of a robust set of dimensions, this may require quantitative research to be undertaken that allows factor analysis to better group factors into dimensions. We are open to other suggestions.
- Developing and testing the model (CMM) in several different PM contexts. Can it be applied to non-alliance and alliance project environments equally?

The authentic leadership traits discussed may be found to be present to some extent in other leadership styles. As discussed, authentic leadership may be viewed as an extension of transformation leadership. The Swedish leadership style (Holmberg and Åkerblom, 2006), that involves consulting all relevant team participants requires the transparency present in

Table 1
Possible CMM format.

Profile level	Description skills, attributes, experience required
Mature	For each identified dimension, or component, of authentic project leadership, the skill, attributes and experience and standards expected at each level will be described. Performance will be measured and career paths mapped using the CMM. This will enable authentic leadership development programmes and work experience opportunities to be planned.
Experienced alliance PM	
Developing	
Intermediate alliance PM	
Nascent	
Recent alliance PM	
Foundational	
Aspiring alliance PM	

the practise of authentic leadership. The levels of communication and dialogue required in alliances are found in authentic leaders, and in the Swedish leadership style. Future research exploring the suitability of the Swedish leadership for alliances and its similarity with authentic leadership may prove valuable.

This paper has an opportunity to expand on research of others in relation to project leadership. It has introduced the increasingly preferred procurement method of alliance project agreements and the different skills, knowledge and attributes it requires now, and will require of project leaders and team members in the future. It has provided results of a pilot study and preliminary results of further research which demonstrate that the new project leadership style required for the 21st century links closely to Avolio et al.'s (2004) authentic leadership.

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References

- ACA, 1999. Relationship Contracting — Optimising Project Outcomes. Australian Constructors Association, Sydney.
- Aubry, M., Hobbs, B., Thuillier, D., 2008. Organisational project management: an historical approach to the study of PMOs. *International Journal of Project Management* 26 (1), 38–43.
- Avolio, B.J., 1996. What's all the Karping about down under? In: W. Parry, K.W. (Ed.), *Leadership Research and Practice*. Pitman Publishing, South Melbourne, pp. 3–15.
- Avolio, B.J., Gardner, W.L., 2005. Authentic leadership development: getting to the root of positive forms of leadership. *The Leadership Quarterly* 16 (3), 315–338.
- Avolio, B.J., Luthans, F., 2006. The high impact leader: moments matter in accelerating authentic leadership development. New York McGraw Hill.
- Avolio, B.J., Waldman, D.A., Yammarino, F.J., 1991. Leading in the 1990's: the four I's of transformational leadership. *Journal of European Industrial Training* 15 (4), 11.
- Avolio, B.J., Gardner, W.L., Walumbwa, F.L., May, D.R., 2004. Unlocking the mask: a look at the process by which authentic leaders impact follower attitudes and behaviors. *Leadership Quarterly* 15, 801–823.
- Bass, B., Steidelmeier, P., 1999. Ethics, character, and authentic transformational leadership behaviour. *The Leadership Quarterly* 10, 181–217.
- Bourne, L.M., 2009. Stakeholder Relationship Management. UK Gower, Farnham, Surrey.
- Bradley, G., 2006. Benefit Realisation Management. UK Gower, Aldershot.
- Brady, T., Davies, A., 2004. Building project capabilities: from exploratory to exploitative learning. *Organization Studies* 25 (9), 1601–1621.
- Bredin, K., 2008. People capability of project-based organisations: a conceptual framework. *International Journal of Project Management* 26 (5), 566–576.
- Briner, W., Hastings, C., Geddes, M., 1996. *Project Leadership*, 2nd edn. UK Gower, Aldershot.
- Carroll, A.B., 1999. Corporate social responsibility. *Business and Society* 38 (3), 268–295.
- Clark, I., Coiling, T., 2005. The management of human resources in project management-led organizations. *Personnel Review* 34 (2), 178–191.
- Cooke-Davies, T., 2002. The "real" success factors on projects. *International Journal of Project Management* 20 (3), 185–190.
- Cooper, K.G., Lyneis, J.M., Bryant, B.J., 2002. Learning to learn, from past to future. *International Journal of Project Management* 20 (3), 213–219.
- Crawford, L., Cooke-Davies, T.J., 2006. Project governance — the role and capabilities of the executive sponsor. PMOZ — Achieving Excellence, Melbourne, Australia, 8–11 August, PMI — Melbourne Chapter: 1–11 CD-ROM paper.
- Crawford, L., Morris, P., Thomas, J., Winter, M., 2006. Practitioner development: from trained technicians to reflective practitioners. *International Journal of Project Management* 24 (8), 722–733.
- Crawford, L., Cooke-Davies, T., Hobbs, B., Labuschagne, L., Remington, K., Chen, P., 2008. Governance and support in the sponsoring of projects and programs. *Project Management Journal* 39 (S1), S43–S55.
- Dainty, A.R.J., Cheng, M.-I., Moore, D.R., 2004. A competency-based performance model for construction project managers. *Construction Management & Economics* 22 (8), 877–888.
- Dainty, A.R.J., Cheng, M.I., Moore, D., 2005. A comparison of the behavioral competencies of client-focused and production-focused project managers in the construction sector. *Project Management Journal* 36 (2), 39–49.
- Davies, A., Hobday, M., 2005. *The Business of Projects Managing Innovation in Complex Products and Systems*. Cambridge University Press, Cambridge.
- Department of Treasury and Finance Victoria, 2010. *The Practitioners' Guide to Alliance Contracting*, Melbourne. Department of Treasury and Finance, Victoria.
- Doz, Y.L., Hamel, G., 1998. *Alliance Advantage — The Art of Creating Value Through Partnering*. Harvard Business School Press, Boston.
- Dulewicz, V., Higgs, M., 2000. Emotional intelligence: a review and evaluation study. *Journal of Managerial Psychology* 15 (4), 341.
- Elkington, J., 1997. *Cannibals with Forks*. London Capstone Publishing.
- El-Sabaa, S., 2001. The skills and career path of an effective project manager. *International Journal of Project Management* 19 (1) pp.19 1–7.
- Gardner, W.L., Avolio, B.J., Luthans, F., May, D.R., Walumbwa, F., 2005. "Can you see the real me?" A self-based model of authentic leader and follower development. *The Leadership Quarterly* 16 (3), 343–372.
- Gareis, R., 1989. Management by projects: the management approach for the future. *International Journal of Project Management* 7 (4), 243–249.
- George, B., 2003. *Authentic Leadership: Rediscovering the Secrets to Creating Lasting Value*, 1st edn. Jossey-Bass, San Francisco.
- George, B., Sims, P., McLean, A.N., Mayer, D., 2007. Discovering your authentic leadership. *Harvard Business Review* 85 (2), 129–138.
- Gitlow, A.L., 1991. *Being the Boss: The Importance of Leadership and Power*. Irwin Professional Publishing, New York.
- Goleman, D., 1995. *Emotional Intelligence*. Bantam Books, New York.
- Goleman, D., 1998. What makes a leader? *Harvard Business Review* 76 (6), 92–102.
- Goleman, D., 1999. *Working with Emotional Intelligence*. Bloomsbury, London.
- Goleman, D., 2000. Leadership that gets results. *Harvard Business Review* 78 (2), 78–90.
- Goleman, D., Boyatzis, R.E., McKee, A., Buntine, A., 2002. *The Leadership Repertoire; Emotional Intelligence: Leadership Competencies*. Little Brown, London.
- Hall, M., Holt, R., Purchase, D., 2003. Project sponsors under new public management: lessons from the frontline. *International Journal of Project Management* 21 (7), 495–502.
- Hartman, F., Ashrafi, R.A., 2002. Project management in the information systems and information technologies industries. *Project Management Journal* 33 (3), 5–15.
- Hobbs, B., Aubry, M., 2007. A multi-phase research program investigating Project Management Offices (PMOs): the results of phase 1. *Project Management Journal* 38 (1), 74–86.
- Hobday, M., 2000. The project-based organisation: an ideal form for managing complex products and systems? *Research Policy* 29 (7–8), 871–893.
- Holmberg, I., Åkerblom, S., 2006. Modelling leadership — implicit leadership theories in Sweden. *Scandinavian Journal of Management* 22, 307–329.
- Huemann, M., Keegan, A., Turner, J.R., 2007. Human resource management in the project-oriented company: a review. *International Journal of Project Management* 25 (3), 315–323.
- Humphreys, P., 2001. Designing a management development programme for procurement executives. *Journal of Management Development* 20 (7), 604–623.
- Ibbs, W.C., Kwak, Y.H., 2000. Assessing project management maturity. *Project Management Journal* 31 (1), 32–43.
- Ingle, C., Mülller, J., Cocks, G., 2008. The financial crisis, investor activists and corporate strategy: will this mean shareholders in the boardroom? EIASM Workshop on Corporate Governance, Brussels, 27–28 November: 32 pp.

- Kloppenborg, T.J., Petrick, J.A., 1999. Leadership in project life cycle and team character development. *Project Management Journal* 30 (2), 8–13.
- Knights, D., O'Leary, M., 2005. Reflecting on corporate scandals: the failure of ethical leadership. *Business Ethics: A European Review* 14 (4), 359–366.
- KPMG, 1998. Project alliances in the construction industry. Literature Review, Sydney, NSW Department of Public Works & Services, 7855-PWS98-0809-R-Alliance.
- Kyles, D., 2005. Managing your multigenerational workforce. *Strategic Finance* 87 (6), 52–55.
- Leban, W., Zulauf, C., 2004. Linking emotional intelligence abilities and leadership styles. *The Leadership and Organization Development Journal* 25 (7), 554–564.
- Lechler, T., 1998. When it comes to project management, it's the people that matter: an empirical analysis of project management in Germany. In: Hartman, F., Jergeas, G., Thomas, J. (Eds.), *IRNOP III. The nature and role of projects in the next 20 years: research issues and problems*. University of Calgary, Calgary, pp. 205–215.
- Lewicki, R.J., McAllister, D.J., Bies, R.J., 1998. Trust and distrust: new relationships and realities. *Academy of Management Review* 23 (3), 438–459.
- Light, M., Berg, T., 2000. The project office: teams, processes and tools. The Gartner Group, R-11-1530: 30.
- Lindgren, M., Packendorff, J., 2007. Performing arts and the art of performing — on co-construction of project work and professional identities in theatres. *International Journal of Project Management* 25 (4), 354–364.
- Luthans, F., Youssef, C.M., 2004. Human, social, and now positive psychological capital management: investing in people for competitive advantage. *Organizational Dynamics* 33 (2), 143–160.
- Maltz, A.C., Shenhar, A.J., Reilly, R.R., 2003. Beyond the balanced scorecard: refining the search for organizational success measures. *Long Range Planning* 36 (2), 187–204.
- Manu, C., Walker, D.H.T., 2006. Making sense of knowledge transfer and social capital generation for a Pacific island aid infrastructure project. *The Learning Organization* 13 (5), 475–494.
- Maqsood, T., Finegan, A., Walker, D.H.T., 2004. Project histories and project learning — a knowledge management challenge. 20th ARCOM Conference, Edinburgh Scotland, September 1–3, Khosrowshahi F., ARCOM, 1, pp. 561–570.
- Mayer, R.C., Davis, J.H., Schoorman, F.D., 1995. An integrated model of organizational trust. *Academy of Management Review* 20 (3), 709–735.
- Morris, P.W.G., 2009. Aligning projects. Making essential choices with scant information — front-end decision making in major projects. In: Williams, T. M., Samset, K., Sunnevig, K.J. (Eds.), *Palgrave Macmillan*. Basingstoke, UK, pp. 39–67.
- Morris, P.W.G., Jamieson, A., 2004. Translating Corporate Strategy into Project Strategy. PMI, Newtown Square, PA.
- 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.
- Neeley, A., 1997. A practical approach to defining key indicators. *Measuring Business Excellence* 1 (1), 42–46.
- Neeley, A., 2002. *Business Performance Measurement — Theory and Practice*. Cambridge University Press, Cambridge, UK.
- Pant, I., Baroudi, B., 2008. Project management education: the human skills imperative. *International Journal of Project Management* 26, 24–128.
- Paulk, M.C., Curtis, B., Chrissis, M.B., Weber, C.V., 1993. Capability maturity model, version 1.1. *IEEE Software* 10 (4), 18–27.
- PMI, 2003. *Organizational Project Management Maturity Model (OPM3)*. Knowledge Foundation, PMI, Newtown Square, Pennsylvania.
- Price, T.L., 2003. The ethics of authentic transformational leadership. *The Leadership Quarterly* 14 (1), 67–81.
- Sense, A.J., 2003. Learning generators: project teams re-conceptualized. *Project Management Journal* 34 (3), 4–12.
- Shamir, B., Eilam, G., 2005. What's your story? A life-stories approach to authentic leadership development. *The Leadership Quarterly* 16 (3), 395–417.
- Shenhar, A.J., Dvir, D., Levy, O., Maltz, A.C., 2001. Project success: a multidimensional strategic concept. *Long Range Planning* 34 (6), 699–725.
- Sirias, D., Karp, H.B., Brotherton, T., 2007. Comparing the levels of individualism/collectivism between baby boomers and generation X — implications for teamwork. *Management Research News* 30 (10), 749–761.
- Stevenson, D.H., Starkweather, J.A., 2010. PM critical competency index: IT execs prefer soft skills. *International Journal of Project Management* 28 (7), 663–671.
- Thiry, M., 2005. Delivering business benefits through projects, programs, portfolios & PMOs. Sydney PMI Chapter Meeting, Sydney, 23 February, PMI Sydney: 14.
- Thiry, M., Deguire, M., 2007. Recent developments in project-based organisations. *International Journal of Project Management* 25 (7), 649–658.
- Thomas, J., Mullaly, M., 2008. *Researching the Value of Project Management*. Project Management Institute, Newtown Square, PA.
- Thomas, J., Delisle, C.L., Jugdev, K., 2002a. Selling Project Management to Senior Executives: Framing the Moves that Matter. Project Management Institute, Newtown Square, PA.
- Thomas, J., Delisle, C.L., Jugdev, K., Buckle, P., 2002b. Selling project management to senior executives: the case for avoiding crisis sales. *Project Management Journal* 33 (2), 19.
- Toor, S.-u.-R., Ofori, G., 2008. Leadership for future construction industry agenda for authentic leadership. *International Journal of Project Management* 26 (6), 620–630.
- Turner, R., Lloyd-Walker, B., 2008. Emotional intelligence (EI) capabilities training: can it develop EI in project teams? *International Journal of Managing Projects in Business* 1 (4), 512–534.
- Turner, J.R., Müller, R., Dulewicz, V., 2009. Comparing the leadership styles of functional and project managers. *International Journal of Managing Projects in Business* 2 (2), 198–216.
- Twenge, J.M., Campbell, S.M., 2008. Generational differences in psychological traits and their impact on the workplace. *Journal of Managerial Psychology* 23 (8), 862–877.
- Velasquez, M.G., 1998. *Business Ethics Concepts and Cases*. Prentice Hall, Upper Saddle River, New Jersey.
- Walker, D.H.T., Hampson, K.D., 2003. Project Alliance Member Organisation Selection. *Procurement Strategies: A Relationship Based Approach*. In: Walker, D.H.T., Hampson, K.D. (Eds.), Blackwell Publishing, Oxford, pp. 74–102. Chapter 4.
- Walker, D.H.T., Nogeste, K., 2008. Performance Measures and Project Procurement. *Procurement Systems — A Cross Industry Project Management Perspective*. In: Rowlinson, Walker D.H.T.S. (Ed.), Taylor & Francis, Abingdon, Oxon, pp. 177–210.
- Walker, D.H.T., Maqsood, T., Finegan, A., 2005. The Culture of The Knowledge Advantage (K-Adv)—An Holistic Strategic Approach to the Management of Knowledge. *Knowledge Management in the Construction Industry: A Socio-Technical Perspective*. In: Kazi, A.S. (Ed.), Idea Group Publishing, Hershey, PA, pp. 223–248.
- Walker, D.H.T., Bourne, L., Rowlinson, S., 2008a. Stakeholders and the Supply Chain. *Procurement Systems — A Cross Industry Project Management Perspective*. In: Rowlinson, Walker D.H.T.S. (Ed.), Taylor & Francis, Abingdon, Oxon, pp. 70–100.
- Walker, D.H.T., Segon, M., Rowlinson, S., 2008b. Business Ethics and Corporate Citizenship. *Procurement Systems — A Cross Industry Project Management Perspective*. In: Rowlinson, Walker D.H.T.S. (Ed.), Taylor & Francis, Abingdon, Oxon, pp. 101–139.
- Williams, G., Zinkin, J., 2008. The effect of culture on consumers' willingness to punish irresponsible corporate behaviour: applying Hofstede's typology to the punishment aspect of corporate social responsibility. *Business Ethics: A European Review* 17 (2), 210–226.
- Winter, M., Smith, C., Morris, P.W.G., Cicmil, S., 2006. Directions for future research in project management: the main findings of a UK government-funded research network. *International Journal of Project Management* 24 (8), 638–649.
- Wood, P., Duffield, C., 2009. Pursuit of Additional Value: A benchmarking study into alliancing in the Australian Public Sector. Melbourne, Department of Treasury and Finance, Victoria, p. 191.