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**From the Selected Works of Susan R. Madsen**

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2005

## Common Factors of High Performance Teams

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# The Effects of Performance Monitoring Measures on Executive Pay Structure: Evidence from Australia

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## **Abstract**

*The impact of performance monitoring of chief executive officer (CEO) pay structure has been widely studied, both in Australia and internationally. Previous studies; however, have been hindered by a limited number of indicative variables defining monitoring. This paper addresses this shortcoming by introducing eight variables that capture the structural attributes of the company board, its activities and the role of the external audit function.*

*In the paper, it is hypothesised that the level of CEO performance pay contracts are negatively related to the amount (as measured by the size and nature of the board of directors, particularly independent ones) of monitoring undertaken by the board and/or external audit groups. The findings of this study support this hypothesis and reveal significant negative correlation between CEO performance monitoring measures and the use of CEO incentive-based pay measures. The proportion of non-executive directors (NEDs) on the board, highest paid NEDs, number of sub-committees established and auditor independence, were all significant performance monitoring measures associated with lower levels of incentive-based CEO pay. These findings suggest that NEDs fulfil an important role in monitoring the performance of CEOs (and possibly all executive directors). This provides some justification to regulators who have been calling for majority representation of NEDs on boards and also the establishment of sub-committees to oversee the nomination of professional directors.*

## **Introduction**

This research utilises a simplified view of the principal-agent model to determine whether chief executive officer (CEO) long-term pay incentives and CEO performance monitoring devices imposed by the owners are substitutable.



The theoretical basis of the paper is in agency theory, in which the agent (CEO) is attempting to maximise their utility within the constraints imposed by the principal (owner). In the situation where only the CEO's output is observable, but their effort level is not, Holmstrom (1979) models a solution that includes an incentive to be provided to the CEO based on output. The magnitude of this performance incentive is largely dependent upon the probability that the CEO's effort will result in increased reward. Where effort closely tracks output, the incentive is likely to be minimised, as the probability of being rewarded for the effort is high. Where output is highly variable and subject to numerous contingencies beyond the CEO's control, then the risk-averse CEO is forced to carry greater risk, necessitating increased contingent compensation.

One method to moderate the latter effect is for the owner to directly monitor the CEO in order to gain additional insight into the CEO's effort level. In this way, CEO performance pay becomes a function of both output and monitoring measures, allowing an efficient reduction in contingent compensation. Bosworth, Dawkins and Stromback (1996) make the point that effort continues to be unobservable in the principal-agent model, while monitoring provides an additional signal that is correlated with the CEO's effort.

The CEO's wage outcome, therefore, becomes a function of both output and the level of monitoring, facilitating a reduction in the incentive contract (incentive alignment). This can be operationalised by viewing the incentive contracts as long-term market-based incentives offered to CEOs in the form of share and option grants. The level of monitoring can be viewed as being related to the activity level of the board of directors and external auditors, both appointed directly by the owners. An inverse relationship is thus predicted between monitoring levels and performance pay.

The paper adds to the general understanding of the alignment between performance monitoring and incentive-based pay. In particular, the study uses a more comprehensive approach to the monitoring construct than that previously adopted.

The remainder of this paper is organised as follows. In Section 2, the hypothesis on which the paper is founded is developed and articulated. Section 3 gives an overview of the variable definition and variable observation. In Section 4 the model is specified and is discussed in Section 5. The paper concludes with a review of the findings and limitations in Section 6.

## **Hypothesis Development**

From the previous discussion, the empirical question arises as to whether a reduction (increase) in monitoring would give rise to an increase (reduction) in incentive payments. Beatty and Zajac (1994), within a framework preconditioned on firm risk, investigate this trade-off, hypothesising that increased monitoring will result in smaller non-cash incentives appearing in top managers' total compensation. Additionally, they test whether smaller CEO equity holdings are associated with greater levels of firm monitoring. Both hypotheses are supported as is the authors' conclusion that 'the greater the level of the agency incentive problem, as defined by lower levels of managerial stock holdings, the greater the level of monitoring provided' (p. 328). Lippert and Moore (1995) support this

in finding that monitoring (measured according to the effectiveness of the board of directors), substitutes for 'bonding', operationalised as the alignment of pay and performance measures. Their 'board effectiveness' measure is less precise than that modelled here, capturing only two variables. Firstly, CEO duality, where the CEO and chairperson of the board of directors are combined and secondly the percentage of inside directors (percentage of executives on the board). Nevertheless, they find a consistent and significant inverse relationship between monitoring and bonding mechanisms. Traichal (1999) determines that external monitors decrease the use of pay for performance contracting, consistent with agency theory. External monitors are proxied by measures of regulation, debt and shareholder concentration. Harvey and Shreives (2001) similarly find CEO incentive pay to be inversely related to firm debt – suggesting greater scrutiny by external debt holders.

In studies of the compensation structure for Australian CEOs, Coulton and Taylor (2002) found that the relative use of incentive-based pay lags behind the US. They did; however, find a positive association between prior performance and contemporaneous pay. The results of the Chalmers, Koh and Stapledon (2003) study suggested a significant association between CEO compensation and governance and ownership attributes.

The above studies provide initial empirical support for the substitutability of a range of incentive alignment and CEO monitoring mechanisms, which may be implemented by the board of directors. Hence:

*H: All else being equal, the extent of monitoring through an independent board of directors and external auditors will be negatively related the level of CEO performance pay contracts designed to align shareholder and manager interests.*

The development of the hypothesis is based upon the interaction between two constructs; 'monitoring' and 'performance pay alignment' which are expanded upon below.

### **Monitoring**

Fama and Jensen (1983) saw the interaction between the board and the CEO to be, ideally, as follows:

<i>Initiation</i>	It is the CEO's responsibility to initiate project ideas and put forward proposals to the board.
<i>Ratification</i>	It is the board's responsibility to decide which proposals should be implemented.
<i>Implementation</i>	It is the CEO's responsibility to effectively implement the proposal.
<i>Performance Evaluation</i>	It is the board's responsibility to set performance measures, assess the CEO's performance and determine rewards.

Although the role of monitoring was implicit in early writings on agency theory with respect to CEO compensation (Jensen & Meckling, 1976; Fama & Jensen, 1983), it is only more recently that empirical testing has begun in earnest. A number of variables have been used in the developing literature in an attempt to represent and measure the construct of monitoring. These can be categorised into three broad groupings: the composition of the board of directors; the committee structure imposed by the board; and the CEO's role on the board.

The first group encompasses the percentage of outside representation on the board, generally via the proportion of non-executives (e.g. Westphal & Zajac, 1995) to executives (company employees). The second investigates whether the existence of selected board subcommittees influences executive pay or company performance. The subcommittees studied are remuneration and compensation (Main & Johnston, 1993) and audit and nomination (Klien, 1998). The final group investigates the role of CEO duality (i.e. a combined CEO and chair of the board) on performance or pay outcomes (Forker, 1992; Muth & Donaldson, 1998).

Recent governance legislation in this area includes the Higgs Review (UK) and the *Sarbanes-Oxley Act* of 2002 (USA). In regards to specific regulation concerning the board of directors, two areas are of interest: the Nomination Committees as a subcommittee of a board and the appointment of non-executive directors (NEDs) to the board. In Australia, the *Audit Reform and Corporate Disclosure Act* (CLERP 9, June 2004) does not directly address either of these two areas of interest. The document does; however, require the government to amend the law to require the annual directors' report for listed companies to disclose, with respect to each director holding office during the reporting period, details of all other directorship positions held currently and over the past two reporting periods. It also enforces a separation between auditors and directors.

This study extends previous research by utilising a more comprehensive measure of monitoring, including board structure, the level of board activity and the extent and independence of the audit function.

### *Board Structure*

This reflects the structural composition of the board, the assumption being that certain parameters facilitate independent decision-making and are in the owner's best interests. Three measures will be used to represent board structure: the proportion of external representation on the board, CEO duality and the degree of subcommittee activity.

Few executive pay studies have investigated the role of monitoring beyond the NED representation and CEO duality measures cited above. An exception is the work of Main and Johnston (1993), which studied the effect of the existence of a remuneration committee on executive pay levels and structure. Core, Holthausen and Larcker (1999) examined the association between the level of CEO compensation and the quality of a firm's corporate governance. They found a strong relationship with board of director

characteristics and ownership structure and the level of CEO compensation. A study by Conyon and Peck (1998) found a positive relationship between pay level and the existence of a remuneration committee. Despite the closeness of the remuneration committee to executive pay decisions, the nomination and remuneration committees fulfil equally important monitoring roles. The nomination committee is specifically charged with nominating directors with appropriate skills and qualifications and ensuring the independence of the appointment process. The audit committee ensures the adequacy of audit processes, the independence of the auditors and the implementation of audit recommendations (*Corporate Practices and Conduct*, 1995). Despite the absence of prior research, the voluntary establishment of such committees by the board of directors indicates a desire for greater monitoring of the management's activities (via audit and remuneration) and the owner's desire for a more independent board (via nomination).

#### *Board Activity and Motivation*

A board may appear independent in its structural attributes, but this will have little effect on monitoring or governance if it is quiescent. A board that is involved and motivated should provide greater levels of monitoring for any given board structure. Although it is not possible to directly observe board activity, a partial surrogate is available in the regularity with which the board of directors meets. This effectively measures the frequency of attendance of individual directors, but does not purport to capture the extent to which the board has the opportunity (or power) to challenge the CEO.

The motivation of directors may similarly be reasonably seen as correlating to the level of financial reward accruing to those directors. These rewards are generally in the form of salary paid by the company and returns on company equity held by the directors. Although prior research in this area is sparse, director equity holdings have been included as a variable in some related studies. Klien (1998) found evidence to support the contention that NED equity holdings are positively related to firm performance where at least one outside director holds two per cent of the firm's equity. Morck, Shleifer and Vishny (1988) similarly found a positive relationship between equity and Tobin's  $Q$  (as a measure of the market value of firm's assets). Mallette, Middlemist and Hopkins (1995) argue that 'active defence of stockholders' interests may depend on the existence of directors whose personal interests compel them to actively monitor management activities and more critically examine proposals that enhance management control' (p. 260). On balance, the literature supports (albeit weakly) the notion that equity held by NEDs is positively linked to shareholder outcomes. If such equity holdings are viewed as a surrogate for the 'personal interest' of directors, it should lead to greater monitoring of executive action.

#### *Audit Activity and Independence*

External audits are a mechanism by which owners ensure the accuracy of statutory financial statements presented to them through an independent review by qualified auditors. Auditors, as part of the process of validating the statements, monitor the company's internal controls to ensure adequate safeguards apply to the assets of the company. This direct monitoring of company management by an external party that

reports direct to the shareholders (via the audit opinion expressed as part of the annual report) forms an important monitoring device for company principals. For the purposes of this research, 'audit activity' refers to the extent of audit coverage while 'auditor independence' refers to the ability of the auditor to express an opinion to the owners unconstrained by the actions of company management.

In firms where the auditor's remuneration is higher, the workload of the auditor, and in turn the intensity of monitoring activity, should also be higher. Davis, Ricchuite and Trompeter (1993) confirm this relationship, finding a strong positive correlation between audit fees paid to the auditor and the direct labour hours used in the production of the audit. As such, audit activity can be reasonably proxied by the audit fee paid to the auditor (adjusted for firm size).

The level of auditor independence (see Craswell, Stokes & Laughton, 2002; DeFond, Raghunandan & Subramanyan, 2002) is viewed as a prime determinant of the ability of auditors to properly monitor the actions of the executive and to report impartially to shareholders. In an Australian study, Ruddock, Sherwood and Taylor (2004) found a positive correlation between non-audit services and earnings management. In their survey, as the absolute value of abnormal accruals went up, so did the level of unplanned non-audit services as well as the level of unexpected total fees. Their results seem to indicate that paying for high levels of non-audit services can reduce the independence of auditors (and by extension the quality of financial reports). The importance of independence has been recognised by the accounting profession and numerous references to it are made in the auditing practice statements that guide the profession. The statement of auditing practice (AUP 32) issued by the Australian Society of CPAs and the Institute of Chartered Accountants in Australia states that:

*The concept of independence is fundamental to auditing, since the auditor's objective is to enhance, through the expression of an independent opinion, the credibility of the reported financial information of an entity. The value of the independent audit lies both in the fact that the auditor is, and is seen to be, independent of the audited entity, and hence is able to carry out the audit free of any externally imposed constraints (para 6).*

In addition, the recent cases involving Enron and HIH have been a catalyst for moves towards increased auditor independence.

The degree to which auditors are perceived to be independent has been studied by investigating the association between fees for audit services versus fees received for other (non-audit) services; in particular, the association of this relationship to the probability of qualified audit reports (Craswell, 1988; Barkess & Simnett, 1994). This recognises that audit services are provided to the companies' owners (via the board) with auditor appointment and dismissal requiring the owner's approval, whereas non-audit services are provided to (and paid for by) management at their discretion.

As noted in AUP 32, 'fees obtained from "other" services suggest that an entity may be able to exert undue pressure on the auditor through the threat of removal from other engagements. ... The auditor should consider the effect on independence of the level of

fees derived from "other" services' (para 37). The suggestion is that the greater the reliance on non-audit income, the greater the likelihood that the independence of the audit process will be compromised.

### ***Performance Pay Alignment***

This represents the degree to which rewards accrue to the CEO, which are directly linked with outcomes to the firm's owners. Generally, these rewards are based on returns to market-linked incentives such as CEO share and option holdings, where the CEO reward and owner returns are directly aligned.

A relative measure of performance incentive considers the magnitude of the reward (or loss) accruing to CEOs from their equity holdings relative to their cash pay. In simple terms, a CEO with a salary of \$1 million and equity returns of \$0.5 million would be considered to have an equivalent incentive to a CEO with a salary of \$5 million and equity returns of \$2.5 million. The CEOs with the greatest incentive pay will be those with the largest incentive-based payments relative to base salary, all else being equal.

### Variable Definition and Sample Description

#### ***Board Structure***

Three variables are collected to represent the construct of board structure. First, the proportion of NEDs to executive directors on the board. Second, CEO duality, a dummy variable coded 1 if the CEO and chair roles are combined and 0 otherwise. Finally, subcommittee representation through an index scored from 0 to 3, with 1 point awarded for the disclosure of each of three board subcommittees: remuneration, audit and nomination.

#### ***Board Activity and Motivation***

Three variables are collected to represent the constructs of board activity and motivation. Activity of the board is measured directly via the number of board of directors meetings scheduled in the financial year. The motivation of NEDs is represented through two measures of the financial rewards accruing to directors. The first, a measure of the proportion of total equity held by all NEDs captures their total exposure to changes in their firm's market price. The second is a direct measure of pay received by the highest paid NED and is normalised by the use of a natural logarithm.

#### ***Audit Activity and Independence***

It is not possible to directly observe the quality or extent of monitoring performed as part of the audit process; however, two possible surrogates are suggested by the literature. First, a measure of audit activity that attempts to gauge the extent of audit coverage by using the fee paid to the auditor. Larger firms will normally incur higher audit cost and therefore audit time, but this does not necessarily indicate a higher level of monitoring than in a smaller firm with lower fees. To control for this effect, most authors have either chosen to divide the audit fee by some measure of company size or have adopted

functional forms in which the audit fee is set as dependent upon some measures of size. Simunic (1984), who applies the square root of total assets as the denominator takes the former approach. The latter is used by Abdel-Khalik (1990) in setting the log of the audit fee as the dependent variable and the log of sales as the independent variable. The remaining size proxy, market capitalisation, is not appropriate as the market value of the firm may bear only a minor relationship to the volume of financial transactions processed or the complexity of operation — the main drivers of audit costs.

Revenue, while by no means a perfect measure, does reflect actual transactions within the company and should more closely correlate with audit scope and cost. Its major weakness is that high sales volume, low sales margin companies (usually retail) included in the sample will bias the result. Applying this definition means a large retail firm would appear to be spending less on audit, when compared with a capital intensive (high margin) business of a similar size. To overcome this weakness, auditor activity in this study is calculated by taking the auditor's remuneration for audit activity divided by the sum of the company's sales and assets in thousands.

The second measure of the effectiveness of audit monitoring is auditor independence. The level of auditor independence is viewed as a prime determinant of the ability of auditors to monitor the actions of the executive and to report impartially to shareholders. With audit firms increasingly deriving income from non-audit sources (e.g. management consultancy; legal, tax, accounting expert advice; and internal audit services), the independence of the audit process and subsequent impact on audit quality has been explored (Barkess & Simnett, 1994; Craswell, 1988). Relating the auditor's remuneration for audit services to their total remuneration attempts to capture this independence effect. For this study, audit independence is therefore measured as auditor remuneration for other services as a proportion of total auditor remuneration (audit + other services).

### ***Performance Pay***

Two measures are proposed to capture the level of performance pay alignment. First, CEO market-linked incentives (performance pay) *relative* to CEO cash remuneration and, second, the proportion of total share equity held by the CEO relative to total issued shares.

The first measure selected to represent the alignment of shareholder and manager interests is set according to the returns of CEO market-linked incentives relative to CEO cash remuneration. Market-linked incentives are defined as including CEO share and option holdings. Returns on CEO shareholding are calculated as the change in the capital value of the shares held by the CEO over the financial year, assuming dividend reinvestment. To this is added the change in the value of options held by the CEO based on the change in the underlying market value. Following the approach of Clinch (1991), this will only be applied to options that are 'in the money' (i.e. where the exercise price is less than the share price). This approach differs from a number of studies that have applied variations of the Black-Scholes valuation method (originally designed for traded options) to the valuation of executive options (Antle & Smith, 1985; Main, Bruce & Buck, 1996). While Black-Scholes does allow for consideration of the time value of the option there are some acknowledged problems with its use. Standard executive options, while

similar in nature to traded call options, exhibit important differences including their taxation, transferability, non-tradability, longer lifespan and the existence of a vesting time some time after the original grant date (Noreen & Wolfson, 1981). Pavlik, Scott and Tiessen (1993: 167) conclude that the use of the Black-Scholes model is likely to produce values 'higher than those given by executives who can not sell the options for a period of time and are limited in their ability to diversify their risk'.

The change in the combined values of shares and options, calculated in accordance with the methods above, is then divided by the CEO's cash pay to establish their relative magnitude. To correct for non-normality in the data, resulting from most CEOs having relatively small shareholdings compared to those CEOs who are founding members or family members of listed family-controlled companies (Pavlik, Scott & Tiessen, 1993), the square root is taken.

Relative performance pay alignment was therefore measured by the magnitude of the reward (or loss) accruing to CEOs from their equity holdings relative to their cash pay. Whilst this is a sound measure of alignment, it does not study, whether the board's decision to implement further monitoring is influenced by the sheer size of the CEOs potential exposure to the market. For example, a CEO with substantial share holdings would register the same value as one with no equity holdings, if only the above alignment measure were applied and if share prices remained constant throughout the year. For the purpose of this model, incentive alignment is broadened to include an additional variable: the proportion of issued shares held by the CEO. This measure is designed to complement incentive alignment measure and capture the CEO's total exposure to the market.

### ***Sample Description***

The sample consists of 300 companies representing 23 industry groups, drawn from the top 500 Australian Stock Exchange listed companies by market capitalisation as reported in Shareholder (July 2002). To ensure consistency of reporting periods, only companies with 30 June year-end were retained (231 companies). From this, a further 41 companies were deleted as these were trust and investment companies, which follow different reporting requirements. Missing data also impacted on the sample size. The major contributors to missing data were the inability to segregate executive and NEDs, failure to disclose CEO pay and changes of CEO during the current or previous financial year leading to a significant distortion of the cash pay. Applying listwise deletion in ordinary least squares regression, resulted in the final sample size of 162.

### **Model Specification**

Least squares regression was used to estimate the relationship between the independent (monitoring) variables and performance pay alignment. The model consists of two separate regressions and is expressed as follows:

$$\text{Relative Performance Pay} = \alpha + \beta_1(\chi_1) + \beta_2(\chi_2) + \beta_3(\chi_3) - \beta_4(\chi_4) + \beta_5(\chi_5) + \beta_6(\chi_6) + \beta_7(\chi_7) + \beta_8(\chi_8) + \varepsilon$$



$$\text{Proportion CEO Equity} = \alpha + \beta_1(\chi_1) + \beta_2(\chi_2) + \beta_3(\chi_3) - \beta_4(\chi_4) + \beta_5(\chi_5) + \beta_6(\chi_6) + \beta_7(\chi_7) + \beta_8(\chi_8) + \varepsilon$$

Where the variables are defined as follows:

	MONITORING (Independent)	
	Variable Definition	
<i>1. Structure</i>	$\chi_1$ The proportion of non-executive directors on the board. $\chi_2$ A dummy variable coded 1 if the CEO and chair roles are combined; and 0 otherwise. $\chi_3$ An index scored from 0 to 3, with 1 point scored for the disclosure of each of three board sub-committees: remuneration, audit and nomination.	
<i>2. Activity and Motivation</i>	$\chi_4$ The number of board meetings held per annum. $\chi_5$ The proportion of total equity held by non-executive directors. $\chi_6$ The natural log of the highest paid non-executive director.	
<i>3. Audit</i>	$\chi_7$ Auditor remuneration for audit services as a proportion of total auditor remuneration received from the company (audit + other services). $\chi_8$ Auditor remuneration for audit activity divided by the company's sales and assets (in thousands).	
	PERFORMANCE PAY ALIGNMENT (Independent)	
	Hypothesised Direction	Variable Definition
<i>1. Relative Performance Pay</i>	-	The square root of the ( $\Delta$ value of CEO shares plus option holdings <sub>t-1</sub> ) / (CEO cash remuneration <sub>t-1</sub> ).
<i>2. Proportion CEO Equity</i>	-	The proportion of total equity held by the CEO.

## Results

The model sets performance pay incentives held by the CEO as a function of the level of monitoring implemented by the board of directors to establish their potential substitutability. Table 1 presents the results of the regression of monitoring variables on relative performance pay. It finds that the proportion of NEDs on the board, highest paid NED and auditor activity and independence are influential in determining relative performance pay.

**Table 1: Results of Regression Analysis of Monitoring Variables on Relative Performance Pay Alignment**

Variable Description and Hypothesised Direction		B	t
(Constant)		4.139	5.241*
NEDs as a % of board	-	-2.021	-4.250*
Number of sub-committees	-	-.061	-0.546
Number of board meetings	-	.012	0.646
NED equity	-	-0.134	-0.310
Highest paid NED	-	-0.297	-2.242**
Auditor independence	-	-1.249	-3.127*
Auditor activity	-	0.609	2.138**

Source: Original table. Notes:  $r^2= 0.195$ ;  $f=6.897^*$ ;  $* p < .01$ ;  $** p < .05$ ;  $*** p < .10$ .

The combined role of chair of the board and CEO (CEO duality) variable was excluded from the OLS testing since CEO Duality was evident in only 11 (or 7%) of the sample companies. Tabachnik and Fidell (1996) warn that the use of dichotomous variables, where more than 90% of the results fall in one category, may underestimate correlations existing in the true population.

**Table 2: Results of Regression Analysis of Monitoring Variables on the Proportion of Issued Shares held by the CEO**

Variable Description and hypothesised direction		B	t
(Constant)		0.404	5.265*
NEDs as a % of board	-	-0.169	-3.664*
Number of sub-committees	-	-.020	-1.849***
Number of board meetings	-	0.002	1.031
NED Equity	-	0.011	0.263
Highest paid NED	-	-0.039	-3.078*
Auditor independence	-	-0.118	-3.04*
Auditor Activity	-	0.041	1.515

Source: Original table. Notes:  $r^2=.207$ ;  $f=7.327$ ;  $* p < .01$ ;  $** p < .05$ ;  $*** p < .10$ .

Table 2 presents the results of the regression of various measures of monitoring on the proportion of issued shares held by the CEO. In common with the previous regression it finds that the proportion of NEDs on the board, highest paid NED and auditor independence are influential in determining relative performance pay, although auditor activity is no longer significant. Additionally, the number of subcommittees is highly significant for this regression on CEO shareholding. For relative performance pay it was insignificant, although its coefficient was in the hypothesised direction.

The coefficients of these four variables (NED representation, highest paid NED, auditor independence and number of subcommittees) are as expected and lend support to the hypothesised substitution between monitoring costs and incentive payments. In contrast, frequency of board meetings and the proportion of total equity held by NEDs were not significant in determining performance pay.

## **Conclusion**

The hypothesis sets CEO incentive pay mechanisms as a function of CEO performance monitoring implemented by the board of directors to establish their potential substitutability. While the effects of performance monitoring on CEO actions have been incorporated into previous research, attempts to measure this construct have been limited to one or two variables. Applied research to date has generally utilised only CEO duality (combined chairperson of the board and CEO roles) and NED representation on the board as indicative of the level of monitoring. This research presents a more comprehensive approach to the monitoring construct, incorporating eight measures that capture not only the structural attributes of the board noted above, but also indicators of its activity level and the role of the external audit function.

Findings of this study support the hypothesis, with significant negative correlations occurring between CEO performance monitoring measures and the use of CEO incentive-based pay measures. The proportion of NEDs on the board, highest paid NED, number of sub-committees established and auditor independence were significant performance monitoring measures which were associated with lower levels of incentive-based CEO pay.

These findings suggest that NEDs fulfil an important role in monitoring the performance of CEOs (and possibly all executive directors). Where NEDs are dominant, active and properly rewarded it appears that the need to motivate CEO effort through the use of performance based pay aligned to shareholder rewards is reduced. This provides some justification to regulators who have been calling for majority representation of NEDs on boards and also the establishment of sub-committees to oversee the nomination of professional directors. This could also indicate that a negative relationship between executive oversight and performance pay outcomes may be partially attributed to a reduction in the ability of management to 'over-compensate' itself.

Limitations of the research are evident in the number of control variables utilised (limited through sample size) and measurement error in the independent variables. While the sample of 162 firms from the Top 500 is sufficient for statistical validity in the tested model, the specification could be improved through additional control variables. These include controlling for factors such as: industry-specific trends; company size by market capitalisation; diversity of operations (domestic, international or both); and indicators of company financial performance.

The measures of audit independence are controversial and findings should be treated with caution. Many in the audit profession would argue that fees derived from consultancy would have no impact on their independence and ability to conduct a professional audit. In a similar vein, the construct of board monitoring, represented here

through a number of empirical criteria, lends itself to a broader measurement. Investigation is required into what constitutes monitoring from both the executives and boards perspective, such that more comprehensive measures may be established. The work of Tosi and Gomez-Mejia (1989; 1994) in developing a 17-item scale based on managerial perceptions of monitoring is a move in this direction. Continued examination of this issue will be particularly important if researchers attempt to determine the degree to which monitoring costs are substituted for managerial incentives and the relative efficiency of such decisions.

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# Demographic Change in Singapore and its Possible Consequences for Women's Involvement in the Paid Workforce

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## Abstract

*This paper explores the potential effects of an ageing population on the paid work opportunities of women in Singapore over the next half century. Demographic change is having a significant impact on Singapore's labour supply characteristics. The country's economic growth prospects will depend on its ability to secure a reliable, highly skilled workforce. An increase in the labour force participation rate is one important option for achieving an alternative supply of labour and this has particular implications for the future role of women in the paid workforce. Women's employment rates are likely to also be boosted by the effects population ageing will have on the demand for caring and other services, and by rising levels of education among women. To ensure, however, that increased involvement in paid work by women doesn't come at the cost, for example, of lower levels of fertility, there is a need for institutional support for women as they attempt to combine an increased level of paid work involvement with their other roles in the family and community.*

## Introduction

This paper reviews the broad demographic trends affecting the Singaporean economy and examines the potential consequences for women's employment. Singapore, as with many other industrialised economies around the globe, is experiencing a dramatic ageing of its population (Sleeboos, 2003; OECD, 2003a; Kato, 2004). This trend raises questions and creates challenges related to how increasing health and caring needs will be financed and how the economy's future labour requirements will be met.

The relationship between demographic change and the future labour needs of the Singaporean economy is a particular focus of this paper. One likely response to the possible labour shortages associated with demographic change is a rise in labour force participation rates (that is, an increase in the proportion of the population aged between 15 and 65 who are actively involved in the labour market). Such a development has particular implications for the involvement of women in the Singaporean labour market, as women's (in most age groups) participation rates are currently substantially less than



men's. Furthermore, as a result of recent changes in education and trends in the structure of the economy, women are increasingly gaining the types of skills that are likely to be demanded in the future. As is argued in the remainder of this paper; however, efforts to increase the involvement of women in the Singaporean labour market will need to be sensitive to the possibility that, without adequate institutional support for the combining of work and family roles, increases in women's participation rates might come at the cost of lower levels of fertility. The paper also argues that the important care roles that older women perform in the community should be considered in the development of policy on labour force participation.

The paper is organised into six further sections. The next section draws on the results of a number of published studies to create a summary of the pattern of demographic change in Singapore. Section 3 discusses the relevance of labour force participation rates as a response to population ageing. Section 4 elaborates on the effects of demographic change on the employment prospects of Singaporean women, whilst Section 5 examines the links between fertility rates, elder care and women's involvement in the paid workforce. Policy responses to the issues raised in the paper are canvassed in Section 6 and a short conclusion is provided in Section 7.

## **Overview of Demographic Change in Singapore**

A number of factors are contributing to a rapid ageing of Singapore's population. These include:

- a. A reduction in fertility rates. This occurred over the latter half of the twentieth century and is expected to continue over future decades. For example, the number of births per woman fell from a 4.7 in 1965 to 1.4 (below replacement fertility) in 2001 (Singapore Department of Statistics, 2000). The fertility rate is expected to fall further to 1.28 in 2015. It is; however, expected to rise again to 1.85 in 2050 (UN, 2002).
- b. Falling death rates. Due to improving living standards and medical technologies, the expectation of life at birth is forecast to grow by 5 years over the period to 2050 (UN, 2002).
- c. The ageing of the 'baby boomer' generation. That is, the population cohort that was born when fertility rates were very high (especially between 1956 and 1965) will be aged 65 years and over by the 2020s.

Together these trends point to a shift in the age structure of the Singaporean population from the traditional 'pyramid' age distribution to a 'bee-hive' distribution with relatively few younger people and a large older population. As is shown in Table 1, the proportion of the population in the 0 to 14 year age group is expected to decline by almost half, from 21.7 per cent in 2000 to 12.6 per cent in 2050. The proportion of the population aged 65 years and over is projected to more than quadruple over the same period, from 7.1 per cent in 2000 to 30.4 per cent in 2050. A deceleration in these changes is expected by 2030.

**Table 1: Population Projections, Singapore, 2000 to 2050**

Year	Age group						Total Population
	0-14	%	15-64	%	65+	%	
2000	873,000	21.7	2,854,000	71.1	287,000	7.1	4,014,000
2010	711,000	15.5	3,408,000	74.5	454,000	9.9	4,573,000
2020	585,000	12.2	3,393,000	70.4	836,000	17.3	4,814,000
2030	675,000	13.6	2,946,000	59.7	1,313,000	26.6	4,934,000
2040	636,000	13.2	2,678,000	55.7	1,490,000	30.9	4,808,000
2050	573,000	12.6	2,852,000	62.8	1,384,000	30.4	4,539,000

Source: UN (2002).

### *Basic Dependency Ratios*

Dependency ratios are a convenient way of summarising these population changes and identifying their economic significance. A dependency ratio compares the number of citizens assumed to be financially dependent on others to the number of citizens assumed to be economically active. In its broadest (yet most common) form, a dependency ratio compares the number of citizens aged over 65 years and under 15 years to the number of citizens aged between these two ages.

As is shown in Table 2, Singapore's total dependency ratio is expected to climb strongly over coming decades from 0.42 in 2000 to a peak of 0.79 by 2040, before falling to 0.69 in 2050. The figures in the table also demonstrate clearly the ageing of the population, with the aged dependency ratio rising from 0.10 in 2000 to 0.56 in 2040. Finally, the figures show the impact of ageing on the size of the labour force. The projected size of the potential domestic labour force in 2040 is only 93 per cent of its size in 2000.

**Table 2: Forecast Changes in Basic Dependency Ratio, Singapore, 1999 to 2051**

Year	Dependency ratio			Change in working-age population <sup>a,b</sup>
	Youth <sup>c</sup>	Aged <sup>d</sup>	All <sup>e</sup>	
2000	0.31	0.10	0.42	1.00
2010	0.21	0.13	0.34	1.19
2020	0.17	0.25	0.42	1.19
2030	0.23	0.45	0.68	1.03
2040	0.24	0.56	0.79	0.93
2050	0.20	0.49	0.69	1.00

Source: Original table (derived from figures in Table 1). Notes: a) Working age population is the population aged 15-64 years; b) The figures in this column are calculated relative to the 2000 working age population; c) 0 – 14 years age group as a proportion of 15 – 64 years age group; d) 65+ years age group as a proportion of 15 – 64 years age group; e) 0 – 14 years age group and 65+ years age group as a proportion of 15 – 64 years age group.

These basic ratios are useful in providing an indication of the likely future trends in the availability of labour, as well as demands for public welfare, health and pension systems. They have been widely used internationally to guide public policy (OECD, 1998; Johnson, 1999).

The significance of the trends in the dependency ratios; however, tends to vary from country to country. The public finance consequences of rising aged dependency ratios in Singapore may be less than is the case in many Western nations because of the role that families play in supporting elderly family members. Based on Population Census 2000 data (Singapore Department of Statistics, 2000), the majority (77%) of residents aged over 65 rely on their children or spouse for their main financial support and many have their own incomes.<sup>1</sup> This contrasts with the experience of many Western nations, where income support is often provided to elderly residents through publicly funded pension schemes. Although it is still the case that many Singaporean commentators are voicing concerns about the resource burden of increasing levels of geriatric health care and the social security needs of especially elderly women with low Central Provident Fund (CPF) account balances and limited family resources (Lee, 1999).

The economic significance of the changes in basic dependency ratios will also vary with changes in labour force participation rates. To understand this point it is important to first note that the figures in the above table are drawn on the assumption that all citizens aged between 15 and 65 years are economically active (that, is a labour force participation rate of 100 per cent is assumed). However, this is not the case. Indeed, in 2001 the total labour force participation rate in Singapore was only 65.4 per cent (MOM, 2003a).

### ***Labour Force Dependency Ratios***

The concept of a labour force dependency ratio (LFDR) reflects these considerations. This ratio is calculated by comparing the number of citizens who are not participating in the workforce with those who are participating. Applying the above participation rate to the 2000 figures in Table 1 gives a LFDR of 1.15. If participation rates remain unchanged in 2040 then the LFDR will rise to 1.78, but if aggregate participation rates increase to 80 per cent between now and 2040 then, based on the figures in Table 1, the LFDR will rise to only 1.24.

Changes in participation rates are, thus, an obvious way a country can respond to concerns about the balance between the number of people who are economically active and the number potentially dependent on others for their financial needs. Although, before the options for lifting participation rates are examined further, it is also important to keep in mind that a number of other 'strategies' can also address these concerns. The most important of these strategies is an increase in the use of foreign labour.

A recent paper by Hui and Hashmi (2004) provides a detailed discussion of the role of foreign labour in Singapore, especially in the light of demographic change. They argue that foreign labour is likely to become an increasingly important source of labour force growth in coming decades. Indeed, under one of their scenarios for the future

Singaporean economy, foreign labour will comprise 70.7 per cent of all employees in 2034.<sup>2</sup>

If practical and politically feasible, such changes would, according to Hui and Hashmi (2004), enable Singapore to achieve its economic growth rate targets. They would also help generate tax revenue to help finance the caring needs of the local population. Foreign workers could also be used directly to assist with the provision of care for older Singaporeans.<sup>3</sup> As Hui and Hashmi (2004) note; however, the increased global competition for skilled labour, together with residents' concerns about the effects of immigration on their own job chances, are likely to limit the number of foreign workers in Singapore in coming decades.

Another approach to the economic issues created by demographic change involves attempting to increase the amount of income and production that can be achieved from a given labour force. Within this framework, possible measures include increasing the hours of work and raising the productivity of labour, especially via the use of more technologically advanced methods of production while in countries such as Australia, where part-time work is prevalent and the option of increasing working hours has some potential, this does not appear to be the case in Singapore, where rates of part-time work are low.<sup>4</sup>

Improvement in the productivity of labour is an attractive alternative. Hui and Hashmi (2004) estimate that a 50 per cent increase in Singapore's productivity growth rate would substantially reduce its forecast labour shortage. Although they also comment that the ability to achieve such a large change in productivity is uncertain, depending, inter-alia, on the achievement of a competitive business environment and a dynamic industry structure. The fact that population ageing itself is likely to create demands in parts of the economy that are relatively labour intensive (that is, health and caring services) also calls into question the likelihood of substantial increases in productivity growth rates.

## **Demographic Change and Participation Rates**

Potential changes in participation rates are important to consider in the light of this analysis. Two main approaches to raising participation rates have been taken by countries faced with demographic change: increasing the involvement of especially older men in the labour market and increasing the participation of women.

### ***Participation Rates among Older Men***

The relevance of a strategy aimed at increasing participation rates of older Singaporean men can be seen in the statistics presented in Table 3. They show that participation rates currently fall substantially among older Singaporeans. Amongst men aged 60-65, the participation rate is currently 53.3 per cent. This compares to a participation rate of over 90 per cent among men aged 25-55 years. It is also lower than the participation rate among 60-65 year old men in other industrialised countries. For example, the equivalent rate in Japan is 70.9 per cent<sup>5</sup>, whilst it is 57.6 per cent in the United States.

**Table 3: Male Labour Force Participation Rate by Age Group, Selected OECD Countries and Singapore, 2002**

	Singapore	US	Japan	UK	Canada	Aust.	Norway	Sweden
<b>Age</b>								
<b>15-19</b>	12.9	47.5	18.1	60.8	54.2	55.8	49.1	32.1
<b>20-24</b>	67.8	80.7	71.6	81.7	81.1	84.0	77.0	70.0
<b>25-29</b>	93.9	91.4	94.6	92.8	90.9	90.6	88.9	86.3
<b>30-34</b>	98.1	93.4	96.9	93.0	93.1	92.4	92.7	91.7
<b>35-39</b>	98.2	92.7	97.3	92.7	92.8	90.7	92.6	91.3
<b>40-44</b>	97.7	91.6	97.4	91.7	92.8	90.7	92.6	91.0
<b>45-49</b>	96.7	90.2	97.1	90.8	91.3	89.8	89.9	90.4
<b>50-54</b>	92.1	86.5	96.3	85.5	87.7	85.9	88.9	89.1
<b>55-59</b>	79.3	78.0	93.8	76.1	73.9	72.1	83.6	84.7
<b>60-64</b>	53.3	57.6	70.9	50.8	50.9	46.7	60.0	60.8
<b>ALL</b>	77.2							

Sources: OECD (2003b); MOM (2003c). Notes: Singapore data are for the month of June.

These observations are reflected in current government policy. In 1993, the retirement age was made mandatory and set at 60. With effect from January 1999, the retirement age was further increased to 62 and is forecast to rise to 67 eventually<sup>6</sup>. To moderate the cost of employing older workers, the employer's CPF contribution rate for older workers aged 55 and above has been reduced and employers can cut the wages of workers aged above 60 by up to 10 per cent (Hui and Hashmi, 2004).

The international literature also generally points to increased rates of involvement of older workers in labour markets of the future. Caudron (1997) argues that longer working lives will be promoted by a change in the nature of work from work reliant on physical power to work reliant on cerebral strength. More generally, Herz (1995) notes the propensity of older workers to seek work will increase as the health status of older people improves, health care costs increase and the job opportunities for older workers improve. He also argues that older workers' participation in the labour market is affected by the real value of retirement income streams, which suggests that government policy in this area can affect participation rates (OECD, 1998).

On the other hand, some commentators have questioned the ability of governments to engineer large changes in older workers' participation rates. In the Australian context, Quiggin (2001) asserts that the decline in the institution of life time employment and the increased use of redundancies as a tool of labour market adjustment are undermining the employment chances of older workers. Hui and Hashmi (2004) and Lee (1999) make similar observations about the employment chances of older Singaporeans. They note, in addition, that seniority-based compensation schemes and rapid technological change make it difficult for many older workers to remain competitive in the Singaporean labour market. Lee also comments that a prevailing (unwarranted) view is that older workers are less productive and more expensive to maintain and retrain. He asserts that unless these opinions are challenged, the chances of increases in participation rates among older workers are small.

### *Participation Rates among Prime-Age Women*

The potential for changes in women's participation rate is shown by the figures in Table 4. Participation rates among Singaporean women are currently relatively low. Across the labour force as a whole, women's participation rate is only 53.4 per cent, whereas the rate for men is 77.2 per cent. Participation rates among women aged over 30 years are particularly low. For example, 63.3 per cent of women aged between 35 and 40 years are currently participating in the labour market. This compares to a rate of 75.3 per cent recorded for the same age group in the US, and a rate of 86.8 per cent recorded in Sweden.

**Table 4: Female Labour Force Participation Rate by Age Group, Selected OECD Countries and Singapore, 2002**

	<b>Singapore</b>	<b>US</b>	<b>Japan</b>	<b>UK</b>	<b>Canada</b>	<b>Aust.</b>	<b>Norway</b>	<b>Sweden</b>
<b>Age</b>								
<b>15-19</b>	14.6	47.3	16.4	58.5	54.7	57.3	54.3	39.7
<b>20-24</b>	71.9	72.1	70.3	69.8	74.8	76.5	71.1	64.9
<b>25-29</b>	84.3	75.7	71.8	76.9	80.6	73.2	79.3	79.4
<b>30-34</b>	74.4	74.6	60.3	73.9	80.0	68.4	82.6	84.6
<b>35-39</b>	63.3	75.3	61.8	76.6	81.5	68.2	85.2	86.8
<b>40-44</b>	62.6	77.5	70.5	78.9	82.4	74.5	85.4	88.8
<b>45-49</b>	59.7	77.8	72.4	79.7	81.2	77.3	83.9	87.6
<b>50-54</b>	51.4	74.0	67.8	74.3	74.5	69.3	80.8	86.2
<b>55-59</b>	38.4	63.8	58.1	59.6	54.2	50.5	74.6	79.7
<b>60-64</b>	18.6	44.1	39.2	28.5	30.4	23.6	52.0	53.7
<b>ALL</b>	53.4							

Sources: OECD (2003b); MOM (2003c). Notes: Singapore data are for the month of June.

The importance of changes in women's participation rates vis-a-vis changes in participation rates among older men can be assessed with reference to the figures in Table 5. These show the gender and age characteristics of those Singaporeans who are not currently active in the labour market (that is, the non-participants). They demonstrate that, in 2002, 'prime age women' (that is, women between 25 and 49 years) comprised 33.8 per cent of all the working age Singaporeans who were not employed. Older working age women (that is, women aged between 50 and 64 years) also accounted for a relatively high proportion (19.9%) of the group of non-employed working age Singaporeans. In contrast, older working age men (that is, men aged between 50 and 64 years) accounted for only 6.9 per cent of the group of non-employed working age Singaporeans.

The figures in the table thus serve to emphasise the point that whilst much policy attention has been on increasing the paid work contribution of older male workers, levels of non-employment are currently much higher among prime-age and older women.

**Table 5: Distribution of Non-Employed Singaporeans by Gender and Age Group, 2002**

Age	Men	Women
15-19	14.0%	12.9%
20-24	5.1%	4.4%
25-29	1.2%	3.2%
30-34	0.4%	5.6%
35-39	0.4%	8.7%
40-44	0.5%	8.5%
45-49	0.6%	7.7%
50-54	1.2%	7.4%
55-59	1.9%	5.7%
60-64	3.7%	6.8%
ALL	29.1%	70.9%

Source: Singapore Department of Statistics (2000) and figures from Tables 3 and 4. Notes: Non-employed consists of residents who were not in the labour force in 2002. Population figures are based on the 2000 Census.

## **Demographic Change and the Labour Market Opportunities of Singaporean Women**

Thus far this paper has argued that increases in the labour force participation rate of Singaporean women will be important in the securing of a supply of labour for the future economy. This section elaborates on that theme by providing evidence about likely future trends in the demand for labour and how women's labour market skills complement this. In particular, the section demonstrates the likely future orientation of the economy towards the services sector. It is noted that women's employment characteristics, together with their increasing levels of education suggest that women's labour will be in demand in the future economy.

### ***The Likely Characteristics of the Future Demand for Labour and the Industry Characteristics of Women's Employment***

Partly as a result of ageing, economic growth in industrialised economies in coming decades is anticipated to accentuate past trends and occur especially in the service sectors of the economy. The significance of this pattern of economic development for women's employment opportunities lies in the fact that the service sectors of the economy have traditionally favoured the employment of women. It is also worth noting that in these sectors of the economy, the potential for the introduction of labour-saving technologies is relatively small and, thus, growth is most likely to be labour intensive. The figures in Table 6 elaborate on these, showing the industry composition of total employment in Singapore, rates of growth in total employment by industry over the period 1992-2002 and the female share of employment in each industry.

Apart from the small 'other' sector, the industries that recorded rates of employment growth substantially above the 'average' for the labour market as a whole (of 27.9%) over the 1992-2002 period were the Financial, Insurance, Real Estate and Business Services

sector (101.3%); the Community, Social and Personal Services sector (52.9%); and the Transport, Storage and Communications sector (38.1%).

The top two 'high growth' industries also featured relatively high rates of female employment. Compared to the female share of total employment, of 43.6 per cent, the female share of employment was 48.6 per cent in the Financial, Insurance, Real Estate and Business Services, and 59.1 per cent in Community, Social and Personal Services in 2002.

**Table 6: Industry and Gender Characteristics of Singaporean Employment, 1992-2002**

<b>Industry</b>	<b>Share of total jobs 1992 (%)</b>	<b>Share of total jobs 2002 (%)</b>	<b>Female share of industry jobs 1992 (%)</b>	<b>Female share of industry jobs 2002 (%)</b>	<b>Employment Growth, 1992-2002 (%)</b>
<b>Manufacturing</b>	27.5	18.2	43.9	37.5	-15.3
<b>Construction</b>	6.6	5.9	10.6	14.2	15.4
<b>Commerce<sup>a</sup></b>	22.6	21.3	39.9	44.9	20.7
<b>Transport, Storage &amp; Communications</b>	10.1	10.8	23.0	24.4	38.1
<b>Financial, Insurance, Real Estate &amp; Businesses Services</b>	10.8	17.1	48.7	48.6	101.3
<b>Community, Social and Personal Services<sup>b</sup></b>	21.5	25.7	49.1	59.1	52.9
<b>Others<sup>c</sup></b>	0.9	0.9	12.7	21.8	33.3
<b>Total</b>	100.0	100.0	40.1	43.6	27.9

Source: Ministry of Manpower (2002). Notes: a) Since 1998, Commerce was reclassified into Wholesale and Retail, and Hotels, and Restaurants; b) Since 1998 Community, Social and Personal Services was reclassified into Public Administration and Education, and Personal, Health and Social Services; c) Includes Agricultural, Fishing and Mining and Activities not adequately defined.

Furthermore, women's share of employment increased in many of these industries over the 1992-2002 period. For example, women's share of employment in the Community, Social and Personal Services increased from 49.1 per cent to 59.1 per cent, which may imply that women secured the majority of the new jobs created in these growth industries over the period.

It is also interesting to note that the rate of female employment was relatively low in the industries that experienced either negative or poor rates of employment growth over the 1992-2002 period. Employment fell in the Manufacturing sector (by 27.6%) and rose by only 15.4 per cent in the Construction sector. The female share of employment in these industries in 2002 was 37.5 per cent and 14.2 per cent respectively. In contrast to the experience of several other countries<sup>7</sup>; however, the fact that women's share of jobs fell in



the declining Manufacturing sector suggests that women, rather than men, bore the brunt of job losses in that sector.

### ***Skill Levels***

An additional factor to promote the employment of women in coming decades is the rapid growth in their level of qualifications. As is shown in Table 7, the number of women enrolled in tertiary institutions in Singapore rose dramatically between 1977 and 1997. The largest increases in enrolments occurred at the Polytechnics with a 1015.8% increase in the number of women enrolled and a 376.7 per cent increase in the number of women enrolled at local universities occurred over this period.

**Table 7: Enrolment in Local Tertiary Institutions by Gender, Singapore, 1977-1997**

	University		Polytechnic	
	Male ('000)	Female ('000)	Male ('000)	Female ('000)
<b>1977</b>	4.97	3.86	8.55	2.03
<b>1987</b>	10.19	8.72	17.35	7.26
<b>1997</b>	22.29	18.4	30.90	22.6
<b>Growth (1977-1997) %</b>	348.5	376.7	261.4	1015.8

Source: Singapore Department of Statistics (1998)

These changes in education levels will serve to increase the labour market opportunities of women in the labour market of the future. Rising education levels also impact on women's (and men's) aspirations with regard to income levels and career. Thus, the changes summarised in Table 7 will produce upward pressures on women's participation rates from both labour demand and labour supply sources.

### ***Fertility Rates and Caring Roles***

A further factor that may contribute to an increased involvement of women in the Singaporean labour market is directly related to demographic change. Falling fertility rates, as previously discussed, are reducing a historical constraint on women's labour supply and the effects of this are likely to be witnessed especially in coming decades as younger women with fewer children move into the age groups where participation rates are currently low. Some of the effects are already apparent. For example, increases in both singlehood rates<sup>8</sup> and the average age of women at first birth<sup>9</sup> is likely to have been a critical factor in the increase in the participation rate of women aged 25-29 years from 30.8 per cent in 1970 to 84.3 in 2002 (see Table 4) (Cheung, 1990).

### ***Elder Care***

Another aspect of demographic change, namely population ageing, is producing new sets of caring responsibility that may limit women's participation in the labour market. Women have traditionally met the caring needs of elderly family members and, as is the case with the care of younger children, this role that women perform often constrains their ability to participate in paid work. The Singapore Department of Statistics (2002) refers to the 'sandwich generation', identifying 40,000 households that were headed by

middle-aged couples and had both children and parents in the same household. The care-giving demands on these households is likely to be especially high, as are the financial burdens associated with meeting both the expenses associated with children's education and elderly parent's health care needs.

## **Government Policy and Women's Labour Force Participation**

The Singapore Government has a history of developing policies to influence women's involvement in the paid workforce and/or fertility rates (Pyle, 1997). These included strategies implemented in the 1960s to decrease fertility rates (and subsequently raise participation rates) as part of a bid to attract foreign direct investment in industries (such as electronics) into the country. Lower priority in primary school registration was assigned to children from large families and lower priority in the allocation of public housing was also given to such families.

Yap (2002) describes the reversal in fertility policies that began in the 1980s. Higher fertility rates among the more highly educated Singaporeans were especially sought. Policy measures included a Graduate Mother Scheme, which gave priority in primary school registration to children whose mothers had a university degree or professional qualification; increased child care relief for better educated women; an ability to use CPF funds to pay for maternity costs associated with a third child; public housing rules were relaxed to enable large families to move to bigger apartments; and women's access to abortion and sterilisation was curtailed when they had either more than one "O level" pass in their schooling, and/or they had less than three children.

The financial incentive to have children was also boosted in 1988 when the government introduced substantial personal income tax relief for families with children. Currently a minimum of S\$2,000 is provided per child and, beyond this minimum, further relief is available, depending on the mother's earned income<sup>10</sup>. A Parenthood Tax Rebate allows a mother to claim a S\$10,000 rebate on additional children (Gross & Weintraub, 2005).

Another tier of the government's pro-natalist policies is the Children Development Co-Savings Act, implemented in 2001 and updated in 2004. The scheme operates via a Children Development Account set up for second and subsequent children where S\$500 per year for six years is paid into this account for the second child and S\$1,000 a year for six years for the third child. The government will match dollar for dollar the amount parents put into a Child Development Account, subject to a maximum of S\$1,000 per annum for the second child and S\$2,000 per annum for the third child. This implies that parents can receive up to S\$9,000 for a second child and S\$18,000 for a third child (Low, Tan & Hsing, 2003). In addition working mothers are permitted to take up to 12 weeks of maternity leave. For a mother's first and second child, the employer is required to pay for the first eight weeks of maternity leave and the government reimburses the employer for the final four weeks. If the employee has a third or fourth child, the government reimburses the employer for all 12 weeks of maternity leave.

Measures have also been implemented to reduce the costs of foreign maids for working families. As Yeoh, Huang and Gonzalez (1999) describe, Singapore began to

grant work permits to a limited number of domestic servants from Thailand, Sri Lanka and the Philippines in the late 1970s as a way of facilitating the entry of more Singaporean women into the labour market. The popularity of these maids has increased rapidly in recent years and currently there are more than 140,000 foreign maids in the country (Ng Eng Hen, 2004). Government concerns about the level of this type of migration resulted in the imposition of levies on the hiring of foreign maids. Currently this is set at S\$4,000 per maid per annum; however, tax relief to offset the cost of the levy is available for working women. The amount of this relief is equal to twice the annual Foreign Maid Levy (Ministry of Finance, 2004).

Efforts have also been made to promote so-called family-friendly workplaces. The Civil Service now provides marriage and paternity leave and, is apparently "allowing its agencies to adopt flexi-work practices" (Yap, 2002: 656). A childcare subsidy is also provided at S\$150 a month for full day care in a licensed centre. This compares to the cost of care, which ranges from S\$300 to S\$1,380 a month.

In an effort to provide working parents with more childcare options, the Ministry of Community Development and Sports announced plans to increase the number of infant and childcare facilities to 3,000 by 2009. Currently there are about 670 childcare centres in Singapore, with only 25 centres offering infant care services (Gross & Weintraub, 2005).

In a move to widen the family-friendly policies to include more employees and change the culture of organisations, the Singaporean Government established the Quality Workplaces Department in February 2004. According to the Ministry of Manpower's website, this was part of the national effort to put together a holistic package of policies and schemes to support marriage and parenthood. The government is promoting work-life strategies as a means for organisations to attract and retain talent in today's competitive economy.

The 2004 Budget Speech by Deputy Prime Minister and Finance Minister, Lee Hsien Loong (2004) mentioned plans to use civil service agencies to "set a clear example to companies of how employers can create a work environment that is supportive of families". Despite these initiatives, there appears to be room for improvement, especially among the private sector. Acting Minister for Manpower, Dr Ng Eng Hen (2004), provided many interesting statistics on the current state of play in Singapore with regards work-life balance practices. Private sector companies were described as being "generally sympathetic towards marriages, emergencies, maternity/paternity leave and exam leave. ...[but] they do less well when it comes to time off to take care of sick relatives, employer-provided childcare benefits and flexible working arrangements". Less than ten per cent of private sector establishments provide family care leave; only four per cent of private sector workers were on part-time, flexi-time or flexi-place working arrangements in 2002; and only about three per cent of all childcare places are provided by private sector employers.

This information can be contrasted with the results of the Ministry of Manpower's recent survey of the labour force (MOM, 2003d), which shows that almost half of all potential entrants to the labour market favoured part-time jobs. A small survey by the Ministry of Community Development and Sports (2004) identified the common practice

of a 5.5 day working week as a constraint on employees' ability to achieve work-life balance. There was also a perception that flexible working arrangements were not part of the Singaporean mindset and that workers applying for such arrangements could suffer discrimination.

In an effort to boost the benefits of these work-life programs, the Ministry of Community Development and Sports reported findings about the "Family Friendly Employer" award winning companies (Work & Family Connection, 2004). They concluded that these programs made business sense. These companies made gains from both savings and revenue that averaged \$S1.68 for every dollar spent on work-life initiatives. Increased productivity brought new revenues and savings came from reduced turnover.

It is clear that the Singaporean Government wants to encourage greater flexibility and sees this as an initiative that could apply to workers at different stages of their lives, not only for younger female workers. The government's message has changed from one of family-friendly policies to work-life harmony with a focus on providing flexible work strategies. According to Minister of Manpower, Ng Eng Hen, this should "enable employees to manage their work responsibilities alongside personal and family needs" (*People's Daily Online*). To achieve a change in the Singaporean mindset, the government set up a fund of \$S10 million to encourage companies to adopt this proactive attitude towards creating world-class quality workplaces, which they see as a winning business strategy.

## **Conclusion**

Demographic change is creating many challenges for Singaporeans. This paper has focused on the implications of the change for the labour market prospects of Singaporean women. Below replacement fertility rates imply that Singapore will need to access alternative sources of labour if it is going to achieve high rates of economic growth in coming decades. The ageing of the population will increase the economy's need for skilled labour in the service (and especially health and caring) sectors of the economy.

An increase in the participation rate of Singaporean women would make an important contribution to the meeting of these labour needs. Currently a number of factors are promoting an increased level of involvement of women in the paid workforce. These include the above-mentioned shift in the economy towards the sectors where women have traditionally found jobs and a rise in women's level of education. Lower rates of fertility will also allow for a greater involvement of women in the paid workforce. It is here; however, that the government may face a dilemma: its perceived need to increase fertility rates could result in lowering women's involvement in the paid workforce. To counteract the potential of women withdrawing from the workforce to rear their children, the government has introduced work-life schemes to retain women in the workforce at the same time as it introduced its pro-natalist policies that encouraged them to have children.

In 2004-5, a slight shift occurred that led towards work-life programs and a holistic package of policies began to be implemented by different ministries. These initiatives gained Singapore international recognition (a Work-Life Innovative Excellence Award by

US-based Alliance for Work-Life Progress in 2005) and resulted in an increase in companies (from a few in 1999 to 67 in 2004) gaining awards for work-life initiatives.

As Singapore has the reputation of achieving its societal goals through active policy-making, it is probably that the government will turn towards schemes to encourage older workers to remain in the workforce to counter its ageing population. The government is already considering increasing the retirement age and bringing in practical measures to facilitate the employment of older workers that include flexible work arrangements, job design and retraining (Gross and Weintraub, 2005). One group that potentially can supply a large increase of workers is the 'empty nesters' who may no longer have children to care for but are likely to have elder care responsibilities. It is important now for the Singaporean Government to implement programs to meet the needs of older workers that may include providing more homes for the elderly and reduced working hours so that those with elder care responsibilities can combine these with working.

## Endnotes

- <sup>1</sup> Cheung (1990) also notes that older Singaporeans are an important source of caring service within the family, challenging the notion that they are economically dependent.
- <sup>2</sup> This scenario is based on an assumption that total fertility rates remain at their current levels and there is no net permanent immigration (Hui & Hashmi, 2004).
- <sup>3</sup> The role that foreign domestic workers play in facilitating women's labour market participation is outlined later in the paper under Government Policy and Women's Labour Force Participation.
- <sup>4</sup> In 2003, part-timers formed less than 6 per cent of employed persons in Singapore, in contrast to 24 per cent in Japan, 23 per cent in the UK and 21 per cent in the US (MOM, 2003b).
- <sup>5</sup> The relatively high participation rates in Japan can be attributed, in part, to the presence of an agricultural sector, which provides opportunities for older workers to remain economically active.
- <sup>6</sup> Prior to 1993, there was no mandatory retirement age and it was common practice for companies to retire their workers at the age of 55.
- <sup>7</sup> Goodman (1994) describes how women filled the majority of the jobs added in the US recovery of 1992-93 and in each of the recovery periods since 1975. At the other end of the US business cycle, job losses apparently were concentrated in the male segment of the labour force. Goodman, Antezak and Freeman (1993: 26) explain that "men lost at least 9 times as many jobs as women did" over the five recessive periods between 1969 and 1992. The resilience of employment in the services sector during the recession periods and the long-term decline in agricultural and manufacturing employment were attributed to the changing gender composition of the US workforce.
- <sup>8</sup> The proportion of women who are likely to remain single rose from 6 per cent in 1980 to about 15 per cent in 2001 (Yap, 2002).
- <sup>9</sup> The average age of women at first birth rose from 25.3 to 28.4 between 1980 and 2000 (Singapore Department of Statistics, 2002).
- <sup>10</sup> The amount varies between 5 and 25 per cent of the mother's earned income and will depend on the total number of children she has.

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# Common Factors of High Performance Teams

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## Abstract

*Utilization of work teams is now widespread in all types of organisations throughout the world. An understanding of the important factors common to high performance teams is, however, rare. The purpose of this content analysis is to explore the literature and propose findings related to high performance teams. These include definition and types, goals, talent, skills, performance ethics, incentives and motivation, efficacy, leadership, conflict, communication, power and empowerment, norms and standards and values.*

## Introduction

Despite our nation's natural inclination towards individualism (Richardson & Denton, 2005) organisations continue to utilise team structures because of increasing competition and technological changes (Chen & Klimoski, 2003). Given this movement towards more team-based organisational development (Sheard & Kakabadse, 2002), both researchers and practitioners have been eager to develop methods to enhance team performance within a variety of team settings and at lightening speed (Brown, 2003). According to Larson and LaFasto (1989, p. 13):

*For several decades now social scientists have been urging us to confront a sad paradox in our collective evolution...On the one hand, we possess the technical competence, physical resources, and intellectual capacity to satisfy all the basic needs of mankind...On the other hand, we seem to lack the essential ability to work together effectively to solve critical problems.*

Even with these concerns, organisations of all kinds (e.g., corporate, non-profit, government, and military) are designing and implementing work teams for the purpose of making the decisions and plans that managers had once been tasked to undertake. In fact, Cohen and Bailey (1997) found that organisations with more than 100 employees utilised team structures nearly 82 per cent of the time and that team structures have produced

significant results for the organisations that have utilised them (Hoerr & Pollack, 1986; Shulman, 1996; Daniels, 1998; Kirkman & Rosen, 2000).

According to Katzenbach and Smith (1993: 18), there are four reasons why teams work: individuals coming together bring complimentary skills and experience that exceed any individual; teams support real-time problem-solving and are more flexible and responsive to changing demands with greater speed, accuracy and awareness than individuals; teams provide a unique social dimension that enhances the economic and administrative aspects of work; and teams have more fun. Shulman (1996) and Katzenbach and Smith (1993) hypothesised that individuals, as compared to teams, are no longer able to deal with the complexities and pressures that are best solved using team structures that require multiple skills, judgments and experiences.

Interestingly, although teams have been studied for the past few decades, a consensus has not been reached on the specific high performance practices that make up effective teams for organisations in general. The literature, however, has provided some clues. For example, according to a Development Dimensions International (DDI) study, of the 39 practices studied, team-building skills and self-managed worked teams appeared as the most valuable competency (Daniels, 1998). In another DDI study, high performing organisations continue to rate effective teamwork as one of the top ten competencies needed to compete in the global marketplace (Bernthall, Dalesio, & Wellings, 1997). Generally speaking, as Guzzo and Dickson (1996: 330) stated: "Ample evidence indicates that team-based forms or organizing often brings about higher levels of organisational effectiveness in comparison with traditional, bureaucratic forms." In addition, Jehn and Mannix (2001) found that teams help increase organisational efficiency, flexibility and performance, more specifically by addressing issues related to relationship, task, and process conflict as well as the role of conflict as teams evolve.

With so many organisations utilising work groups and teams, it is important to investigate the factors or components of high performing teams. Furthermore, it is important to note that because most teams are unique in their goals and focus, there is no 'off the shelf' solution for all teams (Davenport, 2001) and that "there is no singular, uniform measure of performance effectiveness for groups" (Guzzo and Dickson, 1996: 309). Shulman (1996: 358) explained that while there seems to be a shared understanding of what makes an effective work group, the "results across studies are inconsistent," primarily because the field is "badly fragmented". Further, Rainey (1991: 185) found that "so many kinds of groups operate under so many different conditions that researchers strain to understand all the variations." Even with these challenges, an exploration of these high performance factors can be beneficial.

This paper is comprised of four primary sections. Following this introduction is the paper's purpose and design. Next, a brief synopsis of the literature on theoretical frameworks and characteristics, features or attributes of effectively functioning teams (i.e., team purpose, objectives, and goals; talents, skills, and ethics; incentives, motivation, and efficacy; leadership; conflict and communication; power and empowerment; norms and standards, and recommendations) is also presented. The paper concludes with some important implications for practice.

## **Purpose and Design**

The purpose of this literature review was to explore the literature related to high performing teams and formulate implications to management and human resource development theory and practice. The following questions were investigated: What are theoretical frameworks used to understand high performing teams? What are some of the characteristics, features or attributes of effectively functioning teams? What findings can assist practitioners in assessing, designing, developing, implementing and/or evaluating team-related interventions? While no team is identical, the constructs addressed in this paper represent many of the core components that seem to permeate much of the team literature reviewed. This review is a content analysis of scholarly literature located in various business (e.g. ABI, General BusinessFile ASAP) and psychology databases (i.e. PsycINFO, Expanded Academic Index). The key words used for the search included: team, team-building, teamwork, high performance teams and work groups. Among the numerous articles and books located and reviewed, the ones most applicable to the topic were subjectively chosen for this review.

## **Findings and Discussion**

### ***Theoretical Frameworks***

According to Bell (1982), a lack of methodological consistency, in addition to the diversity of groups studied, has made it difficult to generalise the phases of team development. However, in studying the stages of development, while three-stage and other types of models have been proposed (Bell, 1982), Tuckman's 1965 model remains a popular summary and continues to be used within the current literature . In this seminal work, Tuckman describes a four-stage model that includes forming, storming, norming and performing. Since Tuckman's original work, numerous scholars and practitioners have refined or modified his model to clarify the stages in team development. Through this refinement of the Tuckman model, Cufaude (as cited in Carter, 2001) re-defined these four stages in a useful framework:

1. *Forming*: Individuals are trying to get to know each other and the organisation. A commitment to the team effort has not yet been formed. Leaders provide direction and outline expectations.
2. *Storming*: In this rocky stage, team members may challenge the leader and each other. The leader coaches members on how to manage conflict and focus on goals.
3. *Norming*: After individuals have worked through conflicts, things start to gel. People appreciate their differences and work together. The leader now serves as a facilitator, offering encouragement and guidance.
4. *Performing*: The team is fully functional, able to manage their relationships, and work toward shared goals. Team members feel accepted and communicate openly with the leader. The leader focuses on delegating responsibilities and identifying when the team is moving into a different stage (Carter, 2001).

Still other researchers have taken Tuckman's original model to increase its complexity. Such was the goal of Sheard and Kakabadse (2002) who referred to each of the four stages by reviewing them as they relate to the task, individual, group itself, and environment—seeking to identify the key factors related to high performance teams.

On the other hand, Katzenbach and Smith (1993) describe a five-stage movement to becoming a high performance team. Stage one is defined as simply the 'working group'. While the working group does achieve a certain level of results, their performance is well below high performance. In a brief review of these stages, Katzenbach and Smith (1993) described the working group as individuals who come together primarily to share information, best practices and perspectives without a real set of group objectives. A second phase, known as the 'pseudo team', actually reaches an even lower level performance before becoming a 'potential team'. A pseudo-team is where a team may have a significant performance need but is not really trying to achieve it; and where there is no common purpose. This type of team is identified as simply the sum of its whole being less than the individual parts. A potential team is a team that is focused on an incremental performance need and there is a bias for reaching high performance. While there is not yet group accountability or a working approach, these teams are potential candidates for reaching the high performance stage. The potential team is followed by a 'real team' and finally by a 'high-performance team' (Katzenbach & Smith, 1993: 84). A 'real team' is a group of individuals who are equally committed to a common purpose for which they hold each other accountable (Regan, 1999); yet, a 'high performance team' is one that satisfies all of the requirements of real teams, but take their commitment further, deepening their relationships for which individuals sacrifice deeply for the overall success of each individual on the team as well as the team itself. It is the move to this last stage where individuals must "take risks involving conflict, trust, interdependence, and hard work" (Regan, 1999: 109).

While these stage models provide a simple outline for the evolution of teams, investigators think differently about team stages of development. Rainey (1991: 188) stated that while group norms and values do develop, if not through vague and elusive processes, that "patterns of conformity to certain behaviours and beliefs" do seem to take place. Like other stage-based opinions, cases can be made on either side about the existence or vagueness of stage development. At the general level, however, it seems useful to review these stages as they offer some insights into the nature of group growth and development which can demonstrate greater levels of independence and accountability (Richardson & Denton, 2005). However, in a further review of the temporal aspects of team or project development, Shulman (1996: 360) concluded that an important implication of the many longitudinal studies indicates that the assumed linear and fixed sequence of group process may have added very little to our understanding of how work groups go about achieving their objectives.

### ***Characteristics, Features or Attributes of Effectively Functioning Teams***

An investigation of all the characteristics, features or attributes of effectively functioning teams is not possible in this length of paper. Instead, the researchers have focused on presenting findings related to the following: definition, purpose and goals,

talent, skills, performance ethics, incentives and motivation, efficacy, leadership, conflict, communication, power and empowerment, and norms and standards, which represent the astonishing scope of group behaviour.

### *Team Definition, Purpose and Goals*

While there are subtle differences in defining what a team is - some differentiating between work groups and teams (i.e. Katzenbach & Smith, 1993) while others use these words interchangeably (Guzzo & Dickson, 1996) - most definitions resemble each other to some degree. Katzenbach and Smith (1993) argue that any number of theorists looking to define teamwork will assert the importance of having a synergistic social entity that works towards a common goal or goals, often with high performance teams exemplifying a total commitment to the work as well as a total commitment to each other (Katzenbach & Smith, 1993). Guzzo and Dickson (1996: 208-209) defined a workgroup as a group "made up of individuals who see themselves and who are seen by others as a social entity, who are interdependent because of the tasks they perform as members of a group, who are embedded in one or more larger social systems and who perform tasks that affect others. This notion is complimented by Salas, Bowers, and Cannon-Bowers (1995) who differentiate between individual *taskwork* and the interpersonal factors that constitute *teamwork*.

Katzenbach and Smith (1993: 2) stated that: "Common sense suggests that teams cannot succeed without a shared purpose". While this may be an obvious statement, teams often form (or are developed) without a clear direction or meaning even though many researchers (e.g. Weiss, 2002) have explained that employees are inclined to do better when they know how to do their jobs and why they are doing them. Teams that seek higher levels of performance should ensure that each member understands and supports the true meaning and value of the team's mission and vision. Clarifying the purpose in this manner is a major contributor for tapping into team potential.

No teams arise without clear elevating goals (Larson & LaFasto, 1989) and performance challenges (Katzenbach & Smith, 1993). As such, it is essential for any performance team to have compelling short- and long-term goals that excite and challenge the individuals as well as the team. While the word *impossible* is rarely used in the literature, the idea of stretch goals are often used to raise the bar and increase the challenge necessary to motivate groups or teams towards their given purpose (Katzenbach & Smith, 1993). In building high performance teams, Regan (1999) explained that teams should be given the impossible goal because such a goal, greater than any one person can handle, ushers in the need for team resources and builds a compelling challenge. According to Knight, Durham and Locke (2001), in a computer simulation study, teams with difficult goals achieved the highest level of performance while taking more strategic risk in order to obtain their goals. Team performance was also positively affected by goal difficulty, team efficacy (positively influenced by the team's goals for both the individuals and the team), strategic risk and tactical implementation (Knight & Durham, 2001). Also, such challenges facilitate inter-dependent behaviour which, according to Gully *et al.* (2002), increases the collective efficacy of the team.

### *Talent, Skills and Ethics*

High performance teams must begin by recruiting and maintaining their best talent, while helping non-value-adding members relocate their talents to more appropriate venues. By recruiting, maintaining and cultivating high talent, morale rises as performance increases (Larson & LaFasto, 1989). This is consistent with the work of Buckingham and Coffman (1999), who asserted that internal resources, rather than being spent on lower performing individuals, should be spent on the high performers to help them achieve more. Thus, while selection and training is critical for cultivating contributing team members, teams must constantly monitor their talent pool to insure that each person's talents and gifts meet the needs of the team. Larson and LaFasto (1989: 71) described two additional features that must accompany talent. These include a strong desire to contribute and the capability of collaborating effectively. Thus, "when strong technical skills are combined with a desire to contribute and an ability to be collaborative, the observable outcome is an elevated sense of confidence among team members" (Larson & LaFasto, 1989: 71).

After selecting for talent (Katzenbach & Smith, 1993), a proper complement of skills are required in order to then build high performance teams. These skills must meet the challenges afforded to each team (Csikszentmihalyi, 1990). It must be emphasised that technical skill building will not insure a high performance team. Instead, individuals must have a sense of balance related to technical, problem-solving, decision-making, and interpersonal skills in order to work with one another most effectively. This later category - interpersonal skills - includes risk-taking, constructive criticism, objectivity, active listening, benefit of the doubt, support and recognising the interests and achievements of others.

While building teams, an overall commitment is expected to be made around performance ethic (Katzenbach & Smith, 1993). This ethic builds into the organisation (and teams) the overarching philosophy of high performance results. Instead of looking towards the next organisational fad, building an expectation of performance that permeates the organisation through organisational leaders and the individual workers remains essential. This ethic and expectation must then be supported by organisational leaders and followers (Katzenbach & Smith, 1993) who, while exercising candour and mutual respect, hold themselves and their organisations relentlessly accountable at both the individual and team level (Chen & Klimoski, 2003).

### *Incentives, Motivation and Efficacy*

While teams are organised around a purpose, they must provide an opportunity for individual members to be rewarded for their efforts. These rewards come in the form both monetary and non-monetary systems that encourage exemplary behaviours that lead to high performance. In their study, Knight, Durham and Lock (2001) found that incentives had a positive impact on tactical implementation and this, in turn, positively affected performance. In looking at incentives, it is important to look at intrinsic as well as extrinsic motivators, and in some settings, the degree to which team leaders have control over the dispensing of incentives (Koppenhaver & Shrader, 2003).

There are many historic and theoretical models of motivation that can be used to better understand employee and even team performance. Incentives that re-enforce behaviours, however, are often used to facilitate team motivation (Steers, Mowday & Shapiro, 2004). Weiss (2002) and others have shown that rewards come in many forms, a powerful form of which includes public or private recognition. When looking at raising the level of team performance, managers and leaders would benefit from looking beyond remunerative strategies to taking a closer look at the intangible benefits and intrinsic motives. The research indicates that over the long-term, intrinsic motivation taps into deeper levels of energy and commitment than external sources of motivation (Deci, 1972).

In his seminal work on 'flow', Csikszentmihalyi (1990) described 'autotelic' experiences as those participated in for their own sake. These kinds of activities are seen to be so enjoyable in and of themselves that individuals will participate in them because of the value they provide intrinsically. As such, exponential levels of performance can take place when employees begin to find personal satisfaction in their work, or when the work itself is motivating (Weiss, 2002). According to Katzenbach and Smith (1993: 54), when small groups of people challenge themselves with something that begins to interest them, "their respective titles, perks, and other 'stripes' fade into the background". Hence, while external motivators are still effective and necessary to improve individual and team performance, finding ways to motivate team members intrinsically may have potentially greater positive results.

Above all, believing in one's self, organisation and team is critical for reaching high performance levels (Brown, 2003). Katzenbach and Smith (1993: 138) found that leaders of high performing teams "simply need to believe in their purpose and their people." In addition, an individual team member must also believe in his or her ability to do a job well in relation to his or her team members, or as Albert Bandura (1997: 468) calls "collective efficacy." A sense of self-efficacy combined with small victories and positive feedback assists in the development of team efficacy. Knight, Durham and Locke (2001) found efficacy was strongly connected to performance. In essence, individuals and teams with higher degrees of efficacy appear to believe in their skills more and thus are more apt to take larger strategic risks in order to achieve their goals (Brown, 2003). Knight, Durham and Locke (2001) offer, however, an important caution: individuals with too much self-efficacy can develop an overconfidence that can lead to unnecessary mistakes.

### *Leadership*

High performing leaders usually accompany high performance teams. High performing teams have leaders who, when times are certain and peaceful, are able to take a proactive stance and help the team stay ahead. Promoting a sense of proactivity, Reagan (1991) encouraged team leaders to create a sense of distress and urgency. Such a strategy was assumed to trump any external crisis or pressure, keeping the focus on the inside of the team. This type of focus promotes a sense of control versus lack of control within the team. Reagan purported that essential leadership qualities include the ability to: have a vision, meaning one should see the crisis before it happens and act upon it; convince the opinion leaders (or those whose opinions have put them in an informal leadership role) of the importance of the goals at hand; organise quantitative goals; be persistent in asking for



the goals to be met; organise endurance testing, whereby leaders must remain steadfast amongst team members trying to test the leader's commitment; induce creativity once goals are set; and stay out of the team's way. As early as 1989, Larson and LaFasto (1989) found that effective team leaders establish a vision for the future, create change and unleash the energy of contributing members. Additionally, they found that effective leaders were driven by guiding principles where, in essence, "the leaders managed the principles, and the principles managed the team" (p. 124).

Katzenbach and Smith (1993) cited six elements necessary for good team leadership: keeping the purpose, goals and approach relevant and meaningful; continuing to build commitment and confidence; insuring their members are always enhancing their skills (including technical, problem solving, decision-making, interpersonal and teamwork skills); being skilful at managing relationships from the outside with a focus on removing obstacles that get in the way of team performance; providing opportunities for others and being the last to seek credit; and not shying away from getting in the trenches and doing the real work. While the authors contend that most individuals can develop effective skills to be a team leader, they suggest these components as a guideline for success.

In yet another concise summary of leadership qualities, De Vries (1999: 74-5) provides a concise summary of qualities important to team leadership:

*Effective team leaders avoid secrecy of any kind at all costs. They treat members of the team with respect, listen to feedback and ask questions, address problems, and display tolerance and flexibility. They offer guidance and structure, facilitating task accomplishment, and they provide a focus for action. They encourage dialogue and interaction among the participants, balancing appropriate levels of participation to ensure that all points of view are explored (and withholding the possible swaying of opinion). They capitalize on the differences among group members when those differences can further the common good of the group. They give praise and recognition for individual and group efforts, and they celebrate success. They accept ownership for the decisions of the team and keep their focus sharp through follow-up. By acting in these ways, they create an atmosphere of growth and learning. In the process, they encourage group members to evaluate their own progress and development.*

While differences in leadership qualities and practices are discussed in all of the cited sources, it appears that there is some agreement regarding the finding that effective team leaders essentially focus on purpose, goals, relationships and an unwavering commitment to the results that benefit the organisation as well as each individual. These qualities and focus are similar in the study of transformational leaders who have the ability to influence team performance through these and other key factors including building-empowered team environments and facilitating functional team conflict (Dionne, Yammamarino, Atwater, & Spangler, 2004). It seems that building effective teams is a balancing act—a balance between rules and creativity, one's own needs and the needs of the group, and between direction from the top and decision-making at the front-lines.

## *Conflict and Communication*

Conflict is an essential part of becoming a high performance team (Katzenbach & Smith, 1993). There are many relational contexts for conflict including individual (i.e. role conflict), interpersonal, within and between groups, and organisational departments. Other aspects of conflict are equally diverse and include culture, values, goals, structures, tasks and functions, process, authority and leadership processes, environmental pressures, demographics and individual personalities (Rainey, 1991: 196; Jehn & Chatman, 2000).

In looking at stages of conflict, Rainey (1991) mentions several phases: *latent conflict* where the conditions for conflict are set; *perceived conflict* where people begin to sense it; *felt conflict* where people begin to feel its presence; *manifest conflict* which includes out and out warfare; and *conflict aftermath* where some solutions and alternatives begin to play out. When looking at these stages of conflict, Rainey discussed several ways people respond. These include avoidance, ignoring or withdrawing; accommodation, where cooperation and concessions are made; compromise, involving an equal exchange of concessions; competing by trying to outdo the other party; and collaboration, which involves trying to meet the needs of each side. While conflict can be very damaging to a group's performance and must be carefully balanced, in regards to decision-making in organisations, "research shows that well managed conflict, especially task conflict often improves the decision making process (Rainey, 1991: 195).

In a study specifically researching the process of conflict, Jehn and Mannix (2001) found certain conflict patterns with high performing teams to be most prevalent. In a longitudinal study, teams that performed best had experienced certain patterns of conflict. These patterns included low but increasing levels of task conflict (Jehn & Chatman, 2000) as a project progressed; low but rising levels of relationship conflict as teams got close to deadlines; and increased levels of task conflict at the midpoint of projects. According to Jehn and Mannix (2001), the members with an ideal conflict profile had pre-established value systems, high levels of trust and respect, and open discussion norms around conflict during the middle stages of their interaction, thus ushering in new perspectives and paradigms which served the overall goals of the team. Additionally, conflict in general was lower for high performing groups and higher for low performing groups, thus supporting the idea that generalised process, task, and relationship conflict possibly came from the crisis the low performing teams were in at the deadline of a project.

While most high performing teams experience some communication-based conflict, varying perceptions about the nature and degree of that conflict is important to address (Jehn & Chatman, 2000). Rainey (1991) explained that varying types of communication strategies have been studied (e.g. circle patterns, chain patterns, wheel patterns). Different communication strategies appear to yield different results (including satisfaction) amongst those who participated, suggesting that the best forms of communication are dependent upon the work group and their goals and objectives. Open communication in high performing teams means a focus on coaching instead of directing (Regan, 1991). The value of coaching has emerged over the past several years as a process for helping individuals think for themselves. Coaching is seen as a facilitative process where team leaders or members help facilitate the process of self and group discovery. By utilising

coaching more frequently, individuals are likely to become less dependent and more able to take greater levels of responsibility.

Communication problems or distortions are also important to understand. Gordon (1990) depicted four types of miscommunication in general: lack of feedback; noise in communication such that the original message is distorted; misuse of language such that words are used, which inflame, distort or otherwise makes vague the information being communicated; and listening deficiencies. Within public bureaucracies and/or governmental organizations, Gortner, Mahler and Nicholson (1987) added others: distorted perceptions, often caused by pre-conceived ideas or from striving to save self-esteem; erroneous translations; errors of abstraction and differentiation, where individuals misinterpret the information or when information is selectively understood or distorted; lack of congruence or an inconsistency between different parts of the message; a distrusted source; jargon, which promotes communication difficulties because of highly, specialized language; and manipulating and withholding important information (Rainey, 1991: 194). As summarised by Weiss (2002: 4), "When you keep channels of communication open, you provide motivation, maintain interest and promote cooperation."

While there are any number of communication problems and solutions, a key to team performance is maintaining open lines of communication, even verbal self-guidance strategies to enhance team efficacy and performance (Brown, 2003). It should also be noted that communication, conflict, and other interpersonal components of high performing teams rest upon the make-up of any group. Current research (see Reagans, Zucherman, & McEvily, 2004) suggests that the understanding of social networks, through network density (homophily) and network range (a broad number of connections), affect the nature of team performance independently of one another, and should be considered when addressing interpersonal dynamics of high performance teams.

### *Power and Empowerment*

The issue of power is highly dependent upon the type of high performance team in question. While most organisations now support egalitarian practices and shared decision-making that leads to greater buy-in, satisfaction and, ultimately, performance, there remain organisations that have depended upon complete hierarchical control (i.e. traditional military teams). While many support the hierarchical integrity of military command structures, there may still be room to empower even those in uniform. Patton (Regan, 1999) is reported to have made the observations that one should: "Never tell your soldiers how to do a job. Tell them the results you want, and they will surprise you with their ingenuity". In corporate and many other settings, however, empowered work teams are seen as a key to high performance. Empowering teams has proved useful for many organisations as they increase ownership, provide an opportunity for developing new skills, increase the overall interest in projects and otherwise facilitate decision-making where the work is being done. In a review of his model for generating sustained workforce performance, Pfeffer (1998) supported several practices, among them the implementation of self-managed teams and the decentralisation or decision-making, such

that a larger part of the organisation can accept more accountability and a greater appreciation for how one's work affects the work of others. To integrate the possible continuum above, Peters and Waterman (1982) discussed the principle of parallel 'loose-tight' properties, such that specific boundaries are constructed with enough room in between the boundaries for individuals to make empowered choices.

In looking at what constitutes a highly empowered work team, Kirkman and Rosen (2000) described four key elements: a sense of potency which translates into a sense of team efficacy, the derivative of which are closely knit relationships and supportive behaviours; a sense of meaningfulness that connects the individuals to the mission of the group which includes an intrinsic caring about the tasks as "Teams high on the meaningfulness dimension of empowerment, individually and collectively, experience ordinary tasks in a extra-ordinary way" (Kirkman & Rosen, 2000: 50); highly empowered teams experience a sense of autonomy, discretion, and control; and empowered teams gain a sense of the impact of their mission (seeing the end results of their work). Feedback from both internal and external clients provides the data necessary to judge impact (for a comprehensive list of team empowerment levers see Kirkman and Rosen, 2000: 56). When looking at leader behaviours that are associated with high levels of team empowerment, Kirkham & Rosen (2000) mentioned generating high team expectations, setting an environment where team members set their own goals and control their work, staying out of the way of team members problems, displaying trust in the abilities of the team members and holding teams responsible for their actions.

### *Norms and Standards*

Like rules that govern group behaviour, norms can be helpful in assisting team development and performance. For example, Jehn and Mannix (2001) proposed that high performance teams build 'open discussion' norms in order to promote task conflict; a type of conflict associated with high performance teams. Other norms of high performance teams include high levels of respect among members and a cohesive and supportive team environment. Any number of norms may exist for a given team, but high performing teams use norms in general to help govern behaviour. In addition to having team norms, teams also benefit from organising their team standards. As asserted by Larson and LaFasto (1989: 95), "openly articulated or haphazardly applied, standards define those relevant and very intricate expectations that eventually determine the level of performance a team deems acceptable". Standards change the nature of performance by setting the bar at a new level; a level that is clearly defined. Such was the case when Roger Bannister broke the four minute mile - a seemingly impossible goal at the time - only to be met and exceeded by several other runners within just a few months.

Clear performance standards are essential to high performing teams. Such standards provide a system of accountability which also feeds into the performance ethic (Katzenbach & Smith, 1993); an ethic that support results for customers, employees and shareholders and recognises that each are of critical importance and must be balanced with great care and consideration. Both internal and external pressures contribute to performance standards. These pressures include the individual's performance expectations, team pressure to perform, team leader pressure, the consequences of success

or failure and other external pressures (e.g. the larger organisation, the crowd) that compel one to excel (Larson & LaFasto, 1989). According to Larson and LaFasto (1989: 100), "people with high standards are those people who do ordinary things in an extraordinary way". When helping people reach the extraordinary, it is important to remember that setting standards must be a flexible process. Larson and LaFasto also provided three common features of developing standards of excellence: setting standards that include a variety of variables, variables that include individual commitment, motivation, self-esteem and performance; mutual accountability; and a dedication to reviewing and reworking standards to keep them fresh and valuable for the team.

### ***Recommendations***

The results of this analysis suggest recommendations for practitioners. Many organisational leaders do not put resources toward efforts (often training- and education-related) to develop high performance teams. Many assign individuals to participate in teams and expect high performance. This, of course, is a wishful course of action. The literature supports the premise that well-functioning teams can out-perform individuals or other groups. Leaders, managers and human resource development professionals need to be educated about the relationship between productivity/performance (the bottom line) and high performing team efforts (including the workplace, psychological and behavioural correlates that influence them). Overall, interventions based around these relationships should be considered. We also recommend that members of current teams (management or non-management) review this and other articles summarising high performance factors so that they can understand team dynamics and how they can help improve performance.

All said, organisational and military leaders (Salas, Bowers & Cannon-Bowers, 1995) who offer resources (e.g., time, money, and educational opportunities) are likely to see organisational benefits derived from more successful team structures. As always, initiatives that have direct or indirect effects on the productivity of our human resources (employees) should assist in promoting organisational competitiveness throughout the marketplace.

### **Conclusions and Implications**

Understanding the various components of high performing teams (definition, purpose, and goals; talent, skills, and ethics; incentives, motivation, and efficacy; leadership; conflict and communication; power and empowerment; and norms and standards) can be helpful in creating and developing these types of teams in organisations today. Teams have been found to offer not only increased organisational performance, but also an increase in team member satisfaction (Hoerr & Pollock, 1986), helping members to become more valuable in the process (Katzenbach & Smith, 1993). Groups have an advantage over individuals because of the availability of new ideas, talent and viewpoints. Group decision-making also promotes more understanding, acceptance and a clearer perspective of why something is taking place (Rainey, 1991). Effective teams learn to think for themselves (Regan, 1999) and, therefore, move decision-making to the front lines where it is often needed. While taking more time at first, its value improves efficiency over time. It is through this process of collective excellence that individuals become more

than the 'sum of their parts' and learn to work together towards goals and objectives that provide tremendous meaning, not only for the organisations who house them, but for the individuals that sacrifice for them. Taken collectively, Brown (2003) comments that advancing team performance means systematically developing and assessing new training methods to support such changes in team effectiveness.

This study offers contributions to the human resource development literature. First, human resource development and organisation development interventions often focus on team-building relationships and nearly always centre on group and team work during the design and development phases. Literature assisting practitioners in acquiring a deeper understanding of high performance teams can assist them in team work of any type. Second, it supports the premise that developing and facilitating high performing teams is a complex phenomenon and influential factors need to continue to be explored for progress in both research and practice. Certainly the number of team factors contributing to team success are many and go beyond the focus of this paper (See Richardson & Denton, 2005) However, through multiple reviews of the literature, one continues to draw important connections and theoretical relationships between a dozen or so key components. Finally, practitioners can utilise this information to assist them in assessing and evaluating new and existing programs or initiatives, and developing new strategies to improve future team performance.

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# The Barriers and Enablers to the Transition from Personnel Administration to Strategic Human Resource Management Practices: A Study of Large Indonesian Companies

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## Abstract

*The management of human resources is one of the key enablers of organisational performance. The traditional literature in this field; however, assumes that human resources and organisational practice or behaviour follows a rational, logical plan. This paper challenges this approach to understanding human resource theory. As an added interest, the author presents the outcomes of research into human resource practices in seven large Indonesian companies. The outcomes are designed to challenge traditional conceptualisations of human resource practice.*

## Introduction

*There is little question that the human resource management is undergoing profound change as the 20<sup>th</sup> century draws to a close. What are the forces for change? Where are human resource management and the human resource functions going? What are the obstacles to getting there? (Beer, 1997: 49).*

In achieving and maintaining a competitive edge in a rapidly changing world, organisations must face certain challenges. These include managing growth and change in a global marketplace (Lajara, Lillo & Sabater, 2002; Lawler III & Mohrman, 2003; Gubman, 2004); issues which resonate particularly with the Human Resource Management (HRM) literature of the 1990s (Beer, 1997; Ehrlich, 1997; Mohrman & Lawler, 1997; Ulrich, 1997). Concurrent pressures from competitors, shareholders and customers require companies to create services and processes ahead of the competition (Brockbank, 1999); demands which are dependent on its employees. This paper will focus on people as human resources, particularly in relation to the implementation of Strategic Human Resource Management (SHRM).

Lundy (1994), Buyens and De Vos (2001), Boxall and Purcell (2000) and Tracey and Nathan (2002) note that there are increasing pressures on businesses to be competitive and these demands, in turn, require HRM to adopt a strategic significance. Lundy also echoes the views of other HRM theorists, such as Mohrman and Lawler (1997) and

Kamoche (1994), when finding the administrative function represented by personnel management is in decline in favour of SHRM. Boxall and Purcell (2000) and Truss and Gratton (1994) also argue that organisations at all levels, in both public and private sectors are increasingly turning to SHRM techniques to pave the way for change, bringing personnel departments to the forefront of organisational transformation and survival. Further, Truss and Gratton (1994) argue that SHRM provides a link between HRM and strategic goals/objectives. The current status and potential of SHRM suggest this approach to HRM could be explored more deeply. In addition, the opportunity to explore the adoption of SHRM in a number of Indonesian companies was felt to add valuable knowledge to the practice of HR in that country.

## **The Study**

The study was therefore conducted in seven large Indonesian Companies, focussing on the development of theory through a case study approach (Eisenhardt, 1989; Yin, 1994). To ensure anonymity, the study companies are referred as Company A, B, C, and in the case of the Sugar Group Companies, Company D, E, F and G. Company A is a holding company of 26 branch offices and 16 subsidiaries. The business scope of the Company is highly diverse, including agro-industry, pharmacy and medical equipment, trading and property. Company B is a telecommunication company. It produces a wide range of telecommunication equipments and provides telecommunication services. It has two subsidiaries and two branch offices. Company C is an electricity company that has Strategic Business Units (SBUs) and subsidiaries in all over Indonesia. The Sugar Group Companies are comprised of three sugarcane companies and one ethanol company, which operate in more specialised markets and are treated as a single organisation in this review.

## **Approach**

A constructivist paradigm was adopted as the background approach to the study. As Denzin and Lincoln (1994: 14-15) have noted, the:

*...constructivist paradigm assumes a relativist ontology (there are multiple realities), a subjectivist epistemology (knower and subject create understandings), and a naturalistic (in the natural world) set of methodological procedure. Findings are usually presented in term of the criteria of grounded theory.*

In the present study such an approach provides a number of alternative possibilities for the researcher to adopt. There is an emergence of ideas and understanding and a grounded theory outcome is possible.

*Grounded Theory (Glaser & Strauss 1967)... It can use quantitative or qualitative data but concepts and theories that emerge are not arrived at by statistical methods... For example, an examination of timesheets could show a severe level of lateness in a department. This quantitative data need to be interpreted by the people involved... The antithesis of grounded theory is any approach that forces data to meet predetermined concepts or theoretical models (Whiteley, 2000: 9).*

This study used the generative aspects of grounded theory (Glaser & Strauss, 1967; Partington, ???) both purposive theoretical sampling and content analysis.

### ***Research Question***

*What are the barriers and enablers influencing the transition from personnel administration (PA) to SHRM in large Indonesian companies?*

### ***Research Objectives***

- *To investigate the activities related to the PA/HRM as reported in the company settings.*
- *To explore barriers and enablers those influence the transition from PA to SHRM in large Indonesian companies.*

### ***Research Design***

The research design had three tiers. The first tier was a literature review followed by the formation of research questions. The preliminary fieldwork was then conducted and the results were analysed to confirm the initial strength of the research question. The second tier was data collection. In this stage both primary data (interviews) and secondary data (HR documents) were collected. The interview data were transcribed and analysed, using content analysis (Holsti, 1969). Analysis was also conducted on the HR documents following Altheide (1996). These led to the third tier, which were findings followed by discussion using theoretical sensitivity.

### ***Data Collection Method***

Data was collected by using semi-structured interviews of managers and HR staff from the organisation involved in the project. The semi-structured interviews (King, 1994) were chosen since these enabled the researcher to ask open-ended specified questions, which allow the researcher more freedom to explore and probe the issue (May, 1997). This format gives respondents the opportunity to tell their stories based on their own experiences, since this study follows the tradition of 'giving voice' to the respondents (Charmaz, 2000). Eighty-eight interviews were conducted and recorded. The interviewees comprised of HR Directors, HR Division Heads, HR Managers, Line Managers, HR Supervisors and HR staff from the subject companies.

### ***Data Analysis***

"Content analysis is the process of identifying, coding, and categorising the primary patterns in the data. This means analysing the content of interviews and observations" (Patton, 1990: 381). Content analysis following Grounded Theory protocols was used. The process is described in Table 1.

### **Table 1: Analysis Process**

Utterance to codes to categories Categories to concepts Constant comparison Constant questioning
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Source: Model adopted from Whiteley (2004: 38).

The data were coded using an open-coding process consistent with a grounded theory approach (Strauss & Corbin, 1990). The coding was conducted with no predetermined codes and this allowed the preliminary codes to emerge from the data (Glaser, 1992). The codes were then reconsidered so that the categories were compared and integrated in a way that reflects theoretical sensitivity in developing the concepts. Thus, the coding process goes through four steps: code, categorise, apply constant comparison and constant questioning, and conceptualise the idea. Following these processes, and consistent with the literature, three clear super categories are identified: PA, HRM and SHRM practices. The definitions of these terms are presented in Table 2.

**Table 2: Definition of PA, HRM, SHRM, and Transition Period**

PA	HRM	SHRM	TRANSITION PERIOD
In this study, Personnel Administration is defined as the administered basic activities such as recruitment, record keeping (attendance, leave, and sickness records), training in company rules and salary computation (Whiteley, Cheung & Zhang, 2000). It reflects short-term view and task oriented.	In this study, Human Resource Management is defined as an integration of human resources into strategic management and the emphasis is on a full and positive utilisation of these resources (Guest 1987). It reflects medium-term view, job related and functional focus.	For the purpose of this study, Strategic Human Resources Management means human resources that are fully integrated with the strategy and the strategic needs of the firm, coheres both across policy areas and across hierarchies (Guest 1989). It reflects long-term view, integrative and developmental focus.	A transitional period that leads from Personnel Administration to Human Resource Management, and from Human Resource Management to Strategic Human Resource Management (Whiteley, Cheung & Zhang, 2000).

Source: Original table.

**Findings and Discussion**

Appendix A presents the summary of the characteristics of elements in Company A, B, C, and Sugar Group Companies. It shows that PA has two characteristics. The first includes Foundational Administration Activities. These activities are static, no expectation of transition, and mainly deal with basic administration functions. They are performed in the Companies as supporting functions (see mark X in Appendix A), such as: Compensation System Administration, Training Administration, Basic Use of IT & Data, and Other Personnel Procedures and Roles. These activities have a short-term view, are task oriented and reactive.

The second characteristic includes PA elements that in Companies and the literature have progressed toward HRM. In other words, these elements are in a transition period and they are moving from PA towards HRM (see mark XT in Appendix A). Examples of these elements are Grading System Administration and HR Division History (in Company B) – meaning the development of the HR Division's functions in Company B.

Table 3 shows that HRM also has two characteristics. The first includes Foundational HRM Activities. These activities are static and there is no expectation of transition (see mark X in Table 3), such as: Recruitment Methods and Selection Process, Orientation and Probation Design, Compensation System, and Industrial Relations. These activities have a medium-term view, are job related and have a functional focus.

The second includes HRM activities that in companies and the literature have progressed toward SHRM. In other words, these activities are in a transition period and they are moving from HRM toward SHRM (see mark XT in Appendix A). Examples of these activities are Organisation Design, Competency Development, Job Analysis and Job Description Development, Human Resource Planning, Performance Management, Training Provision, and Career Progression.

Appendix A demonstrates the major components of SHRM. Examples of these activities are Organisation Development: Future Planning, Competency Assessment, System Development, Preparation for SHRM Application, Recruitment Strategy, Strategic Training and Development, Strategic Performance Management, Strategic Compensation Decision, Preparing Future Leaders, Strategic Communication, and Motivation. These activities have long-term view, integrated and developmental focus.

There is a sense of movement on the elements marked with XT. This came as activities were moving across boundaries, for instance PA activities began to transform into HRM, and HRM activities began to transform into SHRM. These are called as the concept of 'transition'. Furthermore, the data show a combination of Linear and Non-Linear relationships but the sense is one of adaptation. The linear relationship is found in the PA domain while the non-linear relationship, which is characterised by complex adaptive system (CAS), is found in the HRM and SHRM domains. The following is the detailed description of the elements and their movement toward transition, the linear model, and the modified version of complex adaptive system.

### ***The Elements Movement Towards Transition***

The elements that are in a transition period, from PA toward HRM, and from HRM toward SHRM are identified as shown in Table 4.

#### **1. The Element in Transition from PA toward HRM**

##### Grading System Administration

The Grading System Administration element is categorised as PA practice since it classifies the employees into a hierarchical system. But it is not straightforward PA since the application is more complex than that. The grading reflects a status symbol which is embedded in each level, and it is used to determine the salary, bonus, facilities, benefits, allowances, training and development, and career of the employees. For example, lower level employees get different bonus percentage (of the salary) from higher-level employees. They can not get the same facilities, benefits and allowances as what the higher level of employees get. Moreover, lower level employees can not participate in training and development which are only available for higher level employees, and they also can not be promoted to certain level of jobs. The reason is that the qualifications of higher

level and lower levels employees are different. Therefore, the Grading System Administration is categorised as an element which is in transition from PA toward HRM.

## 2. The Elements in Transition from HRM toward SHRM

The elements in Transition from HRM toward SHRM can be seen in Table 4. This paper only describes the transition of Organisation Design and Human Resource Planning elements in Company A.

**Table 4. Elements Movement Towards Transitions in Company A, B, C, and Sugar Group Companies**

<i>Super Category</i>	<i>COMPANY</i>			
	<i>A</i>	<i>B</i>	<i>C</i>	<i>SG</i>
<i>PA in transition toward HRM</i>	Grading System Administration	Grading System Administration	Grading System Administration	Grading System Administration
		HR Division History		
<i>HRM in transition toward SHRM</i>	Organisation Design	Competency Development	Job Analysis and Job Description Development	
	Human Resource Planning	Human Resource Planning	Human Resource Planning	
	Performance Management	Performance Management	Performance Management	Performance Management
	Training Provision		Training Provision	
	Career Progression		Career Progression	

Source: Original table.

### Organisation Design and Human Resource Planning

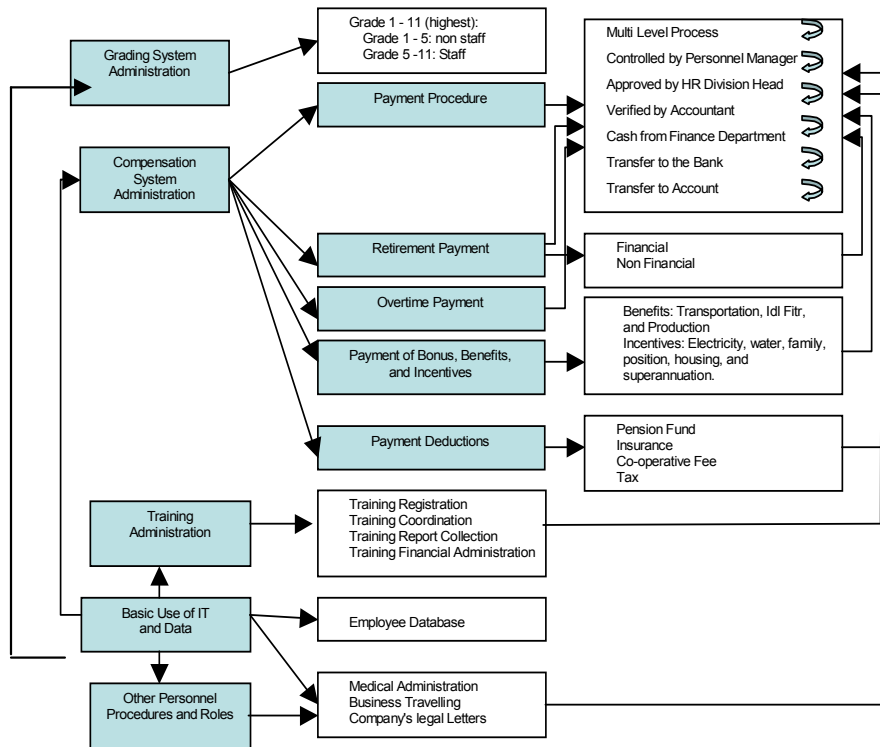
Organisation Design is categorised as HRM practice because the Company tries to manage the organisation more comprehensively by conducting position analyses to adjust the organisation structure, formulating human resource needs and developing job descriptions. Since it begins with the structure rather than the Company's strategy directions, it is categorised as HRM.

The Human Resource Planning element is also categorised as HRM practice since it is based on job analysis and focused on the quantity and quality of the human resources which are needed by the Company. However, the Organisation Design and Human Resource Planning activities are conducted to prepare the implementation of competency based human resources management and to support the Organisation Development: Future Planning. The Organisation Development: Future Planning itself is categorised as SHRM practice as it will change the role of the holding company from operational to investment holding. Therefore, Organisation Design and Human Resource Planning elements are categorised as the elements which are in the transition from HRM toward SHRM (see Figures 2 and 3).

### *A Linear Model in the PA Domain*

Lewin and Regine (2003) discuss the kinds of relationships in the core of management practice, which are linear and non-linear. They explain that in a linear world, things may exist independently of each other, and when they interact, they do so in simple, predictable ways. The data of the PA functional activities in all Companies follow linear relationships. Figure 1 presents a linear model in the PA domain in Company A.

**FIGURE 1. A Linear Model of PA Practice in Company A**



Source: Original figure.

Figure 1 shows that the Compensation System Administration element, which includes the retirement payment, overtime payment, payment of bonus, benefits, and incentives, and payment deductions, follows a payment procedure that involves a multi level process. The process requires that each payment request must be checked by the Personnel Manager to get approval from the HR Division Head before it goes to the Finance Department. Verification is also done by the Accountant before it is paid by the Finance Department. The payment is done by transferring the money to the respective account. The payment that occurs in the other elements: training, medical and business travelling follow the same payment process.

Since all elements utilise the IT and Data in conducting their activities, the IT and Data element is connected to other elements such as to grading system administration, compensation system administration, training administration and other personnel procedures and roles elements. Therefore, it can be said that PA practice in Company A follows a linear model since the links among the elements in PA domain show linearity. It



follows Lewin and Regine's (2003) concept of a linear relationship where the elements in PA domain work independently of each other, and they interact in simple, predictable ways.

### ***The Modified Version of Complex Adaptive System***

The complex adaptive system is described by Stacey (1996) as:

*At its simplest, an adaptive non linear feedback system is a network consisting of a large number of agents, each of whose behaviour is determined by a shared schema consisting of a few rules that are fixed overtime and that apply to all agents without exception....even the simplest adaptive system has some purpose, namely, to perform some task. It follows that....agents in all adaptive systems adjust their behaviour in light of its consequences for their purpose (Stacey 1996: 72).*

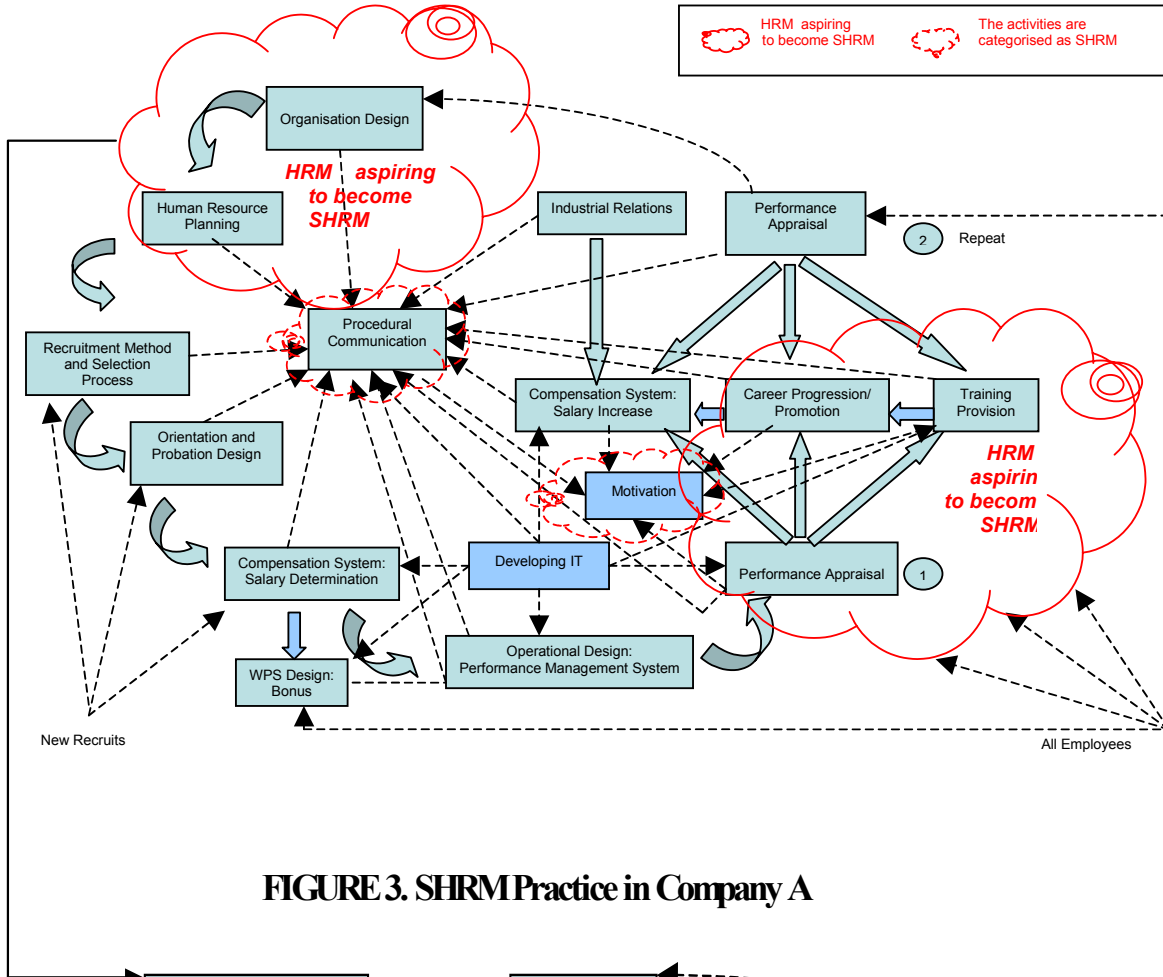
Based on Stacey's concept of the complex adaptive system, the HRM and SHRM practices conducted in the case Companies can be considered as a modified version of a complex adaptive system. The "agents" in Stacey's concept can be interpreted as the elements in the HRM and SHRM domains. Stacey's concept of "schema" is interpreted into the HRM strategy and policy. What Stacey refers to as "rules" is interpreted as the HR rules and procedures. Stacey says that "the rules are fixed overtime and that apply to all agents without exception". In the HRM practice some of the HR rules and procedures are revised periodically and those rules and procedures are applied to all elements in the HRM system. The complex adaptive system has some purpose "to perform some tasks", so do the HRM and SHRM practices since they are conducted to achieve its purposes, aims, and objectives.

Stacey also mentions about "an adaptive non-linear feedback system". A deep look at Figure 2 shows an interconnectedness that takes linear elements and relates them across a spectrum of activities in an integrative way. The spectrum ranges from HRM to SHRM. Building the integrative connectivity, a sense of adaptation grew.

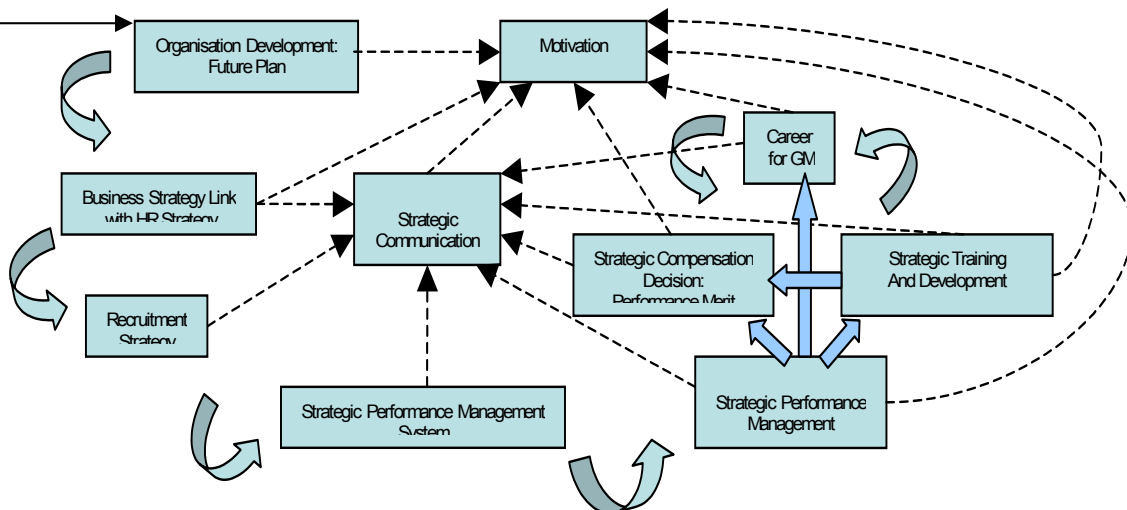
For instance Figure 2 shows that Procedural Communication needed to adapt to the different discourses and protocols required by, for example, Performance Appraisal, Training, Compensation and other elements. The concept of Procedural Communication shapes and in turn was shaped by the procedures and discourses of the various functions. This is resonant with CAS in the sense that elements in modified version of complex adaptive systems adjust their behaviour in light of its consequences for their purpose.

A deep look at Figure 3 also shows interconnectedness that takes linear elements and relates them across a spectrum of activities in an integrative way. Building the integrative connectivity, a sense of adaptation grew. For instance, Figure 3 shows that Strategic Communication needed to adapt to the different discourses and protocols required by, for example, Organisation Development: Future Plan, Strategic Performance Management, Strategic Training and Development, Strategic Compensation Decision and other elements. The concept of Strategic Communication shapes and in turn was shaped by the

**FIGURE 2. HRM Practice in Company A**



**FIGURE 3. SHRM Practice in Company A**



Source: Original figures.

procedures and discourses of the various functions. This is resonant with CAS in the sense that elements in modified version of complex adaptive systems adjust their behaviour in light of its consequences for their purpose.

### **Enablers and Barriers to the Transition**

The data show that the Sugar Group Companies apply mostly PA and HRM practices and in the near future they do not have any intention to apply SHRM practices. Meanwhile, Companies A, B, and C are in a transition period to apply SHRM practices.

Company A will change its roles from "operational holding" to "investment holding" in near future. To do that the Company developed a five-year plan and one of them is to apply competency-based HRM. Meanwhile, Company B starts the application of SHRM practices by developing and applying competency-based HRM systems and Personnel Information System, whereas Company C conducted reorganisation in mid 2003 and restructured the HR Division to support the application of SHRM practices.

Besides these, in all companies the enabler of the transition from PA to SHRM practices is high commitment of the Directors, HR Managers, Line Managers, and HR staff to conduct the transition process. But each Company has some barriers too, such as data availability, not on line connection, unqualified employees, readiness for the changes, and unclear Company's direction. Whilst the Companies identified the barriers, in most cases they had also developed a range of solutions or plans to address these concerns from HRM and SHRM perspectives.

### **Conclusion**

The research's findings on HR practices in seven large Indonesian companies in this 'developing' economy, might have expected to find them to be static, simplistic, and linear. But the reality is clearly that there are movements and transitions occurring both within and external to the companies. The linear approach is evident in PA practices but not HRM and SHRM practices. Within the literature traditional HR theory usually proposes a traditional linear approach to company practices. Many theories take the linear approach, which is predictable, stable, and controlled. This is not supported by the findings in this study. Instead the case study companies provide strong evidence of being more like complex adaptive systems (CAS) with multiple transitions. Organisations that exhibit CAS are characterised by being flexible, innovative, creative, adaptable, and able to dismantle the system if necessary. This study shows that such organisations are not confined to the 'more developed' world. The results indicate a need for further exploration using chaos and dissipative structures theories which will enable us to reflect more deeply on organisational practices within their reality of a turbulent environment.

### **Appendix A: Summary of the Characteristics of Elements in Company A, B, C, and Sugar Group Companies**

<i>Elements</i>	<i>COMPANY</i>			
	<i>A</i>	<i>B</i>	<i>C</i>	<i>SG</i>
<i>PA</i>				
1. Grading System Administration	XT	XT	XT	XT

2. Compensation System Administration:	X	X	X	X
- Payment Procedure	X	X	X	X
- Retirement Payment	X	X	X	X
- Overtime Payment	X	0	0	X
- Payment Deductions	X	X	X	X
- Payment of Bonus, Benefits, and Incentives	X	X	X	X
- Payment of Insurance, Pension, Tax	X	X	X	X
- Financial Report	0	0	X	X
3. Training Administration	X	X	X	X
- In house Training	X	X	X	X
4. Basic Use of IT and Data	X	X	X	X
5. Other Personnel Procedures and Roles	X	X	X	X
- Medical Administration	X	X	X	X
- Attendance & Discipline	X	X	X	X
- Accident & Insurance	0	0	0	X
- Leave administration	0	X	X	X
6. HR Division History	0	XT	0	0
7. Human Resource Planning	0	0	0	X
8. Part Time Employee Administration	0	0	0	X
- Daily Workers Administration	0	0	0	X
- Seasonal Workers Administration	0	0	0	X
<b>HRM</b>				
1. Organisation Design	XT	0	0	0
2. Competency Development	0	XT	0	0
3. Job Analysis and Job Description Development	0	0	XT	0
4. Personnel Roles and Strategy in the Companies' Strategy	0	0	0	X
5. Admin Consistency	0	0	0	X
6. Human Resource Planning	XT	XT	XT	0
7. Recruitment Method and Selection process	X	X	X	X
8. Orientation and Probation Design	X	0	0	X
9. On the Job Training	X	0	X	X
10. Compensation System:				
- Salary Determination, Increase Review and Comparison	X	X	X	X
- WPS design: Benefit and Bonus	X	X	X	X
11. Performance Management	XT	XT	XT	XT
13. Training Provision	XT	X	XT	X
14. Career Progression	XT	X	XT	X
15. Procedural Communication	X	X	X	X
16. Motivation	X	X	X	X
17. Developing IT	X	X	0	0
18. HR Information System	0	0	X	0
19. Industrial Relations	X	X	X	X
<b>SHRM</b>				
1. Organisation Development: Future Planning	X	0	X	0
2. Competency Assessment	X	X	X	0
3. Business Strategy Link with HR strategy	X	0	0	0
4. System Development	0	X	X	0
5. Preparation for SHRM Application	X	X	X	0
6. Organisation Culture and HR Policy Analysis	0	X	X	0
7. Recruitment Strategy	X	X	X	X
8. Strategic Training and Development	X	0	X	0
- Formal Education	0	X	X	0
9. Strategic Performance Management	X	X	X	X
10. Strategic Compensation Decision:	X	X	X	X
- Performance Merit	X	0	0	0
- Performance Based Benefit	0	X	0	0
- Reward, Bonus, Performance Benefit, Award	0	0	X	0
- Bonus, Facilities, Benefits, Allowances	0	0	0	X
11. Preparing Future Leaders:	X	0	X	0
- Career for GM	X	0	0	0
- Branch Manager	0	0	X	0
12. Personnel Information System	0	X	0	0
- HR and Library Websites	0	X	0	0

13. Strategic Communication	X	X	0	0
14. Motivation	X	0	0	X

Source: Original table. Notes: 0= No Activity; X = Activity; XT= Transition.

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## **About the Author**

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# Cost Estimation Models for Software Development: Art or Science?

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## Abstract

*Traditional approaches to procurement tend to assume that defined processes and toolsets can be applied in a logical, rational environment to produce predictable outcomes. Reality; however, is seemingly quite different. This paper reports on some current research, which is now significantly advanced, that identifies the primary challenges within the complex social environment of buyers and suppliers. The authors, researching within public and private sector organisations, present their conceptual model for undertaking this research and, in the process pose the question: Is software cost estimation an art or science?*

## Introduction

The notion of a 'wicked problem' was first considered in the context of social planning and public policy by Rittel & Webber (1973). The notion was further developed by DeGrace and Stahl (1990) in relation to software development. The outcome is a perception of particular problems as unique and extraordinarily difficult to define. 'Wicked problems' are seen to have no conventional, rational basis, they are free of all boundaries, cannot be readily defined, occur independently of the resources available for their resolution and can be found in a number of procurement-related situations.

The notion of the 'wicked problem' encompasses a number of significant features that represent the reverse of the 'bounded rationality' model of decision-making developed by Simon (1957); an approach that has shaped managerial decision-making for



almost two generations. It also challenges the notion of 'systems thinking' which has typified attempts over the past two decades to deal with highly complex management and also action research, developed by Checkland (1999) to help analyse complex organisational problems.

In the usual 'bounded' approach to complex problems, the issues can be defined through the creation of a range of assumptions, and the parameters of potential solutions are seen to emerge from the deconstruction of the supposed problem. 'Bounded rationality', 'systems thinking' and 'action research'; however, are all unable to address the essence of the 'wicked problem' which represents highly complex, intractable, infinitely unresolvable theoretical and practical problems. Software development typically exemplifies this level of complexity. Similarly, advanced technical systems such as those developed in the Defense arena, demonstrate this type of issue, described by Widdensbaum (1998: 76) as "products that are not yet designed or for which production experience is lacking and at prices for which there is little precedent".

It is not as if these types of problems are new, or limited to the provision of services. During World War II, General 'Hap' Arnold is reported to have remarked (O'Leary, 2002: 41):

*We cannot have more A-26s [a Douglas built light bomber] although we have plenty of fuselages, but not enough wings. We could have more wings if we had more spars, but we cannot build more spars due to difficult output of machinery. We might be able to build more wings if we were able to get more machinery, but whether we will be able to get more machinery I was unable to determine, and nobody could give me the answer. One thing is certain: I want the A-26 for use in this war and not for the next.*

Technical complexity has long been recognised as one of the contributors to software development problems, along with other such diverse causes as: problems relating to user involvement, deficiencies in project management and lack of executive support (Lederer & Prasad, 1995; The Standish Group, 2003). The opportunities; however, to research the breadth of this problem appear, from the literature, to have been limited.

## **The Research Challenge**

Traditional approaches to software development procurement have seemingly assumed that linear processes and tools can be applied in a logical, rational way to arrive at a predictable outcome. This paper identifies the primary difficulties within the complex social environment in which software development procurement is conducted. Conklin (2005: 1) has called the boundaries of this dilemma the "forces of fragmentation" and comprises of the "forces that doom projects and make collaboration difficult or impossible" and includes 'wicked problems', social complexity and technical complexity as contributors to this fragmentation.

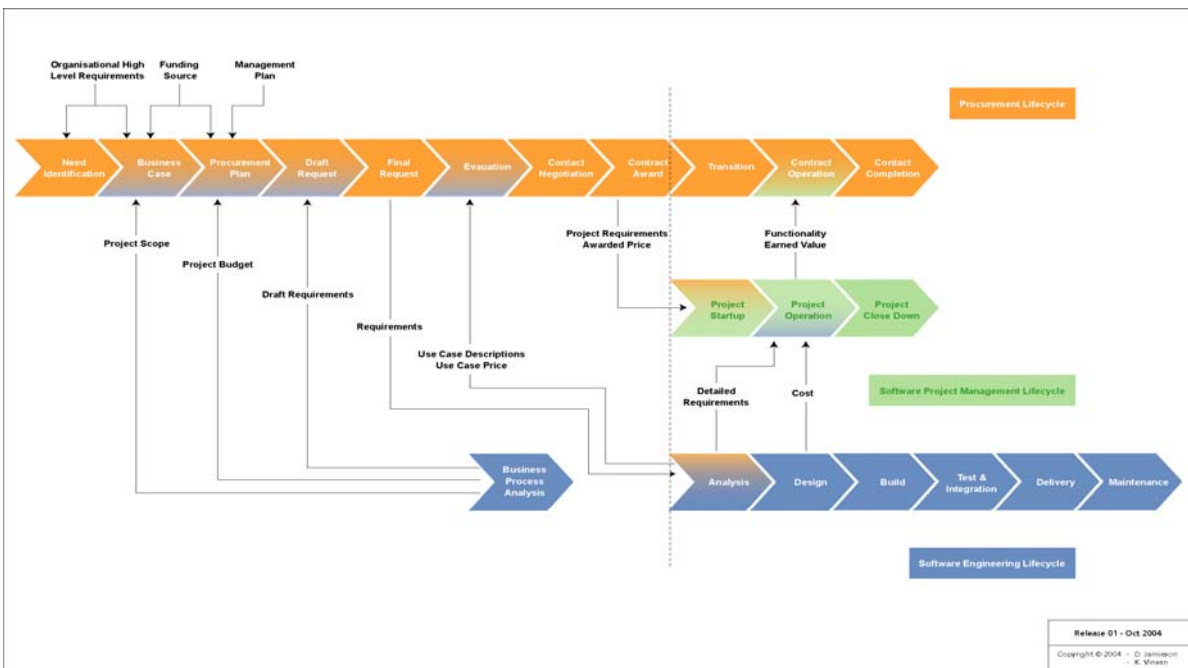
Conklin has suggested that the antidote to a 'wicked problem' (such as software development) and social complexity is "shared understanding and shared commitment"

(2005: 1). This approach, though, may be seen to be simplistic and unrealistic. While commitment and understanding may allow a 'wicked problem' to be recognised as such, even within the software development industry, the use of more effective estimation tools and processes, beyond the defragmentation of a project, remains a challenge.

Conklin also notes that the bigger the project "the more intense the fragmenting forces [and], the more likely the projects are to fail" (2005: 3). This view is supported by the recommendations of The Standish Group (2003) that software development projects should be reduced in size, though this possibility remains distant especially when corporate trends such as acquisitions and mergers and public sector reforms tend towards the creation of larger organisations and systems.

The research commenced with the development of a model reflecting the stages in the acquisition of bespoke software. The initial software costing framework applied a linear procurement model to the notion of software design; an approach designed to harmonise the procurement and software development processes. A complex linear procurement model was developed which recognized the interaction and impact of software cost estimation, procurement, project management and software development processes during the procurement lifecycle of complex software systems (Figure 1).

**Figure 1: "Linear Model"**



Source: Original figure.

On deeper investigation, it became apparent that this initial model, although significantly broader in scope than existing approaches, incorporated an inadequate number of evaluation elements to enable the researchers to more deeply understand the contracting process in a situation of high uncertainty. Nevertheless, the model was

extended to encompass iterative software procurement models, including Evolutionary Acquisition, and to propose an iterative procurement model to support the iterative software development model (Jamieson, Vinsen, & Callender, 2005).

These enhancements, while attractive, only partially address the deeper issues that characterise the complex confluence of two or more organisations when seeking to successfully create and manage a bespoke software development contract. A revised research model, using the buyer and supplier organisations as the primary source of research data, was developed over a period. This represented a more radical departure from former methods of investigation of the problems of the cost estimation for software development. At the risk of making the model unworkable, its parameters were extended to enable the researchers to uncover the wider framework of the buyer-supplier interactions present in a complex procurement situation. Stage 1 of the expanded approach is represented by Figure 2.

The research represents an opportunity to engage in a theory-building process with practical outcomes for the management of partner organisations as well as a wider procurement audience. The researchers will seek to establish new theories and practices associated with software cost estimation, expected to emerge from the range of data sought from partner organisations from the public and private sectors, using a grounded theory approach (Locke, 2001; Partington, 2002). Such an approach is distinguished from the hypothesis testing approach typically found in management research. The benefits of the research can be summarised in terms of the potential to produce an entirely new approach to evaluating the complications experienced in software cost estimation, and an enhanced capacity to identify a range of specific risk factors inherent in complex cost estimation undertakings.

The basic structure is based on the synthesis of grounded theory research developed by Partington (2000, 2002) and Locke (2001). This type of qualitative approach has been described by Hoepfl (1997: 14) as a methodology that "uses a naturalistic approach that seeks to understand phenomena in context-specific settings. Logical positivism, or quantitative research [by comparison], uses experimental methods and quantitative measures to test hypothetical generalizations". In this case, the researchers have expanded the original hypothesis testing approach which sought to establish and test a software costing model drawing data from a range of IT data counting approaches (Vinsen, Jamieson & Callender, 2004).

This paper presents a scoping-out as well as a significant refinement of the research approach. The benefits can be summarised in terms of the potential to produce an entirely new approach to evaluating the complications experienced in software cost estimation and an enhanced capacity to identify a range of specific risk factors inherent in complex cost estimation undertakings.

Against this single, overarching advantage, there are at least four disadvantages associated with the approach now being adopted in this research. First, the amount of time required to develop the research model itself. Second, the level of detailed data to be collected to support the possibility of theory building. Third, the limitations of established

cost estimation tools to evaluate cost data. Fourth, an absence of the seemingly reassuring 'proof' available from a traditional hypothesis testing approach.

From a statistical perspective, it may be possible to demonstrate the 'reliability' of parametric models. The literature review commenced at the outset of this project, especially in regard to software cost estimation, demonstrated a number of problems inherent in this approach. Thus, the current approach to software cost estimation using parametric modelling also reveals a number of shortcomings. First, a modelling approach created in the absence of sophisticated data collection (at the level outlined in this paper) to test the reliability of the model. Second, a use of general statistical methodology in parametric modelling that results in assumptions surrounding model creation being used, instead of relying on data drawn from the entire software development project environment.

Some readers may object to this apparent diminution of parametric modelling. As the quote from the NASA Cost Estimation Handbook (2004, iii) suggests; however, there is some unease with the scientific reliability that should be attached to cost estimation modelling and, instead, presents cost estimation in a more provocative light, namely as both an art and science:

*Cost estimation is part science, part art. There are many well-defined processes within the cost estimation discipline. There is also a subjective element to cost estimating that makes the discipline an art. That is the art form that is learned over time and through experience.*

This ambiguous view may not be appreciated in cultures that extol the value of measurement, a view epitomised by the statement attributed to Lord Kelvin which is etched into the social science research building at Chicago University: "When you cannot measure, your knowledge is meager [sic] and unsatisfactory" (Fiero, 2005).

While a mathematical approach to the analysis of management and economic issues has been long established, it has become the dominant method of measurement and analysis (Partington, 2002; Silverman, 2000) and has the potential to restrain the scope of this research in a number of ways. First, a quantitative approach requires formal and informal activities to be defined in a way that fits mathematical models derived from assumptions about human behaviour, and assigning these assumptions a numerical value (Beacham & Cunningham, 1970). The limitations of this approach in relation to this research can be found in March and Simon (1993: 2), who made the following observations of people in their organisations:

As ... actors deal with each other, seeking cooperative and competitive advantage, they cope with these limitations (the uncertainties and ambiguities of life, ... the limited cognitive and affective capabilities of human actors, ... the complexities of balancing trade-offs across time and space) by calculation, planning and analysis ... they weave supportive cultures, agreements, structures, and beliefs around their activities.

March and Simon (1993: 2) summarised this complexity as a "melange" or "a mixture of incongruous elements" (*Webster's*, 1976: 490). Their argument suggests that mathematical modelling and analysis could only be developed by limiting the scope of

analysis, while reinforcing the scientific nature of its approach. Second, assumptions associated with quantitative research limit the ability to explore disparate parameters and to comment upon their relevance to the focus of the research, without necessarily being able to mathematically measure these parameters. Third, the qualitative approach does not conform to the view that the "cult of efficiency has become a cult of measurement", and helps to demonstrate that social costs are less easily measured than economic costs (White, 1999: 17).

The 'art or science' approach does; however, ensure that the number of assumptions to be made by the researchers in this project will be limited as they are examining multiple factors within the project environment. This method will make the task of eventually defining the parameters of the model and developing an appropriate data set a major challenge. Given the limited success of prior costing approaches, this challenge is considered well worth the risks involved. Indeed, without a detailed investigation of this type it is unlikely that the software costing project will lead to an adequate set of outcomes, beyond the possible validation of probability-based estimation models. This approach aims to address the 'art' element of software cost estimation and replace some or all of the 'art' with more rigorous understanding.

Analysing and synthesising the meaning of the data requires insight: a willingness to explore links between information and to identify both orthodox and unorthodox possibilities. It is an activity that relies upon a consistent search for "techniques and clues" (Porter, 1985: 48) to uncover hidden data about the organisational environment. In addition, this type of research requires a capacity to identify and accept the implications of a wide range of data sources.

At this stage of the research project, the outcomes are uncertain, as is the case of a venture that attempts to break new ground. On the other hand, the model development suggests that a significant refinement of current approaches to software cost estimation may be the project reward. The model outlined in this paper will demand a more comprehensive data set to be uncovered. This will require close alignment of the data drawn from the buyer and supplier organisations representing opposite sides of the same software development contract, if the researchers are to be able to gather complementary information from both sides of the buyer-supplier divide. This information will cover a significant range of soft and hard sources, as will become apparent from the model description which appears below. The extended model will, therefore, require a much more detailed understanding of the organisational issues that impact on the software development process.

While the quantitative approach to software evaluation cannot be ignored, the evidence suggests that a much wider qualitative search for evidence of events that reduce the reliability of software development cost estimation is required to create a comprehensive software costing model.

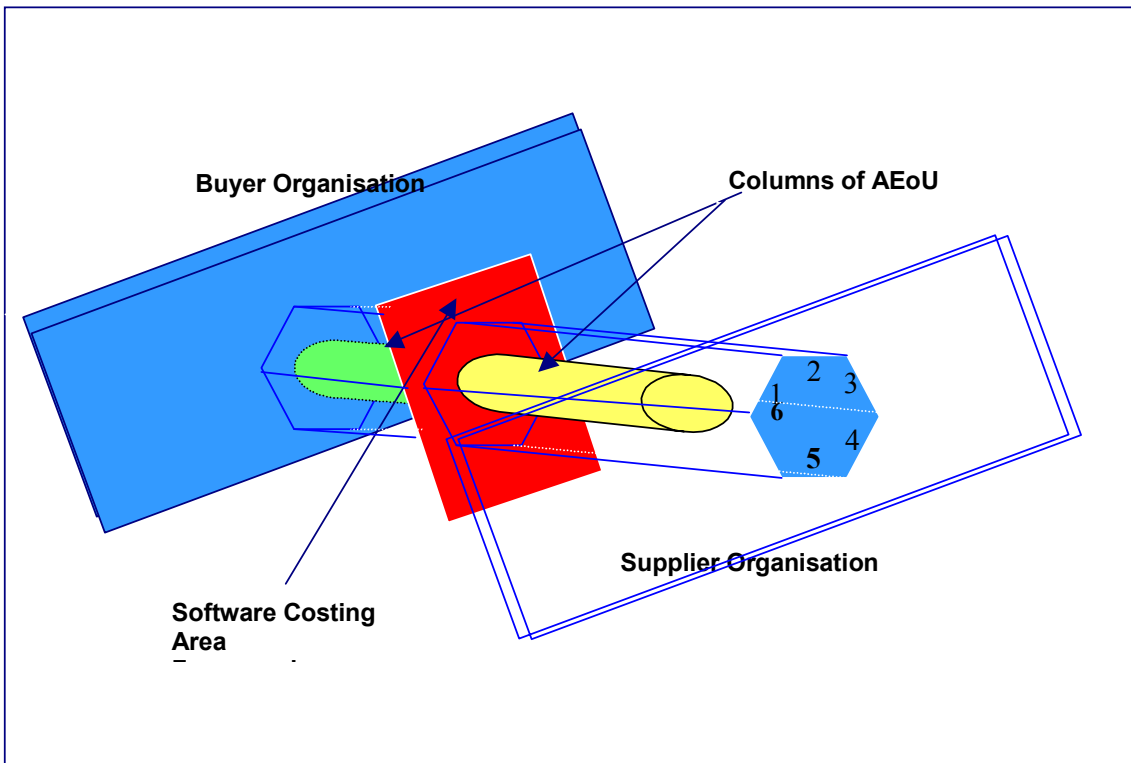
## **Description of the Model**

The research model has undergone a number of significant iterations. It commenced with the "linear" approach illustrated in the initial model (Figure 1), which was widely

debated and elaborated. A review of the research goals and the impediments to their achievement resulted in a different type of model being developed. The two stages of this latest model development are represented by Figure 2 and Figure 3.

The first revised model (Figure 2) was schematically structured to encapsulate the complex and ill-defined boundaries of the buyer and supplier organisations. The buyer-supplier contract arenas were portrayed as two hexagonal objects which themselves interface at the problem area: the point at which software costing and development occurs.

**Figure 2: Second Iteration of the Research Model**



© Callender, G., Jamieson, D., Vinsen, K. 2005. Legend: 1 = External environment; 2 = Internal Environment; 3 = Knowledge Management; 4 = Decision Factors; 5 = Understanding of value; 6 = Contract Management Practices. AEoU = Amorphous Area of Uncertainty.

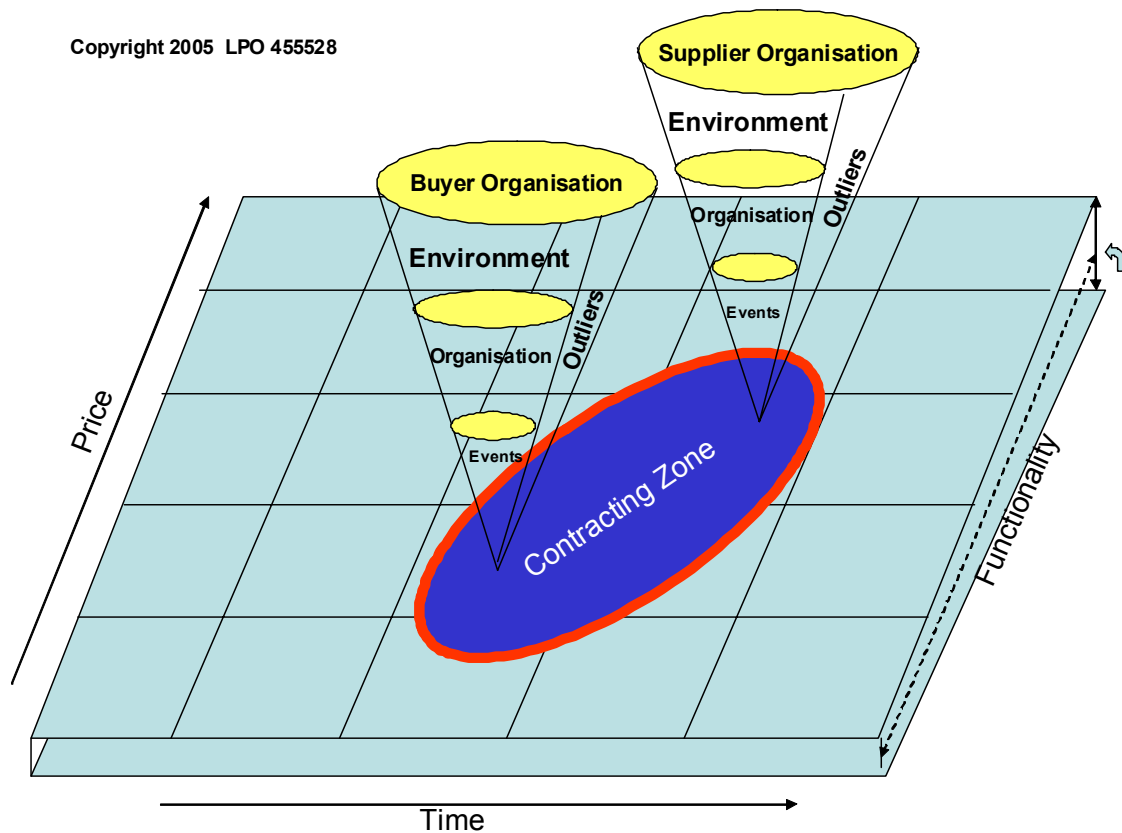
The parameters of the influences at this point of the problem plan were redefined to propose principal elements of data analysis to include:

1. internal environment of the organisation
2. external environment of the organisation
3. knowledge management processes and practices
4. decision factors and approaches applied in each organisation
5. individual and mutual understanding of value

6. process and assiduousness of contract management practices

Each of these elements is notionally represented by one of the faces of the model sketched below (Figure 3) and a part of the volume of the hexagonal object designed to represent that part of each organisation that is explicitly involved in the software development procurement activity. Furthermore, each of the areas selected represents an element which varies with each software development project. However, each element has already attracted significant attention, either in the form of extensive academic research (for example, decision making) while other elements have attracted practitioner interest (for example, contract management). It is the interaction of the elements that creates the basic challenge in this research and it is the level of organisational and individual interaction that is both unknown and unknowable, that creates the major uncertainty present in this research.

**Figure 3: Third Iteration of the Research Model**



Source: Original figure.

The precise format of the model remains somewhat fluid. The four elements of schedule (time), price, functionality and performance follow a standard project management format (for example, see Meredith, 2003). The project; however, will

examine very rigorously the issues that affect the balance between performance and project targets.

The researchers have identified four major contracting elements expected to yield the most useful information about the cost estimation activities occurring in both the buyer and supplier organisations during the unfolding of a software development contract:

*Macro-Issues:* elements influencing each organisation (ideologies and ethos) and the elements comprising their immediate environment (position picture).

*Organisations:* issues defining the software development contract and the processes associated with procurement and supply. These included mapping the supply chains affecting the buyer and supplier organisations and the way in which relationships are structured and developed.

*Outliers:* influential individuals, training and development opportunities, incidents considered out-of-the-ordinary, reward mechanisms and decision approaches are the key issues.

*Events:* the procurement plan, contract management arrangements and project management provide the major focus points of this element.

The significant changes to the research model are reflected in the way in which the research elements are now inter-related. The macro-influences upon the contracting organisations will be examined in some intensive detail using a modified approach to data collection. For example, the traditional approach to examining the external environment of organisations is achieved with the assistance of what is known as the 'PEST+ approach' (in the Management literature) and the 'three environments' (in the Project Management literature) to gathering data on the external environment of buyer and supplier organisations.

Within this research; however, there is a requirement to expand this notion to examine the scope of the external environment and its capacity to influence the opinions and behaviours of the major players. This aspect of the research has therefore been divided into two specific categories: 'Ideologies and Ethos' and the 'Macro-Environment' of the buyer and supplier organisations.

This area of the research seeks to understand the prevailing environment and to assess its potential influences on the contracting organisations as they set out to undertake a software costing initiative. While the background to this model uses some of the PEST+ elements, it also examines background issues such as countervailing views that may be affecting a marketplace.

There is no statistically valid means of analysing much of this data (typical of many qualitative investigations), although the 'rich picture' (Checkland, 1999) that emerges usually provides many hints about the influences upon the buyer-supplier organisation at the time the contract is managed. Furthermore, the issues that are uncovered by this analysis can be ranked according to their relative importance. In this way, not only can the external environment be examined as a static moment in time, changes that occur over the contract management period can also be tracked.



While the number of cases to be examined will be limited, the depth of analysis will be extensive. The focus is upon finding and matching common data within the buyer and supplier organisations and from this data creating a "rich picture" (Checkland, 1999) of the data sets. The refinement of the model, through the interaction of the research data and the analysis made by the researchers, will lead to a modelling process that can be tested against retrospective project exemplars and then trialled with future projects.

## Conclusion

This paper outlines the basic conceptual pathway taken by the authors to uncover some of the patterns inherent in complex, bespoke software development projects. In exploring the conceptual basis of these projects, it is apparent that the breadth, complexity and subtlety of influences upon buyer and supplier are immense. The problems fail to fit any traditional management tools, although managers are ultimately responsible for the outcomes of the decisions they make in the planning, estimation and execution phases. Retreating into the 'art or science' conundrum is a tempting possibility although this is likely to have been one of the reasons why so little has been done to explore the background influences upon software cost estimation. The data gathering and testing of this model will be reported in subsequent publications about this research.

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