What Makes for Top Team Success? A Study to Identify Factors Associated with Successful Performance of Senior Management Teams

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ABSTRACT

Within organisations there is a growth in the use of team development interventions designed to enhance effective team performance. This had been particularly notable in senior management and leadership teams. However this development has not been underpinned by rigorous, organisationally based research (West and Slater, 1995) and the research which has been undertaken has not adequately addressed the issues (Lorsch, 1989; Higgs et al., 2005). It is therefore important to undertake systematic empirical research to underpin the validity of such interventions.

The relationship between top team performance and organisational performance was given a clear focus and a sense of direction as long ago as the 1980s by Hambrick and Mason's 'Upper Echelon Theory' (Hambrick and Mason, 1984). This promoted a stream of demographically based research, but the results have been limited and sometimes contradictory (Pettigrew, 1992; Higgs et al., 2005), in part as a result of the absence of direct data relating to the impact of teams on performance. Also both team and group research have

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failed to analyse the importance of the mix of personalities and team processes in achieving high performance (Higgs, 1999).

This paper presents the results of a research programme involving fifty-four senior management teams using direct data. The research assesses the importance of the mix of personalities in a team and the processes they employ in working together, in determining performance outcomes. The results highlight the benefits of successful team processes, many of which relate also to Higgs and Dulewicz's studies of board processes (1997). This finding indicates the potential value of process intervention as a means of developing team performance.

***Key Words*:** Teams; Teamworking; Belbin Team Roles; Competencies; Team Processes; Team Performance; Team Mix; Top Teams.

INTRODUCTION

The contribution of effective teamworking, particularly amongst top teams, is an enduring topic within management literature. Within this literature there is a frequent critique suggesting that focusing on teams and teamworking is something of a fad and is viewed as the solution to many pressing, and often complex, issues relating to organisational performance (e.g. Industrial Society, 1995; West and Slater, 1995). In the popular literature there appears to be a common assumption that the case for teamworking is proven and well understood. In their book *The Wisdom of Teams* Katzenbach and Smith (1993) make two statements which typify the assumptions frequently adopted. These are:

i) 'It is obvious that teams outperform individuals'.
ii) 'Team is a word and concept well known to everyone' (Katzenbach and Smith, 1993: 4).

However, even a cursory review of the vast literature on teams and teamworking reveals that these assumptions are, at the best, questionable. West and Slater, in a review of the evidence for the benefits of teamworking, comment that, 'assumptions about the value of teams are plausible, but the research shows this value is difficult to demonstrate'. (1995: 24). Furthermore a number of authors have

highlighted a degree of confusion and divergence in the use of the concept of a team in an organisational context (e.g. Roosevelt, 2001; Pegels et al., 2000).

This paper explores these issues and assumptions and, based on a recent research study, provides insights into the factors accounting for successful senior team performance.

The importance, ascribed by organisations and authors, to teams and teamworking necessitates the provision of rigorous evidence to support such assertions. Much of the evidence presented does tend to be derivative from group research (e.g. Ray and Bronstein, 1995; Tjosvold, 1991; Higgs et al., 2005). However, the direct team-based evidence tends to be derived from case studies and anecdotal illustration and a clear need for empirical and organisationally based research into teams has been highlighted (e.g. West and Slater, 1995; Furnham et al., 1993; Barsade et al., 2000).

Some have suggested that the lack of specific studies of managerial teams (particularly in an organisational context) may be due to the difficulty in gaining access to such teams (e.g. Higgs and Dulewicz, 1997; Kilduff et al., 2000). In addition, the need to understand the specific issues relating to senior management and top teams has been reinforced by the range of studies emanating from the links demonstrated between organisational performance and top team characteristics and embedded in what has been termed 'Upper Echelon Theory' by Hambrick and Mason (1984). This has led to a growth in top team studies. However, these have been limited to studies predominantly based on archival and demographic data (Lawrence, 1991; Higgs, 1999; Lichtenstein et al., 2005). As a consequence, while there is a growing body of data on relationships between senior teams and organisational performance, the results are often contradictory and the studies fail to shed any significant light on the processes through which such teams come to achieve performance outcomes (Higgs, 1998). While the number of studies which address both inputs and processes at senior level remain rare, those reported (e.g. West and Anderson, 1996; Higgs, 1999) provide intriguing and tantalising insights.

What is a Team?

The range of definitions of teams and teamworking is, indeed, extensive. From Table 10.1 it is evident that, while there is strong

Table 10.1: Common Elements in Definitions of Team

Element	References
Common Purpose	Katzenbach and Smith, 1993; Hastings et al., 1986; Woodcock, 1989; Higgs et al., 2005; Lichtenstein et al., 2005
Interdependence	Ray and Bronstein, 1995; Woodcock, 1989; Belbin, 1993; Higgs et al., 2005
Clarity of Roles and Contribution	Critchley and Casey, 1984; Ray and Bronstein, 1995; Katzenbach and Smith, 1993; Higgs et al., 2005; Aritzeta et al., 2005
Satisfaction from Mutual Working	Katzenbach and Smith, 1993; Hastings et al., 1986; Belbin, 1993
Mutual and Individual Accountability	Katzenbach and Smith, 1993; Aritzeta et al., 2005
Realisation of Synergies	Katzenbach and Smith, 1993; Higgs et al., 2005
Empowerment	Ray and Bronstein, 1995; Tjosvold, 1991

agreement that common purpose, interdependence and distinct roles are widely shared components in defining a team, there are differences in the other definitional components. Much of the definitional literature is theoretical with clear antecedents in the literature relating to group dynamics.

Teams and Performance

The rationale underpinning the role and growth in importance of teams in organisations is that teams produce superior performance to individuals (Ray and Bronstein, 1995; Tjosvold, 1991; Higgs et al., 2005).

The validity of this rationale for teamworking requires a brief review of the evidence on performance which is provided by the research. However, the debate around measures of organisational performance in the context of organisational behaviour influences the interpretation of these studies (e.g. Kaplan and Norton, 1992; Furnham, 1992; Aritzeta et al., 2005), which highlights the potential validity of employing 'hard' and 'soft' measures of performance.

Overall such authors highlight the need for 'mixed measures' in evaluating team performance.

While the group dynamics movement has shaped the nature of much of the research into groups and performance, the focus of much of this research was empirical, with a tremendous emphasis on laboratory methods. However, the generalisability of the outcomes of such studies to organisational settings is questionable (Furnham, 1992). Nevertheless, moving away from experimental designs raises a major challenge of defining and operationalising performance measures. To deal with this Hackman and Morris (1975) presented a useful way of categorising the **outcomes** of group behaviour in terms of *Solutions* and *Other outcomes.* Whilst this framework does not obviate the problems of operationalisation, it does provide an indication of elements of performance, each of which may be more readily operationalised. A further complication in establishing clear evidence in terms of the contribution of groups to enhanced performance is the array of variables in terms of the composition of the group, nature of the group task and appropriateness and efficiency of processes which in turn impact on the performance of the group. The interplay of these variables is well summarised in the model of group interactions described by Hackman and Morris (1975), which was built from the model proposed by McGrath (1964) and is summarised in Figure 10.1.

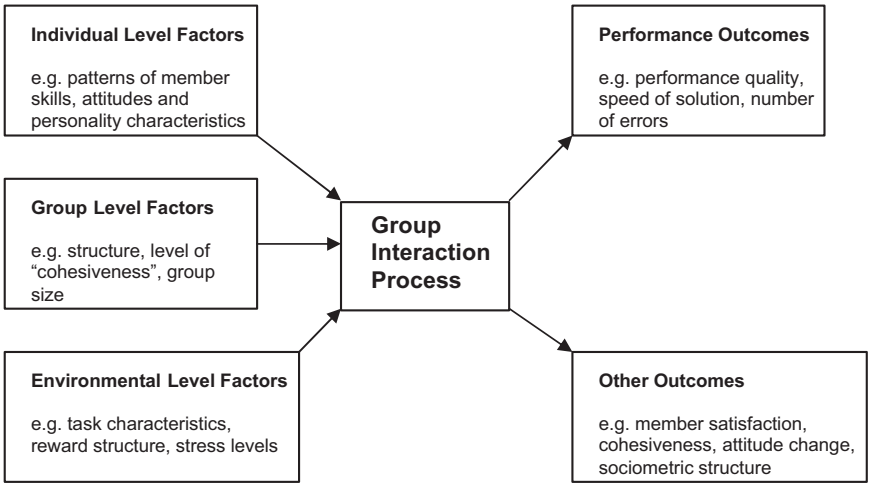
In examining the team literature the evidence to support the added value of managerial teams is less extensive and clear than that relating to operational or work teams. In part this may be due to the purpose and nature of such teams being concerned primarily with strategic rather than operational decisions (Higgs and Dulewicz, 1997; Higgs, 1999; Lichtenstein et al., 2005).

Overall the literature relating to relationships between teams and absolute performance is thus by no means conclusive or consistent. Indeed, based on a significant review of the evidence Tannenbaum et al. (1992) highlight that whilst there is evidence of the positive impact of teamwork on individuals' attitudes and perceptions *they find no relationship between this and performance*.

Summary

From the above it is evident that Katzenbach and Smith's assertions (1993) are by no means borne out by the literature. Research

Figure 10.1: An Interaction Process Model



Note: Adapted from Hackman and Morris (1975)

into teams is a complex process (Furnham, 1992; West and Slater, 1995; Higgs et al., 2005; Aritzeta et al., 2005) which presents challenges in terms of methodology and measurement. The model proposed by Hackman and Morris (1975) demonstrates the complexity and has led to a range of research designed to explore aspects of the overall model in order to begin to build a picture of the relationship between elements of teamworking and performance outcomes.

THE PRESENT STUDY

The aim of the study reported was to explore the relationship between the individual characteristics of the members of managerial teams, the processes employed within the teams and the interaction between these variables, and the effectiveness of the team. From the above review it appears that a number of factors are more likely to be dominant in explaining variation in team performance. These factors relate to: i) the nature and mix of individuals comprising the team; and ii) the processes employed within the team to convert these inputs to productive outputs. It was within this context that the current study was designed.

Hypotheses

From a review of the literature the following hypotheses were developed:

H1: Management teams with an 'optimum' balance of Belbin Team Roles will be rated as higher performing teams in terms of both 'hard' and 'soft' outcomes.

H2: Management teams with a 'balanced' mix of competences will be rated as higher performing teams in terms of both 'hard' and 'soft' outcomes.

H3: A model which accounts for interactions between input and process factors will account for more variation than a main-effects model.

H4: A model which accounts for interactions between input and process factors will provide evidence to show that team processes act as a mediator variable between input and outcome variables.

Sample

Three organisations agreed to participate in this study. These comprised two major UK financial institutions and a local government organisation. Researching in the arena of top teams inevitably leads to a challenge in achieving a large sample (Higgs et al., 2005; Lichtenstein et al., 2005). Given that the proposed analyses would be using the *team* as the unit of measurement, the research design required a sample size of no less than fifty teams. In effect this required access to *all* of the senior level management teams in the participating organisations. The level of interest in this study within the participating organisations resulted in an initial sample of fifty-six teams. Ultimately data could not be obtained in relation to two teams due to organisational changes. This resulted in a final sample of fifty-four teams. In looking at empirical research that examines more senior level management teams the current sample represents a relatively large number of such teams. Within the sample the average age of participants was 38.4 years (S.D. 6.06) with an average tenure of 1.31 years (S.D. 0.96). The average team size comprised 3.6 members (S.D. 0.61). Overall the data for the 54 teams was provided by 196 team members.

Measures

The main measures employed in the study were:

i) Belbin Team Roles/Team Role Mix

Few top team studies have explored the Belbin team roles. However, Lessem and Baruch (2000) did demonstrate its validity with such teams. The Belbin Team Roles for each member were calculated from the 16PF using the formula published by Dulewicz (1995), which was that originally employed by Belbin (1976, 1981).

The essence of Belbin's work (1981) was the identification of the significance of the mix of roles in a team and the relationship between a 'balanced' mix of Team Roles and the performance of a team. Berry (1995) pointed out the difficulties of operationalising the construct of 'Balance'. He developed a statistical Team Role Index model which was employed in this study.

ii) Supra-Competences

A number of authors have hypothesised that a mix of competences may be important when examining team performance (e.g. Hambrick, 1995; Aritzeta et al., 2005; Young and Dulewicz, 2004). Dulewicz (1995) conducted a study in which he found statistically significant relationships between the Supra-Competences (derived from the Job Competence Survey) and Belbin Team Roles. From this it would not seem to be unreasonable to hypothesise that a measure of 'balance' in terms of Supra-Competences may be similar to the Team Role Index (Berry, 1995). Thus a Supra-Competence Index (based on the Job Competence Survey: Dulewicz, 1992) was employed as a measure of the Team Competence mix.

iii) Critical Thinking Appraisal

The Watson Glaser Critical Thinking appraisal (Watson and Glaser, 1964) was employed in the original development of the Belbin Team Role model (Belbin, 1981). It was decided to examine the critical thinking abilities of teams within this study in order to determine its relative impact on team outcomes based on an assessment of the overall average level of team critical thinking ability for the team.

iv) Team Processes

A Team Process Questionnaire was employed which was developed from the Dimensions of Board Effectiveness Questionnaire (Dulewicz and Herbert, 1996), which was modified to take account of input from a series of focus groups and interviews conducted in a preliminary stage of the study. This instrument had been examined for construct validity and reliability in a separate study (Higgs and Dulewicz, 1997). Analysis of the process questionnaire produced a 14-factor model with scales and reliabilities as shown in Table 10.2.

v) Team Outcomes

Team outcomes were assessed by the executive director to whom the team reported using a 16-item questionnaire developed by Higgs and Rowland (1992) and which identified three elements of performance: team cohesion/climate, team achievements and overall team improvement orientation. The scales and their reliability are also shown in Table 10.2.

RESULTS

A total of 226 responses were received from members of 56 teams. The response rate from executives to whom teams reported reduced the number of teams to 54 and thus usable participants (team member responses) to 196. The sample structure of allowable responses comprised 74.5 per cent males ($n = 146$) and 25.5 per cent females ($n = 50$).

Preliminary Analyses

Intercorrelations among each of the measures are shown in Table 10.3. From this table it is clear that there are a number of significant correlations between the Belbin Team Role Index and both Team Process and Team Outcome factors. Similarly there are a number of significant correlations between the Supra-Competence Index and Process and Outcome factors. Further analyses of the data revealed that team size, team tenure and company did not influence any of the outcome variables.

In using the Team Process Questionnaire within the overall study and analysis of the results it is important to emphasise that the unit

Table 10.2: Senior Managerial Team Process and Outcome Factors

Factors	Reliability (Cronbach's Alpha)
Team Environment *Team atmosphere*: The general climate for interaction and working between team members	0.95
Confidence and Comfort: Processes which the team use to acquire external input and expose their thinking to others	0.65
Learning and Improvement: The way in which the team uses feedback to learn and identify improvement opportunities	0.70
Performance Orientation: Team processes which focus members on results and means of improving results	0.76
Alignment: The way in which the team attempts to align individual member's values and goals with those of the team	0.48
Team Interaction *Communication and Interaction*: The processes within the team which address interaction and communication between team members	0.79
Involvement and Participation: The way in which team members are involved in goal-setting, problem-solving and decision-making	0.87
Process Orientation: The processes which the team has in place to review the way in which they function	0.75
Realistic Focus: The way in which the team relates to the practical world and demands of the business	0.60
Team Leadership *Enabling Leadership*: The processes employed by the team leader to facilitate performance and growth	0.77
Interface Management: The way in which interfaces with other parts of the organisation are managed	(i)

(*Continued*)

Table 10.2: (*Continued*)

Factors	Reliability (Cronbach's Alpha)
Team Structure *Roles*: The processes in place to ensure clarity of individual roles and accountabilities	0.76
Composition and Contribution: The way in which the team ensures optimum use of the skills and knowledge of team members	0.69
Outcome Factors and Reliabilities	
Team Climate: The overall degree of cohesion within the team	0.85
Team Achievements: Assessment of the team's achievement of goals and delivery to 'customers'	0.74
Improvement Orientation: The team's ability to be proactive and focus on continuous improvement	0.75

N.B. (i): Reliability cannot be calculated as a single item factor

of analysis is the *team* rather than individual team members. This raises potential issues in relation to the use and analysis of multiple response data and the aggregation of such responses to form a group response (Seidler, 1974). In practice there are few recognised techniques available for the analysis of multiple responses and aggregation of such responses. However, one approach to the examination of consensus (employed in this study) was proposed by James et al. (1984) and employed in a range of previous studies (e.g. West and Anderson, 1996). Using this calculation it was found that the inter-rater agreement values ranged from 0.82 (Involvement and Participation) to 0.92 (Confidence & Comfort, and Composition & Contribution), suggesting that it is appropriate to aggregate individual responses on all of the Process factors.

It is also important to examine differences between groups to determine the discriminating power of the Team Process measures being

Table 10.3: Intercorrelations between Variables Included in the Study (n = 54)

	TEQ1	TEQ2	TEQ3	TEQ4	TEQ5	TEQ6	TEQ7	TEQ8	TEQ9	TEQ10	TEQ11	TEQ12	TEQ13	TEQ14	TPM1	TPM2	TPM3	BTR	Comp.	CTA
TEQ 1	1.00																			
TEQ 2	*** 0.701	1.00																		
TEQ 3	*** 0.716	*** 0.60	1.00																	
TEQ 4	*** 0.787	*** 0.823	*** 0.607	1.00																
TEQ 5	*** 0.761	*** 0.539	*** 0.543	*** 0.73	1.00															
TEQ 6	*** 0.760	*** 0.55	*** 0.582	*** 0.624	*** 0.58	1.00														
TEQ 7	** 0.40	** 0.397	** 0.442	** 0.339	** 0.44	** 0.39	1.00													
TEQ 8	*** 0.522	*** 0.543	*** 0.528	*** 0.529	*** 0.495	** 0.31	** 0.408	1.00												
TEQ 9	*** 0.602	*** 0.59	*** 0.596	*** 0.545	** 0.427	*** 0.573	0.17	** 0.415	1.00											
TEQ 10	** 0.436	*** 0.56	** 0.298	*** 0.513	** 0.419	** 0.431	0.201	** 0.431	*** 0.591	1.00										
TEQ 11	*** 0.693	*** 0.520	** 0.406	*** 0.589	*** 0.485	*** 0.533	0.025	** 0.33	*** 0.483	** 0.355	1.00									

(*Continued*)

Table 10.3: (*Continued*)

	TEQ1	TEQ2	TEQ3	TEQ4	TEQ5	TEQ6	TEQ7	TEQ8	TEQ9	TEQ10	TEQ11	TEQ12	TEQ13	TEQ14	TPM1	TPM2	TPM3	BTR	Comp.	CTA
TEQ 12	*** 0.530	** 0.432	*** 0.479	*** 0.566	*** 0.569	*** 0.48	** 0.43	** 0.451	** 0.438	*** 0.585	** 0.393	1.00								
TEQ 13	0.082	0.132	0.096	0.195	0.061	0.076	0.166	0.116	** 0.34	0.184	0.227	0.228	1.00							
TEQ 14	*** 0.480	** 0.454	** 0.295	** 0.374	** 0.278	** 0.36	0.066	** 0.451	0.21	* 0.260	*** 0.459	0.085	−0.104	1.00						
TPM 1	** 0.275	** 0.310	** 0.27	** 0.284	** 0.365	0.075	** 0.301	*** 0.497	* 0.25	** 0.29	0.122	* 0.24	0.036	0.154	1.00					
TPM 2	0.228	** 0.273	0.02	0.165	0.227	0.15	* 0.24	** 0.340	0.09	** 0.301	* 0.248	0.069	−0.116	* 0.24	*** 0.49	1.00				
TPM 3	0.026	0.102	0.02	−0.025	0.135	0.048	* 0.23	** 0.276	0.15	** 0.340	0.096	0.022	−0.018	0.069	*** 0.571	*** 0.51	1.00			
BTR Index	0.153	0.007	0.12	0.08	0.026	0.23	−0.097	0.42	** 0.37	−0.162	* 0.232	0.008	* 0.28	0.031	* 0.30	** 0.34	0.197	1.00		
Comp. Index	0.16	0.197	0.08	0.136	0.166	0.045	* 0.22	* 0.23	−0.20	* 0.223	−0.011	0.106	−0.192	0.111	0.032	** 0.33	0.029	** 0.39	1.00	
CTA	0.18	−0.014	−0.095	0.022	0.153	0.077	0.006	0.07	0.036	0.072	0.04	0.136	−0.093	0.116	0.122	0.09	0.18	−0.17	−0.163	1.00

***$p < 0.001$; **$p < 0.01$; *$p < 0.05$ (See Appendix 10.1 for Key)

used in this study. This entailed the use of a one-way analysis of variance (ANOVA) which found appropriate levels of discrimination.

Regression Analyses

To use regression analysis with the models indicated by the hypotheses it was necessary to reduce the number of process variables to be included in order to obtain a more parsimonious model which could be tested with the available data. This was done through a combination of theoretical perspectives and review of the preliminary analyses (Hair et al., 1995). Thus the scope for including interactions within the model provides for the inclusion of no more than eleven interactions. Those to be included were determined through reference to the literature. Based on this it was decided that the variables to be included in the model examination would be:

i) *Input Variables:* Belbin Team Role Index, Supra-Competence Index and CTA.
ii) *Process Variables:* Communication and Involvement (composite factor), Performance Orientation, Enabling Leadership.
iii) *Interaction Variables:* Belbin Team Role Index with all Process Variables, Supra-Competence Index with all Process Variables, CTA with all Process Variables.

The proposed models were examined using multiple regression analysis with the outcome factors as the dependent variable. The requirements for regression analysis were tested and found to be met (Hair et al., 1995). Stepwise regression analyses were employed to examine two models. Model 1 was a main effects model and Model 2 a full process interaction one. The results of the examination of these models are summarised in Table 10.4.

In reviewing the results from the main effects model there is unsurprising support for the relationships between the BTR Index, the process factors of Communication, Interaction and Involvement, and the outcome factor of Cohesion.

In relation to the Improvement Orientation outcome factor the regression model supports the relationships with the BTR Index and the Communication and Involvement variables found in the earlier correlational analyses (see Table 10.3). However, somewhat

Table 10.4: Stepwise Regressions of Alternative Models ($n = 54$)

	Outcome Factors	Input, Processes and Interaction Factors	Standardised Betas	Significance of T	R^2
Model 1	Cohesion	BTR Index	0.313	0.016*	0.19
		Communication, Interaction and Involvement	0.325	0.013*	
	Improvement Orientation	BTR Index	0.352	0.008**	0.17
		Communication, Interaction and Involvement	0.239	0.037*	
	Achievements	Enabling Leadership	0.226	0.04*	0.05
Model 2	Cohesion	Communication, Interaction and Involvement	0.573	0.0002***	
		BTR Index × Communication, Interaction and Involvement	0.546	0.0009***	
		Supra-Competency Index × Performance Orientation	0.231	0.042*	0.30
		CTA	0.182	0.142	

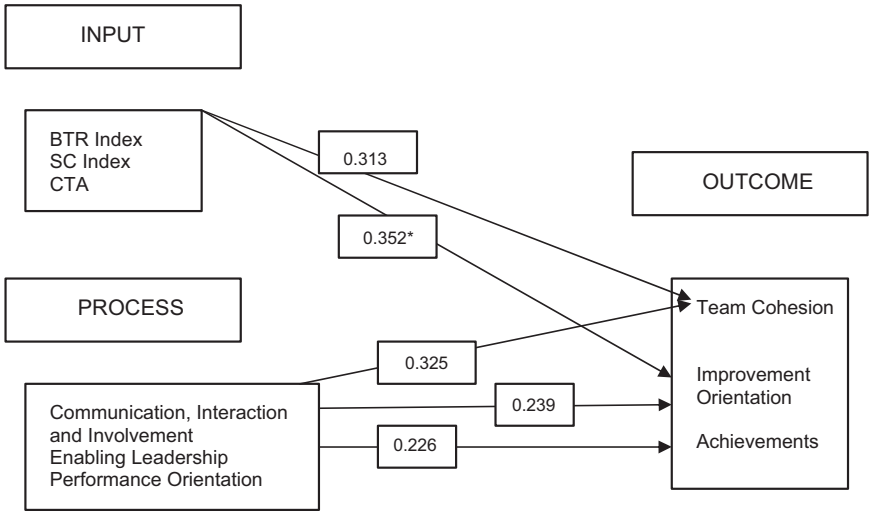
(*Continued*)

Table 10.4: (*Continued*)

	Outcome Factors	Input, Processes and Interaction Factors	Standardised Betas	Significance of T	R^2
Model 2	Improvement Orientation	Communication, Interaction and Involvement	0.297	0.036*	
		BTR Index	0.310	0.028*	
		Supra-Competency Index	0.215	0.038*	0.25
		CTA × Leadership	0.240	0.042*	
	Achievements	Enabling Leadership	0.273	0.05*	
		BTR Index × Communication, Interaction and Involvement	0.282	0.044*	0.15
		CTA	0.203	0.062	

Note: ***$p < 0.001$; **$p < 0.01$; *$p < 0.05$

Figure 10.2: One-stage Regression Model of Team Outcomes



Note: $*p < 0.05$; all coefficients significant

surprisingly, the relationship with the Supra-Competences Index is not encountered in this model. This may well be due to the nature of the Stepwise regression analysis and the impact on the parsimony of relationships due to the elimination of co-linearity (Hair et al., 1995). However, the results from the one-stage regression model are more closely in line with the literature than the results encountered in the correlational study (e.g. Senior, 1996). The model emerging from this analysis is summarised in Figure 10.2.

The results from the analysis of the full process model (Model 2) show a larger number of significant relationships than found in the main effects model. In relation to the 'Cohesion' outcome it is interesting to note that the interaction of the BTR Index and Communication and Involvement Process factor produces a higher level of explanation of variance than the BTR Index alone (either in the correlational analysis or in the main effects model). This may be viewed as evidence of the process factor of Communication, Interaction and Involvement acting as a mediator variable. This was hypothesised by Hackman and Morris (1975) but not demonstrated in their subsequent research. Furthermore, the finding does provide

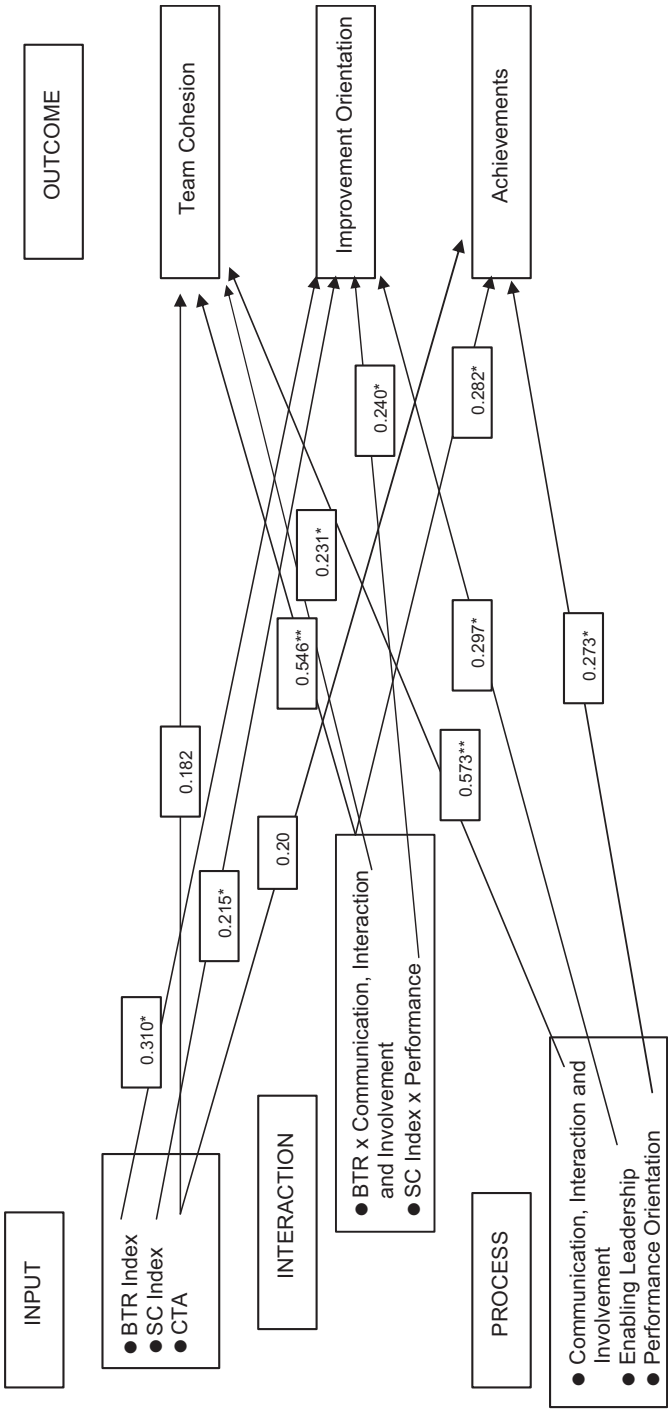
a degree of support for the view, frequently encountered in the literature, that process in a team is an important factor in releasing the potential of the combination of talents and skills within the team (e.g. Anderson et al., 1990; Higgs, 1999; Higgs et al., 2005). The emergence, in this model, of the Supra-Competence Index as a variable related to Cohesion in combination with the Process factor of Performance Orientation provides further evidence of process as a mediator variable.

In relation to the outcome factor of Improvement Orientation it is extremely interesting to note the significant relationship which is found with the interaction of the CTA and process factor of Enabling Leadership. This, together with the relationship of Enabling Leadership to achievements, tends to provide supporting evidence for a significant role of leadership in terms of team performance (e.g. Woodcock, 1989; Senior, 1996). Furthermore, the analysis brings the CTA into the team effectiveness arena for the first time. The absence of relationships between CTA constructs and team performance (or even apparently negative relationships: Belbin, 1981) have contradicted practitioner experience. Belbin's Apollo Team findings (Belbin, 1981) have caused a degree of dissonance with practitioners in this area for some while. However, a set of leadership behaviours able to release the critical reasoning abilities of a team combined with the CTA scores of the team members leads to a higher degree of understandability of previous research findings.

The relationship, within Model 2, between the Achievements outcome factor and the combination of the BTR Index and Communication and Involvement could indicate that the process interaction explains the result of outcome findings originally reported by Belbin (1981), but subsequently the subject of significant debate (e.g. Senior, 1996). The model emerging from the interaction analysis is summarised in Figure 10.3.

In reviewing these results it is important to exercise caution. In multiple regression analysis an important final stage is the validation of the model with a different sample. Practical and logistical barriers prevented this being done in the current study. Therefore validation and confirmation of the encountered models with different samples should be considered as an area for further research.

Figure 10.3: Interaction Process Model of Team Outcomes



Note: $*p < 0.05$; $***p < 0.001$

DISCUSSION

The results examined above have produced a mixture of expected and surprising findings. In part this may be due to the limitations of the sample and a number of the methodologies employed. The somewhat mixed findings may also be a reflection of the complexity of researching into teams which have been highlighted by many authors (e.g. Furnham, 1992; Kurtzberg, 2000; Roosevelt, 2001).

The extent to which the findings support the research hypotheses is discussed below:

H1: Management teams with an 'optimum' balance of Belbin Team Roles will be rated as higher performing teams in terms of both 'hard' and 'soft' outcomes.

The initial correlational analysis provides partial support for this hypothesis with significant correlations between the Team Role Index and the Team Cohesion and Improvement Orientation outcome factors. This clearly provides evidence to support the relationship to 'soft' or psychosocial outcomes. The extent to which Improvement Orientation may be considered a partially 'hard' outcome is questionable. The regression analyses provide support for the hypothesis in relation to 'soft' outcomes. However, when the BTR Index is combined with the Communication, Interaction and Involvement process factor a significant relationship with the Team Achievements outcome factor (a 'hard' outcome) is evidenced.

Overall, the results may be seen as providing partial support for this hypothesis. However, the operationalisation of the outcome factors does not include an objective criterion for the measurement of 'hard' outcomes. Thus, further research with such a measure may well reveal a clearer and complete support for the hypothesis.

H2: Management teams with a 'balanced' mix of competences will be rated as higher performing teams in terms of both 'hard' and 'soft' outcomes.

As with the Team Index results the correlational analysis of competence mix (operationalised as the Supra-Competence

Index) indicates partial support for this hypothesis. The encountered relationship from this analysis is with the outcome factor of Improvement Orientation. As discussed above it is by no means clear whether or not this factor can be seen as purely 'hard' or 'soft'. However, when analysing the differences between high and low performing teams, evidence of relationships between the Supra-Competences and all three outcome factors emerges. The regression analyses support these findings. When the Supra-Competence index is combined with the process factor Performance Orientation a relationship with the outcome factor of Team Cohesion emerges. Thus, from an overall analysis it would appear that the results do offer partial support for this hypothesis. As with the previous hypothesis the need for further research using a more objective measure of 'hard' outcomes may prove fruitful.

H3: A *team interaction model which accounts for interactions between Input* and *Process factors will account for more variance in* Team *Outcomes than* a *main effects model.*

Comparison of the regression results of a main effects and interaction modelling of the data from this study shows that in respect of all three outcome variables the R^2 values in the interaction model are higher. This provides evidence to support the above hypothesis.

H4: A *team model which accounts for interactions between Input* and *Process factors will provide evidence to show that* Team *Processes act as mediator variables between Input* and *Outcome variables.*

Due to sample size and the requirements for the number of observations per variable in a multiple regression analysis (Hair et al., 1995; Money, 1997) the study was only able to examine a limited number of Input/Process interactions (eleven in total). The multiple regression analyses demonstrated that three of these produced significant standardised Betas in relation to the outcome variables. In each case, the interaction either enhanced the value of the Beta for the input

variable alone or introduced a new input/outcome relationship. From an inspection of Table 10.4 it is evident that the current study provides a degree of support for the above hypothesis. However, it does have to be borne in mind that the sample size and scope of the current research did not permit validation of the multiple regression models.

CONCLUSIONS

Hackman and Morris (1975) had proposed that the interaction between input and process factors may be a more powerful way of explaining team performance differences than either group of variables alone. The results from this research into senior managerial teams certainly provided strong support for this proposition. The results demonstrate that the combinations of the mix of individual personalities and competences within a team, combined with the processes employed within the team, account for greater variation in the team's performance than either individual or process factors alone.

In summary this study has shown that:

i) Team 'mix' in terms of the Belbin Team Roles is related to team outcomes (providing organisationally based research evidence to support Belbin's original research findings).
ii) Team 'mix', in terms of the competences of team members, is related to team outcomes (providing practical evidence to support such propositions in literature (e.g. Dulewicz, 1992)).
iii) Team processes mediate the relationship between the mix of personal characteristics and competences of team members and the performance outcomes.
iv) The team processes relating to communication, involvement, performance orientation and enabling leadership amplify the impact of personality and competence mix on team performance outcomes.

This study addresses many of the limitations of previous research findings and provides a practical basis for addressing the managerial question relating to the appropriate strategy for building

effective team performance. While it is important to bear in mind that the results may not be widely generalisable beyond the limited nature of the sample without supporting evidence from further research, it does address the limitations of absence of direct measures in previous studies of top management teams (Pettigrew, 1992; Lawrence, 1991).

APPENDIX 10.1: KEY TO INTERCORRELATION TABLE

TEQ 1	Team Process Factor:	Team Atmosphere
TEQ 2	Team Process Factor:	Communication/Interaction Style
TEQ 3	Team Process Factor:	Performance Orientation
TEQ 4	Team Process Factor:	Involvement and Participation
TEQ 5	Team Process Factor:	Confidence and Comfort
TEQ 6	Team Process Factor:	Learning and Improvement
TEQ 7	Team Process Factor:	Roles
TEQ 8	Team Process Factor:	Composition and Contribution
TEQ 9	Team Process Factor:	Process Orientation
TEQ 10	Team Process Factor:	Realistic Focus
TEQ 11	Team Process Factor:	Alignment
TEQ 12	Team Process Factor:	Enabling Leadership
TEQ 13	Team Process Factor:	Interface Management
TEQ 14	Team Process Factor:	Distribution of Contribution
TPM 1	Team Outcome Factor:	Team Cohesion
TPM 2	Team Outcome Factor:	Improvement Orientation
TPM 3	Team Outcome Factor:	Achievements
BTR Index	Belbin Team Role Index	
Comp. Index	Supra-Competences Index	
CTA:	Average Team CTA Score	

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