An investigation into the link between culture and strategy using soft systems methodology and group analysis.
Part 2 Group Analysis

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Abstract

This was the second of two papers investigating the capability of a consulting firm (the Company) to adopt a team-based business model. The first paper concluded that the evidence suggests that the Company did not have the existing structures, policy and culture to move to team based work. This paper examines the capability of the consultants within the Company to move to a team-based business model using an instrument to determine team role preferences. The conclusion was that the highly individualistic team role preferences of the consultants would not support the proposed business model.

Background

An IT consulting Company, founded in 1980s, decided that it needed to move to a team based organisational structure. The Company's core business was the provision of project management and information technology services, across a broad range of industries including banking, defence, government, telecommunications and utilities. For most of its history, the Company has enjoyed spectacular growth. Recently however, increased competition, globalisation, and the rate of change coupled with a global downturn has meant that the Company has seen its profitability shrink. For the first time in the Company's

history, there had been retrenchments. The Company decided it needed a new organisational structure to address the changing needs of the market. Several management diagnostics were used to determine if the Company was suited to a team based structure.

Belbin's Team Roles

In his first book, Management Teams (1981), Belbin conceived eight team roles: completer finisher, chairman, company worker, monitor evaluator, resource investigator, plant, shaper and team worker, and he posited that individuals will tend to have a distinctive preference to natural 'roles' which they will assume. Later, he also named a ninth team role, the 'specialist', however, this particular role was not identified using any personality tests. It was also at this time that Belbin renamed two of the roles, changing the name 'chairman' to 'co-ordinator' and 'company worker' to 'implementer'.

Belbin's theoretical model has been supported by observations in the field. In a study by Fisher et al. (1998), found that "the findings were to an overwhelming extent in conformity with the theoretical expectations, and as such were construed as giving support to validity of Belbin's model."[1] In a subsequent study, Fisher et al. (2001) expressed further support for Belbin's work when they used his team role model to help them predict a relationship between certain team roles and the exercise of control. They found "that the evidence constitutes a measure of support for the construct validity of the Belbin team role model."[2] Earlier work by Senior (1998), Wiggins (1979, 1982) and Furnham (1993) also confirm these findings.

Belbin's role balance hypothesis

Belbin's central tenet is as follows: *"A team can deploy its technical resources to best advantage only when it has the requisite range of team roles to ensure efficient teamwork."*[3]

Prichard and Stanton found that, as Belbin had hypothesised, mixed teams performed better

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[1] Fisher, S., Macrosson, K., Wong, J. (1998), ***Cognitive style and team role preference***, Journal of Managerial Psychology, 13, p552

[2] Fisher, S., Macrosson, K., Semple, J. (2001), ***Control and Belbin's team roles***, Personnel Review, 30, p586

[3]

than those with one team role model and also that: *"consistent with the hypothesis…it was found that mixed teams, in which a variety of team roles were represented…performed significantly better…than teams composed solely of … 'shapers'"*[4]

When Senior (1997) investigated Belbin's claim that a well-balanced team was associated with superior performance, her research also supported Belbin's findings: *"these findings give some support to Belbin's team role theories which associate team balance with team performance."*[5] In contrast, a study by Partington and Harris (1999) cautioned that *"crudely condensed quantifications of "team balance", based on Belbin's SPI, have no relationship with team performance."*[6]

The Belbin SPI

In the latter stages of his research, Belbin developed the Self-Perception Inventory (SPI) to measure team role scores. The SPI is a questionnaire *"where subjects are required to read seven hypothetical situations and then rate either eight (version 1) or ten (version 2) behavioural statements relating to the situation"*[7] and distribute ten points among those sentences which best describes their own behaviour.

The highest score that is derived from the questionnaire determines the individuals 'team role', which Belbin suggests *"indicates how best the respondent can make his or her mark in a project management team."*[8] According to Belbin, the next highest score on the questionnaire indicates the respondents *"back-up team role"*[9], which the individual should adopt if it was needed by the team or required of the task at hand. In contrast, the two lowest scores indicate areas of possible weakness, which rather than attempt to alter, the team should

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[4] Prichard, J., Stanton, N. (1999), ***Testing Belbin's team role theory of effective groups***, Journal of Management Development, 18, p660

[5] Senior, B. (1997), ***Team roles and team performance: Is there 'really' a link?*** Journal of Occupational and Organizational Psychology, 70, p255

[6] Partington, D., Harris, H. (1999), ***Team role balance and team performance: an empirical study***, Journal of Management Development, 18, p702

[7] Furnham, A., Steele, H., Pendleton, D. (1993), ***A psychometric assessment of the Belbin Team-Role Self-Perception Inventory***, Journal of Occupational and Organizational Psychology, 66, p246

[8] Belbin, M. (1981), ***Management Teams: Why They Succeed or Fail***, Heinemann, p156

[9]

seek another team member with complementary strengths.

Methodology

A mixed approach

Consultants working for the Company were asked to complete the Belbin Team-Role Self-Perception Inventory (BTRSPI) in order to confirm the initial findings of this project. The initial phase of research about the Company used of a number of SSMs (rich picture, cultural web, change kaleidoscope) to identify organizational structures, policies and cultures. The Company was found to be highly supportive of individualistic behaviour. It was hypothesised that the consultants working within the existing structures, policies and cultures would exhibit team role preferences that were appropriate to these organizational settings. The use of BTRSPI had the potential to confirm the initial findings and also to identify any secondary team role preference that would support a team-based approach.

Saunders et al (1997) maintain that *"it was quite usual for a single study to combine quantitative and qualitative methods and to use primary and secondary data."*[10] The approach taken in this study was to use both quantitative and qualitative data to gain a deeper understanding of the issues within the organisation. This multi-method approach allowed 'triangulation' to take place – which involves using different data collection methods to affirm your analysis. Saunders et al (1997) argue *"that since all different methods will have different effects, it make sense to use different methods to cancel out the 'method effect'. This will lead to greater confidence being placed in your conclusions."*[11]

Unfortunately, the researchers were not given permission to poll all the employees in the organisation, the reasons for which will be discussed later on. Given that there was no budget allocated to carry out such an investigation, research using the Belbin SPI was carried out over the internet (Ref) and version two of the questionnaire and corresponding answer sheet were downloaded, distributed and analysed.

The researchers approached the 'bench manager' (the person in the office to whom the

[10] Saunders, M., Lewis, P., Thornhill, A. (2000), Research Methods for Business Students (Second Edition), Prentice-Hall, p98
[11]

consultants report after they have finished an assignment) to survey the available employees (those in the Melbourne office). Answers were returned by email and it was made explicit from the very beginning that individual scores would be confidential. To encourage those polled to complete the questionnaire and return it in a timely fashion, the researchers attended the weekly 'bench meetings' over an extended period in order to explain the topic of research and the importance of the data. Realising that the research would only represent a small sample of employees from one office, the researchers asked that other points of contact from each of the other offices be set up to help poll other 'bench' consultants in other regions. However, only a limited response from one of the offices (Sydney) was collected.
In this respect, a number of consultant 'on the bench' were extremely helpful in contacting their on-client-site colleagues, discussing the topic of research and encouraging them to complete and return an answer sheets for the Belbin SPI. A total of xxx questionnaires were completed and analysed

Sample

The majority of responses came from consultants on 'the bench' in Melbourne office and a small number came from consultants on 'the bench' in the Sydney office. In all, of the 43 respondents, 36 came from the Melbourne office and 7 came from the Sydney office. Of these, 27 of the respondents were male and 16 were female.
The total sample size taken from Melbourne was comparatively large and equated to 25% of the total employees (including administration and managerial staff). In comparison, the sample size from Sydney accounted for only 17% of the total employees.

Questionnaires

Using the nine-role model(second version) of BTRSPI, respondents were asked to rate seventy statements about their typical team role behaviour. The statements were divided between seven categories, each representing a different scenario. Within each scenario there were nine statements describing typical behavioural responses which pertain to one of Belbin's nine roles plus one statement to measure social desirability. Respondents were asked to distribute ten points amongst the statements (in each of the seven categories) against those statements that they thought best described their behaviour. It was indicated that the marks should be distributed among several sentences and asked that respondents try not to spread marks among all ten sentences or attribute ten marks to a single sentence to avoid extremes. The scores were then summed and recorded, as the raw scores achieved in the

BTRSPI always equals seventy. Each persons' highest score indicates their team role preference.

Limitations of the study

The research did not survey the Sydney office (42 staff) Brisbane (32), Canberra (66), London (11) or the Singapore (8) offices, as the company was reluctant to send out unsolicited emails. Previous attempts had met with unfavourable response rates from the consultants and in recognition of the fact that the Company's employees had just responded to a number of internal questionnaires with regards to the 'Full Potential' change programme (the project name for the Company re-structure programme).

Findings

Belbin's SPI results

Belbin explains that: *"The highest score on team role will indicate how best the respondent can make his or her mark in a management or project team. The next highest score can denote back-up team roles towards which the individual should shift if for some reason there was less group need for a primary team role. The two lowest scores in team role imply possible areas of weakness. But rather than attempting to reform in this area the manager may be better advised to seek a colleague with complementary strengths."*[12]

The central tennent of Belbin's work is that the more balanced a team is, in terms of the distribution of the 'team roles' within the team, the more likely that that the team will perform effectively. Belbin's argument would therefore suggest that a balanced team would include either nine individuals' demonstrating a 'natural preference' (primary team role) for each of the team roles or that the individuals within the team were 'able to assume' (back-up team role) those roles that were not represented.

The results from the Belbin SPI suggest that of the nine team roles, the roles of Implementer and Shaper were the most prevalent, illustrated by the fact that the corresponding mean scores (across the whole sample) of the two team roles were 11.12 and 9.44 respectively. In contrast, if we exclude the Specialist role (which was arguably less behaviourally orientated than the other eight roles), then the two least favoured roles in the sample were those respondents' who portray Plant (the ideas person; mean score - 5.44) and Monitor Evaluator

(the strategic, discerning, option seeing person; mean score - 6.98) characteristics. In his 4 x 2 taxonomy, Belbin suggests that these two roles, Plant and Monitor Evaluator, were positively associated, that they can be 'paired' together and that these two roles epitomise the 'intellect' and creative qualities of the team.

Table 1 indicates the range of SPI scores for each of the nine team roles in the Company, illustrating the lowest and highest scores, and the mean and standard deviation for each of the roles.

Table 1 A brief summary of the nine team-role scores

	Minimum	Maximum	Mean	Standard Deviation
Completer Finisher	0	17	7.47	4.15
Implementer	2	23	11.12	4.18
Monitor Evaluator	0	19	6.98	4.15
Coordinator	2	16	8.21	3.82
Team Worker	0	16	7.26	3.49
Resource Investigator	0	16	7.14	3.75
Shaper	3	17	9.44	3.76
Plant	0	18	5.44	4.24
Specialist	0	19	6.95	4.28

Team role correlations For comparison purposes the Specialist team role has been removed as this role was not determined by personality tests and was not thought to be associated with any of the other eight roles. The statistically significant findings suggest that the most popular Implementer role was negatively correlated ($p<0.01$) with that of the Team Worker role. This was contrary to Belbin's (1981) and Senior's (1998) finding that suggests that it

was the Shaper role which should be negatively correlated with and *"mutually exclusive to that of Teamworker."*[13] In this study, it was the Implementer role that was negatively correlated with the Team Worker role and as such it was unlikely that individuals with a preference for an Implementer-type role will be able to assume a Team Worker role. Although not considered statistically significant, the second strongest role in the sample, the Shaper role, was also negatively correlated with the Team Worker role, which was what would be expected given both Belbin (1981) and Senior's (1998) previous research. Given the high affinity of the respondents within the sample to adopt a Shaper role, Senior (1998) would argue that to avoid conflict in newly formed teams these strong Shaper roles should be balanced by including individuals with strong Team Worker roles[14]. However, the data collected suggests that only three of the respondents from the sample have a tendency towards the Team Worker role as a natural preference (primary role) role and only five respondents would be able to assume the role (back-up role) if the circumstances called for it

Other statistically significant results suggest that the Implementer role was negatively correlated with the Plant role ($p<0.05$), and that Resource Investigator was negatively correlated with the Completer Finisher role ($p<0.01$) – all of which concurs with both Dulewicz (1995) and Fisher et al's (2000) findings. The Resource Investigator role was also found to be negatively correlated with that of Monitor Evaluator ($p<0.05$), which was in agreement with Dulewicz's (1995) research. In terms of the Plant role, this team role was found to be negatively correlated with the Completer Finisher role ($p<0.01$), which was accordance to Fisher et al's (2000) study.

Primary and secondary team roles

Figure 2 represents a breakdown of the respondents' primary and secondary team roles, it shows that the Implementer, Shaper and Specialist roles were the three most frequently occurring primary roles, whereas the Completer Finisher and Resource Investigator were the two most scarce primary roles. The remaining roles, Plant, Team Worker and Monitor Evaluator occupy the more middle-order positions in terms of the number of respondents who demonstrate characteristics that determine their 'primary team role.'

[13] Senior, B. (1998), ***An empirically-based assessment of Belbin's team roles***, Human Resource Management Journal, 8, p57
[14]

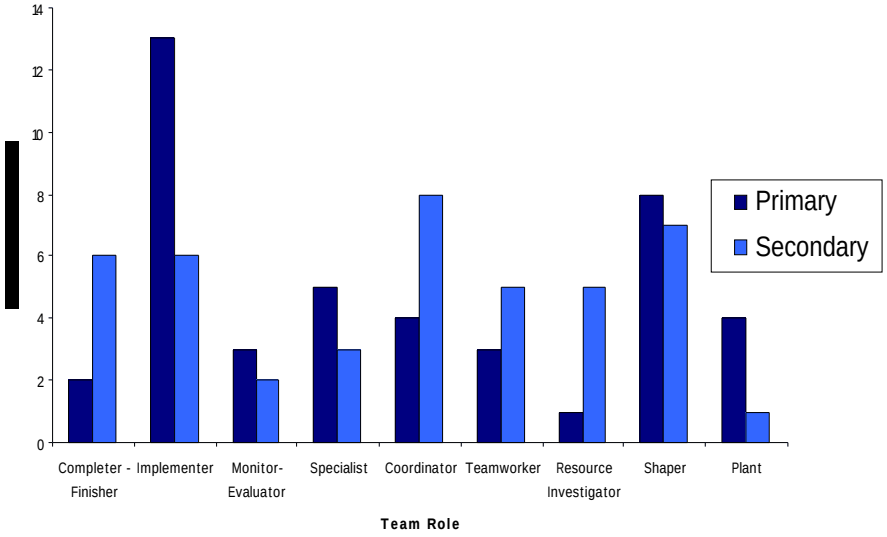


Figure 2 Consultants primary and secondary team roles (scores adjusted)

In order to limit each individuals' results to only one primary and one secondary role, in cases where two or more team roles appeared to be equally dominant, the respondent was then asked to relegate one of the two team roles to a secondary role – this was done by explaining that the two roles were represented equally and asking the respondent to select the one that, in their opinion, best characterised themselves – thus this role became the primary role and the other the secondary role. In the absence of feedback loop opportunities, bias was given to the primary team role based on the group results, for example if two roles appeared to be equally dominant, the more popular role in the sample was chosen as the primary role and the other was relegated to the secondary role.

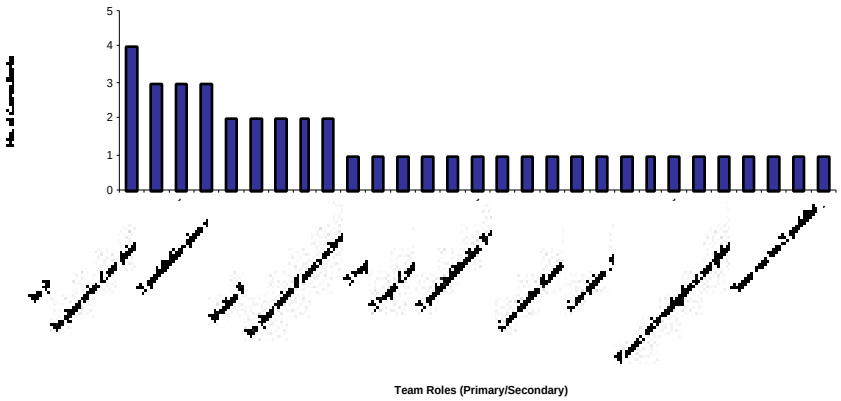
Team role combinations

Figure 3 represents the various team role combinations of respondents in terms of their primary and secondary roles. As before, the results were adjusted to illustrate how many of the responses demonstrate which primary and secondary team role combinations. The results show that the most popular combination was that of Implementer / Coordinator, closely followed by Implementer / Shaper, Implementer / Completer Finisher and Shaper / Coordinator combinations, other such combinations were depicted below.

Team role strengths and weaknesses

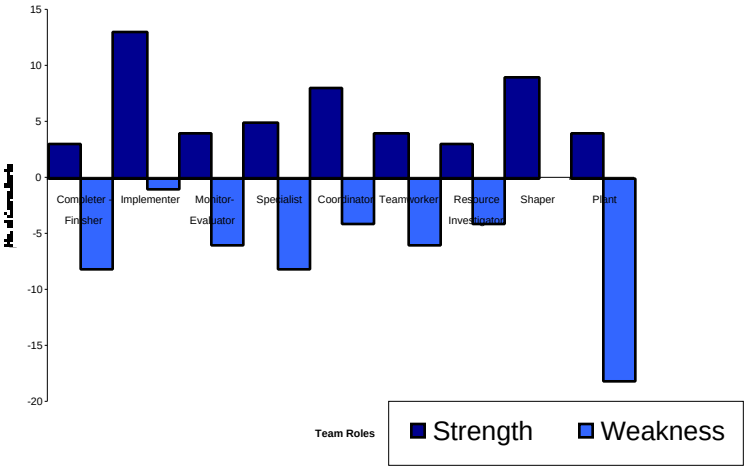
The diagram below, Figure 3 indicates the main areas of strength and weaknesses taken from

Figure 3 Consultant team role combinations (primary/secondary)



the sample. Each respondent's highest team role score and their lowest score is marked on the bar chart for each type of role. As a result, the diagram denotes both those areas of the sample's greatest strengths and greatest weaknesses.

Figure 4 Consultants team role strengths versus team role weaknesses



The results from the sample indicate that in terms of team role strengths, thirteen of those surveyed revealed a high degree of identification with Implementer team role traits and to a

lesser extent the Shaper (nine of the consultants) and Coordinator (eight of the consultants) team role traits. In contrast, in terms of the weakest team roles, eighteen of the consultants polled scored the lowest on the Plant in the Belbin SPI questionnaire, followed by that of Completer Finisher (eight of the consultants) and Specialist (eight of the consultants). The results also drew attention to the fact that from the consultants polled, not one of them scored the Shaper role as their lowest scoring team role and only one consultant scored the Implementer role as their lowest scoring team role. Given that both these team roles were found to be negatively correlated with the Team Worker role, it seems unlikely that many consultants would be able to assume this role.

Role norms

In his initial research, Belbin found that some of eight team roles were more popular than others. To allow the scores from the SPI to be directly comparable between surveys, he derived a table of norms (See Table 3), thus for example an individual scoring 10 or more for the Completer Finisher (CF) role would have a high preference to that role, while a score of 10 in the coordinator role would have an average affinity for that role. To compare our role norms with those in Bebin's research, the cumulative percentages taken from the sample were used to determine the range of scores that were deemed to be low (0-33%), medium (33-66%), high (66-85%) and very high (85-100%) for each of the eight original team roles. Table 4 highlights the norms calculated for this study.

Table 3 Belbin's team role norms

	CF	**IM**	**ME**	**CO**	**TW**	**RI**	**SH**	**PL**
Low (0 – 33%)	0-3	0-6	0-5	0-6	0-8	0-6	0-8	0-4
Average (33 – 66%)	4-6	7-11	6-9	7-10	9-12	7-9	9-13	5-8
High (66 – 85%)	7-9	12-16	10-12	11-13	13-16	10-11	14-17	9-12
Very High (85 – 100%)	10-17	17-23	13-19	14-18	17-25	12-21	18-36	13-29

Table 4 Team role norms for this study

	CF	IM	ME	CO	TW	RI	SH	PL
Low (0 – 33%)	0-6	0-9	0-6	0-6	0-5	0-5	0-7	0-3
Average (33 – 66%)	7-9	10-11	7-8	7-9	6-8	6-8	8-12	4-6
High (66 – 85%)	10-11	12-16	9-10	10-12	9-11	9-12	13	7-10
Very High (85 – 100%)	12-17	17-23	11-19	13-16	12-16	13-16	14-17	11-18

A comparison between the role norms between the two studies shows that the majority of the team role scores and consequent ranges were similar. However, three of the team roles stood out as significantly different between this study and Belbin's findings, that of the Team Worker, Plant and Shaper. The norms for the Team Worker role in this study were considerably lower than those found in Belbin's research, for example, in Belbin's work, respondents with a very high (85-100%) Team Worker SPI score ranged from 17 to 25, in comparison to those found in this study where very high SPI scores ranged from 12 to 16. Both the Plant and Shaper roles also scored significantly lower in very-high ranges than was found in Belbin's work. In terms of the Plant role, very high scores ranged from 13 to 29 in Belbin's study compared to 11 to 18 in this study. Similarly, in the Shaper role, high scores ranged from 18 to 36 compared to 14 to 17 in this study. While these findings were of interest, it must be noted that Belbin's research was much more rigorous than this study and that the small sample size in this study would no doubt affect the norms for each of the team roles.

A comparison of 'bench' consultants with 'on-site' consultants

One area of interest in this study was whether or not there was any differences between the team roles of those consultants polled from the 'bench' and those consultants polled 'on-site', that might possibly explained by changing demand patterns from the client base. Thus a comparison was made between the team roles from each group of consultants using an independent-samples t-test, however no significant differences were found, as was illustrated in the table 5 below.

Table 5 A comparison of 'bench' consultants' and 'on-site' consultants' team roles

TEAM ROLE	***BENCH CONSULTANTS***		***ON-SITE CONSULTANTS***	
	Mean	**Standard Deviation**	**Mean**	**Standard Deviation**
Complete Finisher	8.19	4.51	6.69	3.18
Implementer	11.38	4.61	10.81	3.60
Monitor Evaluator	7.35	4.34	6.38	4.05
Specialist	6.77	4.76	7.44	3.56
Coordinator	8.23	4.17	8.25	3.44
Team Worker	6.88	3.71	7.94	3.21
Resource Investigator	7.19	3.85	6.75	3.61
Shaper	9.38	3.89	9.31	3.67
Plant	4.62	3.95	6.44	4.47

Belbin's 4 x 2 taxonomy – a factor analysis

An oblique factor analysis of the sample data was carried out to identify if the team role scores could be grouped together using a principal component analysis (see Table 6. Factor analysis was used with the aim of testing Belbin's pairing taxonomy, that four pairs of team roles were complementary and counterbalancing. Proponents of factor analysis would argue that at least 5 cases of each item to be factor analysed were needed, and our sample falls just under this requirement. However, it was felt that this analysis would be helpful to test which of the team roles could be grouped together.

Table 6 A factor analysis of the nine team roles

TEAM ROLE	*COMPONENT*			
	1	**2**	**3**	**4**
Plant	.902			
Completer Finisher	-.806			
Specialist		-.818		
Coordinator		.800		
Shaper		.626	-.412	
Team Worker			.900	
Implementer	-.376		-.704	
Monitor Evaluator				-.868
Resource Investigator	.540			.738
Eigenvalue	2.18	1.79	1.55	1.24
% variance	24.21	19.85	17.25	13.73

The results from the factor analysis suggest that, in Group 1, the roles of Plant and Resource Investigator can be clustered together, and that Completer Finisher and Implementer demonstrate tendencies in the opposite direction, which was counter to Belbin's claim that Plant and Monitor Evaluator represent the 'negotiator' pairing, in that they both exhibit good negotiator characteristics. Interestingly Belbin did advocate that Completer Finisher and Implementer roles were linked and displayed 'manager-worker' tendencies, but this cannot be concluded from these findings. In Group 2, the roles of Coordinator and Shaper can be clustered together, and that the Specialist role demonstrates tendencies in the opposite direction, which was in agreement with Belbin's findings whereby the Coordinator and Shaper roles exhibited 'leadership' characteristics and that the Specialist was not associated with any of the other eight roles. In Group 3, the Team Worker role stood alone, and the Implementer and Shaper roles demonstrated contradictory tendencies, which was further supported by these findings that show these two roles were both negatively correlated with that of Team Worker, which was contrary to Belbin's Team Worker and Resource Investigator 'negotiator' pairing. In Group 4, the Monitor Evaluator role stood completely

alone and was not related to any of the other team roles, and the Resource Investigator demonstrated contradictory tendencies to this role.

In this cluster analysis, this sample only supported Belbin's Coordinator and Shaper pairing. From the limited sample in this study there was no support for the other three pairings. However, our study is consistent with Dulewicz's (1995) research in that the findings do not support either the "team role structures presented by Furnham et al (1993), nor do they appear to support Belbin's (1981) proposed 4 x 2 taxonomy of negotiators, manager-workers, intellectuals and team leaders."[15]

Interpretation

Given the Company's desire to move towards team based solutions and the Company's current team role profile, this investigation questions their ability to make this transition without encountering some problems. The findings in this study suggested that a sample of the current consultants within the Company demonstrated predominantly Implementer and Shaper team role characteristics, and that these two prevalent team roles were contrary to the role of the Team Worker. Belbin (1981) and Senior's (1998) research suggested that teams with more than one Shaper were prone to in-fighting, as Shapers tend to covet the leadership position within the team, and that to counter this a strong Team Worker role was needed. These findings suggested that the Company did not have the depth of consultants demonstrating a strong Team Worker role that would be required to enable teams to run smoothly. This was borne out by the fact that only three of forty-three polled exhibited the Team Worker role as their primary role and that their team role scores were extremely low when compared to Belbin's research norms.

The results from this research suggest that in this sample, the Implementer and Shaper roles have the strongest depth in terms of the number of respondents with this as their preferred team role. This is further supported by the fact that, with the exception of one consultant, none of the consultants in this sample indicated that Implementer and Shaper were their weakest roles. In addition, in this sample of consultants, there are not enough consultants who work in the Team Worker and Plant roles. This would suggest that the Company has

[15] Dulewicz, V. (1995), ***A validation of Belbin's team roles from 16PF and OPQ using bosses' ratings of competence***, Journal of

limited capability to adopt a team-based approach to its work as a balance of all role types is required for successful teams.

Final Conclusion

The structure of this organisation, in terms of its hierarchy, its support systems, methods of working, and the relationships between its consultants supports and re-enforces an individualistic culture. Proof of this was further illustrated when the researchers examined the personal profiles of the consultants within the organisation, where it was found that the characteristics exhibited aligned more to individual working practices than those associated with successful team working.

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