

Chapter 4

RESEARCH RESULTS

This chapter presents the findings of the study. First, it describes the characteristics of the respondents and discusses the practice of Covey's 'effective habits' by consulting engineers. Then it discusses the relationship between the practice of each habit vis-a-vis the demographic variables of consulting engineers. Finally, it evaluates the influence of the demographic variables on the effective habits of consulting engineers.

4.1 CHARACTERISTICS OF THE RESPONDENTS

The response rate to the survey was 87.5%. Although 175 consulting engineers responded to the questionnaires, only 170 sets of data were fully usable. Table 4.1 summarises the characteristics of the respondents.

The respondents consisted of more males (82.9%) as compared to females (17.1%). This is because the engineering consulting profession is still male dominated. Approximately 75% of the respondents were below 30 years of age. This could be due to the fact that many fresh graduates work as consulting engineers and subsequently change professions after a few years in engineering consulting firms. The recession in

the mid 80's also may have caused many engineers to abandon the consulting profession.

Table 4.1 : Characteristics of the Respondents

<u>Characteristic</u>	<u>N¹</u>	<u>%</u>
<u>Sex</u>		
Male	145	82.9
Female	30	17.1
<u>Age</u>		
Below 25 years	45	25.9
26 to 30 years	87	50.0
31 to 35 years	24	13.8
36 to 40 years	12	6.9
41 to 45 years	4	2.3
Above 55 years	2	1.1
<u>Race</u>		
Malay	26	14.9
Chinese	137	78.3
Indian	10	5.7
Other	2	1.1
<u>Marital Status</u>		
Single	114	68.1
Married	60	34.3
Divorced/Widowed	1	0.6
<u>Education Level</u>		
Diploma	10	5.7
Bachelors Degree	151	86.3
Post Graduate Degree	14	8.0

¹ Total value of N may not add up to 175 due to missing values.

	<u>N</u>	<u>%</u>
<u>Number Of Years Working As A Consultant</u>		
Below 10 years	162	92.6
11 to 20 years	11	6.3
21 to 30 years	2	1.1

<u>Number Of Years Working Not As A Consultant</u>		
Below 10 years	173	98.9
11 - 20 years	2	84.0

<u>Professional Engineer</u>		
Yes	28	16.0
No	14.7	84.0

<u>Annual Income</u>		
Below RM30,000	99	56.6
RM30,001 to 60,000	56	32.0
RM60,001 to 90,000	13	7.4
RM90,001 to 12,000	1	0.6
Above RM120,001	5	2.9

<u>Size Of Firm</u>		
Below 20 staff	83	47.4
21 to 40 staff	18	10.3
41 to 60 staff	22	12.6
61 to 80 staff	13	7.4
81 to 100 Staff	6	3.4
Above 100 staff	32	18.3

<u>Engineering Discipline</u>		
Civil	142	81.1
Mechanical	13	7.4
Electrical	14	8.0
Other	5	2.9

The respondents ethnic breakdown appears to be representative of the ethnic composition in the consulting profession. 78.3% of them were Chinese, 14.9% were Malay and 5.7% were Indian. 65.1% of the respondents were single whereas 34.3% were married. This tallies with the age group of the respondents as 75% of the respondents were below 30 and so were not likely to have been married.

With regard to academic qualification, 86.3% of the respondents had a bachelors degree and 8.0% of them a post graduate degree. But 5.7% of them had only a diploma.

As for the number of years the respondents had worked as consulting engineers, 92.6% had worked less than 10 years, 6.3% had worked between 11 to 20 years and only 1.1% had worked more than 21 years. None had worked more than 30 years. Of the respondents, only 1.1% had worked more than 11 years in other professions besides consultancy. Furthermore, only 16.0% of the respondents were "professional engineers" registered with the BEM. And as for the annual income of the respondents, 56.6% earned less than RM30,000 and 32% earned between RM30,001 to RM60,000. Only 2.9% earned more than RM120,001 per year. This 2.9% may be partners or directors of consulting engineering firms.

Approximately 47.4% of the respondents indicated that they were from firms which had less than 20 staff while 18.3% came from firms which had more than 100 staff. But, based on the actual distribution of the questionnaires, this figure does not tally. Most of the questionnaires were distributed to firms which had more than 20

staff. Respondents may have misread the question, "number of staff in your firm, including the directors" as "number of engineers in the firm" or "number of staff in your section". Because of to this discrepancy, this item was excluded from subsequent analysis to avoid polluting the results.

As for the engineering discipline they were in, 81.1% of the respondents were civil engineers and 7.4% and 8.0% were mechanical and electrical engineers, respectively. This appears to be representative of the situation in the Klang Valley.

4.2 RELIABILITY OF THE QUESTIONNAIRE

The internal consistency test using Cronbach's Coefficient Alpha was carried out to assess the homogeneity of the measures. Table 4.2 summarises the results of the value of Cronbach's Coefficient alpha of the items for each habit, as well as for the combined habits.

Table 4.2: Reliability of Each Habit Scale

Scale	Alpha
Habit 1	0.5944
Habit 2	0.5615
Habit 3	0.6467
Habit 4	0.5746
Habit 5	0.6431
Habit 6	0.6046
Habit 7	0.7091
Combined Habits	0.8461

Based on Nunnally's guideline on the necessary value of alpha of a scale for exploratory research, all the items in each habit were reliable as they all had a value in excess of 0.5. Also, the combined habits had a reliability of 0.8461. This means that the items in the questionnaire were consistent and free from error and that the questionnaire itself was a reliable measure for exploratory research.

4.3 THE PRACTICE OF "EFFECTIVE HABITS" BY CONSULTING ENGINEERS

The mean score of each habit item was computed to identify the level of practice of Covey's "effective habits" by consulting engineers. Each score was then compared with the preset index, where a mean score of "3" indicates "Very Poor", "6" indicates "Poor", "9" indicates "Fair", "12" indicates "Good", "15" indicates "Very Good" and "18" indicates "Outstanding".

Table 4.3: Mean Score of Each Habit

Score	Mean of Scores
Habit 1	11.433
Habit 2	11.716
Habit 3	11.934
Habit 4	12.092
Habit 5	11.697
Habit 6	11.679
Habit 7	12.929

As can be seen from Table 4.3, consulting engineers do indeed practice Covey's "effective habits". The habit that was best practised was Habit 7 (Habit of Self

Renewal), followed by Habit 4 (Habit of Win/Win). The habit that was least practised was Habit 1 (Habit of Being Proactive). The level of their scores averages "good" but falls well short of "very good". Based on what Covey advocates, these habits should be cultivated so that a "very good" or even "outstanding" level can be achieved.

4.4 THE RELATIONSHIP BETWEEN THE PRACTICE OF EFFECTIVE HABITS AND THE DEMOGRAPHIC VARIABLES OF CONSULTING ENGINEERS

Stepwise multiple regression analyses were carried out to identify the predictive demographic variables on the practice of each effective habits as well as the combined effective habits of consulting engineers. The results of the analyses with the F-Level of significance are shown in Table 4.4. Only those items which are significant at the 0.05 level are shown. The overall adjusted coefficient of determination (R Square) for each habit is also shown in the table. The adjusted R Square values indicate the variance in the practice of each habit about its mean as explained by the significant predictor variables.

Table 4.4: Regression Tables Of Each Habit

Habit	Constant	Multiple For				Significant F Value	Adjusted R Square
		X ₁	X ₂	X ₃	X ₄		
1	10.598	0.416				0.0049	0.041
2	10.902	0.497				0.0049	0.040
3	13.732		-1.522			0.0005	0.063
4	7.692			1.378	0.857	0.0001	0.090
5	6.638			1.275	0.853	0.0002	0.085
6	9.372			1.204		0.0053	0.039
7	14.047		0.921			0.0003	0.108

where: X_1 = Demographic Variable : Income
 X_2 = Demographic Variable : Sex
 X_3 = Demographic Variable : Education Level
 X_4 = Demographic Variable : Race

As Table 4.4 indicates, only the variable "income" was significant in predicting the practice of Habit 1 (Be Proactive) and Habit 2 (Begin With the End in Mind). For Habit 3, (Put First Things First) the variable "sex" was significant in predicting that habit. The negative relationship shows that male engineers have a better level of practice of Habit 3 as compared to female engineers. The variables "education level" and "race" were significant in predicting the practice of both Habit 4 (Think Win/Win) and Habit 5 (Seek First to Understand). Habit 6 (Synergize) was best predicted by the variable "education level". And Habit 7(Sharpen The Saw) was best predicted by the variable "sex", with male engineers having a better level of practice of this habit as compared with female engineers.

For the practice of the combined habits, the linear regression formula obtained was:-

$$\text{Combined Habits} = 69.799 - 3.795X_2 + 6.561X_3 + 2.6346X_4$$

* * **

where X_1, X_2, X_3 and X_4 have the same notation as shown above, where * indicates significant at the 0.10 level and ** indicates significant at the 0.05 level.

On the whole, the linear model was significant at the 0.0003 level. The overall adjusted coefficient of determination (R Square) had a value of 0.108. This means

that 10.8% of the variance in the practice of the combined habits scores about its mean was explained by the significant predictor variables.

From the equation in the model, the variables "sex" and "education level" best predicted the practice of the combined habits. This is followed by the variable "race". The remaining variables (like "professional engineer", "age" and "annual income" were not significant predictors in the practice of the effective habits.

4.5 ORGANISATION OF DATA BY GROUPS FOR COMPARISONS

The influence of the demographic variables on the effective habits was evaluated by two different analyses. The first analysis involved organising the data into groups for comparisons by means of crosstabulation. Crosstabulations were done using all the independent variables and the Combined Habits. Percentages were calculated across the Combined Habits and the Pearson Chi-Square Significance Values were obtained for each independent variable. If the value obtained is less than 0.05, then it can be concluded that the variables are dependent of each other. Table 4.5 summarises the results of the crosstabulation.

Table 4.5 : Summary of Results of Crosstabulation

Demographic Variable	Pearson Chi-Square Significance Value	Significance of Variable (at 0.05 level)	Variable Dependent	Null Hypothesis
Sex	0.02121	Yes	Yes	Reject
Age	0.04905	Yes	Yes	Reject
Race	0.03667	Yes	Yes	Reject
Marital Status	0.03394	Yes	Yes	Reject
Education Level	0.02614	Yes	Yes	Reject
Number of Years in Consultancy	0.70225	No	No	Accept
Professional Engineer	0.75176	No	No	Accept
Income	0.49314	No	No	Accept
Engineering Discipline	0.43906	No	No	Accept

As can be seen from the table, the variables "sex", "age", "race", "marital status" and "education level" had significant influence on the practice of the effective habits. The practice of the effective habits was dependent on these variables. On the other hand, the practice of effective habits is independent of the variables "number of years in consultancy", "professional engineer", "income" and "engineering discipline".

4.6 COMPARATIVE ANALYSIS ON THE MEANS OF HABITS WITH DEMOGRAPHIC VARIABLES

The second analysis conducted to evaluate the influence of the demographic variables on the effective habits involved comparative analysis by means of anova. Anova was used to test the significance in the differences of intra-groups means of

each independent variable. The observed statistic (F-values) were compared with the test value at the 0.05 level of significance to gauge whether there were significant differences in the means of the sample groups. The results of this analysis are shown in Table 4.6.

Table 4.6: Significance of Differences Between Means of Demographic Variables

Demographic Variable	Significance of F. Obtained	Null Hypothesis	All Means Equal At Significance Level of 0.05
Sex	0.081	Reject	No
Age	0.005	Reject	No
Race	0.045	Reject	No
Marital Status	0.194	Accept	Yes
Education level	0.002	Reject	No
Number of Years In Consultancy	0.656	Accept	Yes
Professional Engineer	0.228	Accept	Yes
Income	0.092	Accept	Yes
Engineering Discipline	0.338	Accept	Yes

From the results, it can be concluded that there were significant differences in the intra-group means of the Combined Habits for variables "education level", "age", "race" and "sex" (in the order of significance). Other than these, the other variables did not have a significant difference in the intra-group means of the Combined Habits at the 0.05 level.

The general results of the t-test show that male engineers had a significantly higher mean score than female engineers, Chinese had a significantly higher mean score than Malays; and respondents with a degree had a higher mean score than those with only a diploma.