CHAPTER 4

FINDINGS

4.1 Introduction

Descriptive statistics of the demographic profiles of the respondents and results of the empirical tests are described in the following sub-sections. Table 3 shows a summary of the demographic characteristics of the sample. Results of other descriptive statistics such as the exploratory factor analysis, correlation and regression analyses are also shown in this chapter.

4.2 Demographic Characteristics of Respondents

Table 3 shows that 63% of the samples were female respondents, while 37% were males. Majority of them (61%) were in the age group of 21 to 30 years old, while 39% were between 31 to 50 years old. The demographic profile also shows that the respondents were holding a position within a unit or a division at their workplace. The respondents were therefore within the allowable working age of Malaysians (i.e. above 16 years old) and they were active employees in the organisations (below retirement age). Therefore, the working population in the country seems to be represented in this study.

Table 3: Demographic Profile of the Respondents

	n	%
Gender		
Male	77	37.0
Female	131	63.0
Age		
20 years & below	0	0
21 to 30 years	127	61.1
31 to 40 years	59	28.4
41-50 years	22	10.6
More than 50 years	0	0
Ethnicity		
Malay	97	46.6
Chinese	73	35.1
Indian	27	13.0
Others	11	5.3
Highest Education Level		
SPM/STPM or less	0	0
Certificate/Diploma	15	7.2
First Degree	150	72.1
Postgraduate Degree (e.g. Master of Doctorate)	42	20.2
Professional Certification	1	0.5
Others	0	0
Job Designation		
Top/Middle Management (e.g. CEO, CFO, COO, VP, GM & etc.)	22	10.6
First Line Management (e.g. Department Manager, Supervisor & etc.)	62	29.8
Executive/Engineer	106	51.0
Support Staff (e.g. Administration Assistant, Clerk & etc.)	18	8.7
Unit/Division		
Information Technology	26	12.5
Engineering	29	13.9
Account/Finance	28	13.5
Logistic/Distribution	17	8.2
Production	8	3.8
Human Resource	25	12.0
Sales/Marketing	29	13.9
Others	46	22.1

Since this study was conducted in Malaysia, majority of the respondents were from the main ethnic groups in this country. About 47% of the respondents were Malays, while 35% were Chinese and 13% were Indians. However, only 5% of the respondents were from a different ethnicity. Therefore, it was assumed that respondents are mainly Malaysians and the rest were either minority groups (other ethnics in Malaysia such as Kadazans, Ibans, and etc.) or foreigners who were working in Malaysia. Hence, it is believed that the sample would be relevant to the Malaysian context.

In terms of education, 92% of respondents were either holding first degree or Postgraduate degree, with only 0.5% having Professional Certification. It generally shows that most of the respondents were highly educated employees. More than half of them were employed either as an executive or an engineer (51%) and they represented several industries including engineering, sales/marketing, account/finance, information technology, human resource, logistic/distribution, and production.

From an overview of the demographic profiles of the respondents, it showed that they have represented the population of working adults in Malaysia. Thus, feedback from the respondents would be relevant for this research as they shared the same characteristics of the targeted population.

4.3 Analyses of Measures

Analyses of the measures were performed to examine the reliability, accuracy and quality of the selected scales for this research. This is important to ensure that the statistical results based on the selected measures are valid and reliable. In this research, the dimensionalities and the reliabilities of the selected scales were obtained through factor analysis and the internal reliability test. The exploratory factor analysis (EFA) was chosen to simplify the interrelated measures. On the other hand, the internal reliability test will determine if the selected measures produce the same results when being tested repeatedly. The following discusses the EFA and the reliabilities of the measurements.

4.3.1 Factor Analysis

Factor analysis was conducted to examine the interrelationships among variables and it also grouped the items based on common underlying factors (Hair et al., 2006). It provides a better solution for justifying the validity of constructs through the interpretation of communalities, eigenvalue, the scree plot, and factor matrix. As suggested by Houghton and Neck (2002), exploratory factor analysis (EFA) was conducted to assess the construct validity of the 35-item Revised Self-Leadership Questionnaire (RSLQ). Prior to performing the EFA, two tests were conducted to determine the suitability of data for structure detection and the factorability of the items. The prerequisite tests for structure detection are the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and the Bartlett's Test of sphericity.

High values (close to 1.0) of KMO and the significant value of Bartlett's Test ($p<0.05$) tend to indicate that the items selected to represent self-leadership are suitable for EFA. With a KMO of 0.85 and significant value of Bartlett's Test ($p=0.00$) for self-leadership measure, the results indicate that the data matrix has sufficient correlations for conducting the factor analysis. As practical significance of the loadings is crucial for preliminary examination of the factor matrix, a critical value of 0.40 was selected as suppression on small coefficients. This is in accordance to the rule of thumb for the minimal level of loading requirement as suggested by Hair et al. (2006).

Communalities for all self-leadership items were above 0.30 (refer to Appendix C), indicating that the extracted components represented the variables well. Since they have met the criteria for the factorability of a correlation, EFA was conducted with all 35 items of self-leadership. Consistent with Houghton and Neck (2002), Principal Component Analysis was used as the extraction method, while Varimax with Kaiser Normalization was used as the rotation method for data reduction as it maximized the sum of variances of the required loadings of the factor matrix (Hair et. al., 2006).

Based on Kaiser's criterion and Scree Test results, 9 factors with eigenvalue of 1 or more were extracted. These components explained a total of 70.68% of the variance and were matched with the research variables for further analysis.

Based on these indicators, all 35 self-leadership items were qualified for further examination.

4.3.2 Reliability

Reliability is referred to the internal consistency of a scale in measuring a construct (Hair et al., 2006). Based on correlation of items within a scale, reliability test will determine if the set of items representing a variable are standardized and are providing similar results when repeatedly tested. Data for this study was further analyzed using Cronbach's alpha reliability test, which is commonly used by researchers.

Out of the 51 items, three were removed to improve the reliability coefficient among variables. They were item 4 of innovative behavior, item 4 (reverse coded) of environmental dynamism and item 5 (reverse coded) for organisational innovativeness. Eventually, only 48 items were qualified for correlations and regression analyses. Reliability coefficient for this study after removing the two items ranged from 0.79 to 0.93, which is above the acceptable level of 0.7 as suggested by Hair et al. (2006). Thus, the result indicates that all variables are reliable and acceptable for further analysis. Details on constructs reliability result are exhibited in Table 4.

Table 4: Reliability of the Constructs

Variable	Item	N	Cronbach's Alpha α
Self-Leadership	35	208	0.93
Innovative Behavior	5	208	0.79
Environmental Dynamism	4	208	0.81
Organisational Innovativeness	4	208	0.83

4.3.3 Correlations Analysis

Correlations analysis was conducted to examine the correlations between the variables, and to determine the strength as well as the direction of the relationship (Coakes, Steed, & Ong, 2010). It can be obtained by using the Bivariate Pearson Product-Moment Correlation Coefficient for continuous variables. Results from this analysis were used to describe the strength and direction of the linear relationships between two variables. Table 5 shows the correlations results between the research variables.

Table 5: Correlation Coefficient Analysis

Variable	1	2	3	4
1. Self-Leadership	(0.93)			
2. Innovative Behavior	0.64**	(0.79)		
3. Environmental Dynamism	0.11	0.25**	(0.81)	
4. Organisational Innovativeness	0.18*	0.35**	0.23**	(0.83)

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 5 shows that except for one, most of the variables were significantly and positively related with one another. Only self-leadership and environmental dynamism was not significantly correlated ($r = 0.11$, $p = 0.12$), suggesting that self-leadership has no appreciable effect on environmental dynamism. The coefficient correlations ranged from 0.11 to 0.64.

According to Cohen (1988), the strength of the correlation is small when the Pearson correlation (r) is between ±0.10 to ±0.29, medium when the r is between ±0.30 to ±0.49, and large when r is between ±0.5 to ±1.0. Based on the results, it was found that only self-leadership and innovative behavior was strongly and positively correlated ($r = 0.64$, $p < 0.01$), while a medium positive correlation was found between innovative behavior and organisational innovativeness ($r = 0.35$, $p < 0.01$). Therefore, both H_1 and H_2 were supported by these results.

On the contrary, there were small and positive correlations between self-leadership and environmental dynamism ($r = 0.11$, $p = 0.12$), self-leadership and organisational innovativeness ($r = 0.18$, $p < 0.05$), innovative behavior and environmental dynamism ($r = 0.25$, $p < 0.01$) and also between environmental dynamism and organisational innovativeness ($r = 0.23$, $p < 0.01$).

As expected, the above findings have suggested that self-leadership will significantly influence innovative behavior, i.e., employees with high self-leadership are likely to display innovative behavior. Accordingly, employees who

display innovative behavior will positively influence the organisational innovativeness of their workplace. However, results had shown that self-leadership was not significantly correlated with environmental dynamism of the organisation. Therefore, environmental dynamism does not have the potential to be a mediator in the relationship between self-leadership and organisational innovativeness as it does not meet the criteria to establish mediation as suggested by Baron and Kenny (1986). Overall, the results indicated that correlations between variables were in accordance to the theoretical framework of this study.

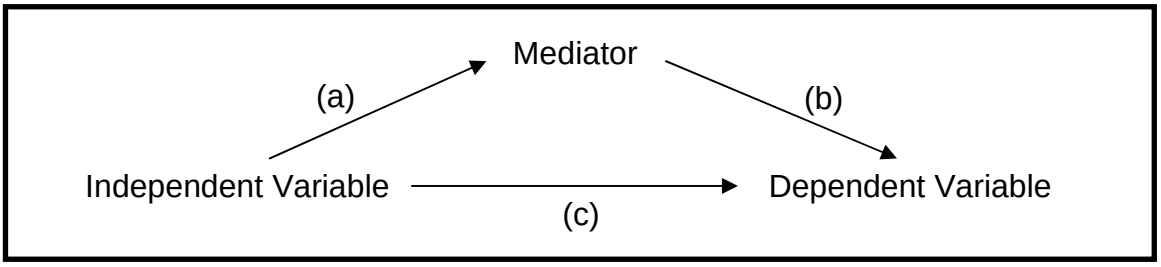
4.4 Hypotheses Testing and Results

Testing of the hypotheses was done through regression analysis as suggested by Baron and Kenny (1986). Both the mediator and moderator effects were tested by using the hierarchical regression analysis. For this study, innovative behavior was tested as a mediator between self-leadership and organisational innovativeness. On the other hand, environmental dynamism was tested as a moderator in the relationship between innovative behavior and organisational innovativeness.

Figure 2 illustrates the path diagram of a mediation model as proposed by Baron and Kenny (1986). The first step to test the mediator effect was to run a simple regression analysis with self-leadership predicting organisational innovativeness

(path c). This was followed by an analysis of self-leadership predicting innovative behavior (path a). The third step was to conduct another simple regression analysis with innovative behavior predicting organisational innovativeness (path b). Finally, a multiple regression analysis was conducted to test the indirect relationship between self-leadership and organisational innovativeness, by inserting innovative behavior as mediator.

Figure 2: Path Diagram of a Mediation Model



Source: Baron, R., & Kenny, D. (1986). The Moderator-Mediator Variable Distinction in Social Psychology Research: Conceptual, Strategic and Statistical Considerations. *Journal of Personality and Social Psychology*, 51(6), 1173-1182.

Results of the mediated regression analysis are shown in Table 6.

Table 6: Mediated Regression Analysis between Self-Leadership, Innovative Behavior and Organisational Innovativeness

Level	Dependent Variable	Independent Variable	B	β	R^2
1	Organisational Innovativeness	Self-Leadership	0.04**	0.18**	0.03
2	Innovative Behavior^M	Self-Leadership	0.12**	0.64**	0.40
3	Organisational Innovativeness	Innovative Behavior^M	0.37**	0.35**	0.12
4	Organisational Innovativeness	Self-Leadership	-0.02	-0.07	0.13
		Innovative Behavior^M	0.42**	0.40**	

Note: M is the mediator. β is standardized Beta coefficient. *p<.05, **p<.01

According to Baron and Kenny (1986), mediation is not possible if one or more relationships (level 1, 2 and 3) of the simple regression are insignificant. Referring to the Table 6, all simple regressions (path a, b and c) were significant at $p<0.01$, indicating that there was a possibility of mediation effect. It is said that some form of mediation was supported since the effect of innovative behavior remain significant after controlling for self-leadership.

The next step was to determine if a partial or full mediation has occurred by interpreting the results of the multiple regression analysis (refer to level 4) in Table 6. Since the relationship between self-leadership and organisational innovativeness was no longer significant when innovative behavior was added into the model ($\beta = -0.07$, $p = 0.39$), it is said that innovative behavior was fully mediating the relationship between self-leadership and organisational innovativeness.

Nevertheless, according to Preacher and Leonardelli (2003), the Baron and Kenny's (1986) method inherits the Type I error and unable to address the significance of indirect effect. They suggested that the mediation effect should be evaluated using Sobel test which is superior to the Baron and Kenny's (1986) method. Thus, Sobel test was conducted for this study via the online calculator located at http://quantpsy.org/sobel/sobel.htm. Based on the online Sobel test calculator, the results indicate that the indirect effect of seld-leadership, innovative behavior and organisational innovativeness were significant ($z = 4.84$, $p = 0.00$). Therefore, the results revealed that full mediation has occurred as the Sobel's z-value was significant and the beta weight for the relationship between self-leadership and organisational innovativeness became insignificant in the multiple regressions.

However, a mediator may suggest an environmental intervention that would increase the controllability of social encounters (Baron & Kenny, 1986). Thus, moderated regression analysis was conducted on environmental dynamism as a moderator between innovative behavior and organisational innovativeness. Using hierarchical regression method, the interaction was tested by creating an interaction variable, known as IBED. IBED is a newly computed variable by multiplying innovative behavior and environmental dynamism to create an interaction term. A moderator is said to exist if the addition of IBED into the model significantly increased the R^2.

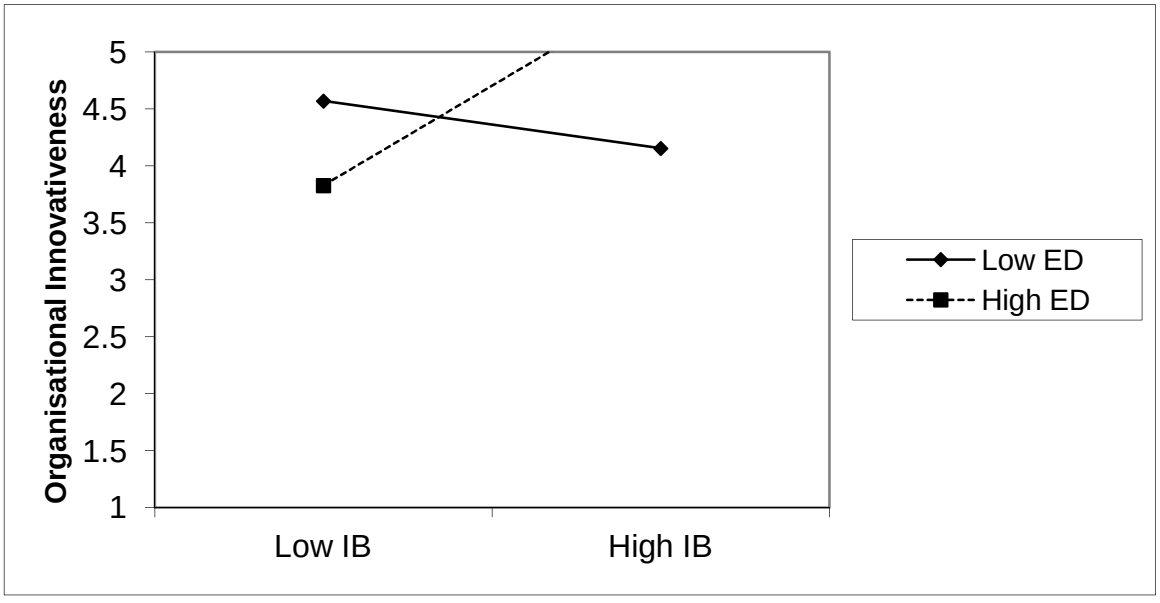
Based on the results shown in Table 7, the R^2 change was 0.04 with the addition of the interaction variable (IBED) in Model 2. The change was significant at $F(1,204) = 9.80$, $p < 0.01$, confirming that environmental dynamism has moderated the effect of innovative behavior on organisational innovativeness.

Table 7: Moderated Regression Analysis between Innovative Behavior, Environmental Dynamism and Organisational Innovativeness

Model	R^2	Adjusted R^2	R^2 Change	df1	df2	Sig. F Change
1	0.14	0.14	0.14	2	205	0.00
2	0.18	0.17	0.04	1	204	0.00

Additionally, the moderation was further confirmed through the interaction effect graph as illustrated in Figure 3.

Figure 3: Interaction Effect of the Moderator



As highlighted earlier, H_4 predicted a moderating influence of environmental dynamism on the relationship between innovative behavior and organisational innovativeness. Referring to the Figure 3, the interaction between environmental dynamism and innovative behavior was in the expected direction and consistent with H_4 ($t = 3.13$, $p = 0.00$).

The positive sign of the coefficient indicates that environmental dynamism significantly influences organisational innovativeness under conditions of high innovative behavior. In other words, the influence of environmental dynamism increases as innovative behavior rises. Figure 3 depicts this interaction based on median splits of innovative behavior and perceptions of the level of environmental dynamism. As a conclusion, it was confirmed that environmental dynamism moderates the relationship between innovative behavior and organisational innovativeness.