Chapter 4

Data Analysis

This research aims to examine the impacts of personal factors and social factors on marketing mixes preferences of single-detached house customers. This chapter reports the research results from the analysis that is divided into four sections. Section 4.1 demonstrates the formation of scales and variables from the principle component analysis. Then, section 4.2 explains the characteristics of each variable using descriptive statistics. Section 4.3 demonstrates the results of the Spearman's rank correlation coefficient and reports the screening of independent variables to be used in multiple linear regressions. Finally, the results from hypothesis testing using multiple linear regressions are exhibited in detail in section 4.4.

1. Principle Component Analysis

Principle Component Analysis was employed to define the construct of social factors and seven marketing mixes. Then, Cronbach's alpha was used to confirm the internal reliability of each construct. This section reports the construct and internal reliability of social factors and the seven marketing mixes respectively as follows.

1.1 Construct of Social Factors

According to the literature review, this study examines the impact of social factors from the perspective of influence and trust toward six social network groups, which are representative of different social structures. Factor analysis reveals six groups of constructs that are consistent with the structure of the questionnaire. However, five items of influence and trust of each social network type cannot be separated. Hence, this study forms the social factor items into one construct of each variable to represent each social network type. Nunnally (1978) recommended that the acceptable level of a coefficient alpha is equal to or more than 0.70. The minimum Cronbach's alpha of social factor constructs is 0.87, which is acceptable, so they are used for further analysis.

1.2 Construct of Seven Marketing Mixes

Principle Component Analysis reveals the seven constructs of marketing mixes in this study. However, the internal reliability analysis shows only four highly consistent constructs which are: product (alpha = 0.93), physical evidence (alpha = 0.86), promotion (alpha = 0.74) and process (alpha = 0.75).

As demonstrated in table 4.1, the construct of product consists of items related to the house and the recreation of the project such as house material, design, warranty and security systems. Physical evidence in this context is comprised of items reflecting the credibility of the project such as developer's reputation, sale office, infrastructure and facilities of the project. The construct of promotion contains the items related to the special offers and advertising such as loan services, discount, offers and advertising. Construct of process in this study consists of specialist consultation, additional coordination services offered, price and location, and credibility from advertising and public relations. Even though some of the items of the process are not directly related to the servicing process itself, it is posited to be relevant as they reflect indirect service and interaction such as credibility from advertising and public relations. The results from the factor analysis of the marketing mixes can imply the application of marketing mixes theory in the unique context of the Thai residential property market. Further discussion regarding this result will demonstrate this in chapter five.

According to the findings in this section, only four out of seven marketing mixes elements are extracted. Hence, hypotheses related to the other three, which are hypothesis b, c and e, are dropped from the hypothesis testing.

2. Descriptive Statistic of Variables

This section reports the characteristic of variables through descriptive statistical techniques in order to provide the overview of the samples and other variables, which are used in hypothesis testing.

TABLE 4.1
PRINCIPAL COMPONENT ANALYSIS WITH VARIMAX ROTATION OF MARKETING MIXES

Construct	Factors
Product	material, price VS Material, design, warrantee, project environment, sample house, security, CCTV, project cleaness, convenient transportation, consulting ability
Physical	developer reputation, sale office location, sale office atmosphere, have some sold, infrastructure and facilities, information given from sales, service ability
Promotion	loan service, high discount, comparation of promotions, special interest rate, site visit from ads
Process	specialist consultation, coordination services, price and location, credibility of ads and PRs

2.1 Personal Factors

Most of the variables of personal factors are examined in single-items although those variables are in different data level. Respondents of this survey represent 404 samples that consists of 171 males (42.3%) and 233 females (57.7%). The majority of the participants (approximately 80%) are working age or between 25-45 years old, and more than half of them are single (68.6%). More than 70% of the respondents have undergraduate degrees and approximately 20% are postgraduates. Moreover, approximately 60% of the respondents have their own income that is between 20,000-60,000 Baht per month. About 20% of the respondents earn lower than 20,000, while another half have the income higher than 60,000 Baht. The average level of specific knowledge in house buying is relatively high at 2.83 (S.D. = 0.51) from the five points Likert Scale.

2.2 Social Factors

The social factors of this study are represented through the level of influence and trust of the respondents toward each social network group. The data are all in interval scales. This study divides the social network of a person into six groups in order to examine the level of influence and trust that the respondents have to each

group of social factors structure (see literature review). In accordance with the literature, the analysis of mean and standard deviation shows that each group of social network gets a different level of influence and trust from the perspective of the single-detached house customers. The group of respondents' parents have highest average rate (mean=3.35, S.D. = 0.67), while the group of spouses and children and the spouse's parents have the two lowest means at 1.07 (S.D. = 1.69) and 0.96 (S.D. = 1.50) respectively. In addition, relatives and closed friends experienced friends and specialists have a relatively high average at approximately 2.8 and standard deviation of about 0.5.

2.3 Marketing Mixes

The factor analysis and internal reliability analysis reveals four marketing mixes, which are product, physical evidence, promotion and process. All four marketing mixes have a relatively high preference level at approximately three. The average of product and physical evidence scales are 3.39 (S.D. = 0.56) and 3.35 (S.D. = 0.51) respectively. The means of promotion and process are also nearly the same at 3.16 (S.D. = 0.40) and 3.18 (S.D. = 0.45) correspondingly.

3. Spearman's Rank Correlation Coefficient Analysis

Spearman's rank correlation coefficient is exploited to identify the correlation among independent variables of this study for two reasons. Firstly, it is applicable to the analysis of correlation coefficient of variables with multiple data level (Jones, 1972; McDonald, 2009). Secondly, it is applicable with non-parametric measure and is not assume linear relationship of variables (Jones, 1972; McDonald, 2009). Hence, this study argues that Spearman's rank correlation coefficient best suits this study. The results demonstrate a number of significant relationships between variables both within and between independent variable groups. These results can be used for both hypotheses testing to answer the third research objective, which aims to identify relationship between personal and social factors, and screening the high correlation of independent variables before doing multiple regression analysis.

TABLE 4.2

SPEARMAN'S RANK CORRELATION COEFFICIENT MATRIX OF INDEPENDENT VARIABLES

	1. Gender	2. Status	3. Age	4. Education	5. Personal Income	6. Specific Knowledge	7. Spouse and Child SF	8. Own Parent SF	9. Spouse's Parent SF	10. Relatives & Closed friend SF	11. Experienced Friends SF	12. Specialist SF
1. Gender	1											
2. Status	-.06	1										
3. Age	-.08	.13**	1									
4. Education	-.13*	-.06	.29**	1								
5. Personal income	-.19**	.03	.52**	.32**	1							
6. Specific Knowledge	-.22**	.08	.14**	.12*	.29**	1						
7. Spouse and Child SF	-.05	.89**	.17**	-.03	.08	.05	1					
8. Own Parent SF	.29**	-.04	-.12*	-.11*	-.34**	-.40**	.01	1				
9. Spouse's Parent SF	-.02	.90**	.14**	-.04	.04	.02	.97**	.06	1			
10. Relatives & Closed friend SF	.07	-.11*	-.14**	.01	-.15**	.08	-.12*	.22**	-.05	1		
11. Experienced Friends SF	.01	-.11*	-.12*	-.02	.02	.03	-.12*	.10	-.05	.47**	1	
12. Specialist SF	-.06	-.04	-.04	-.03	.11*	.03	-.06	-.03	.00	.42**	.62**	1

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

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

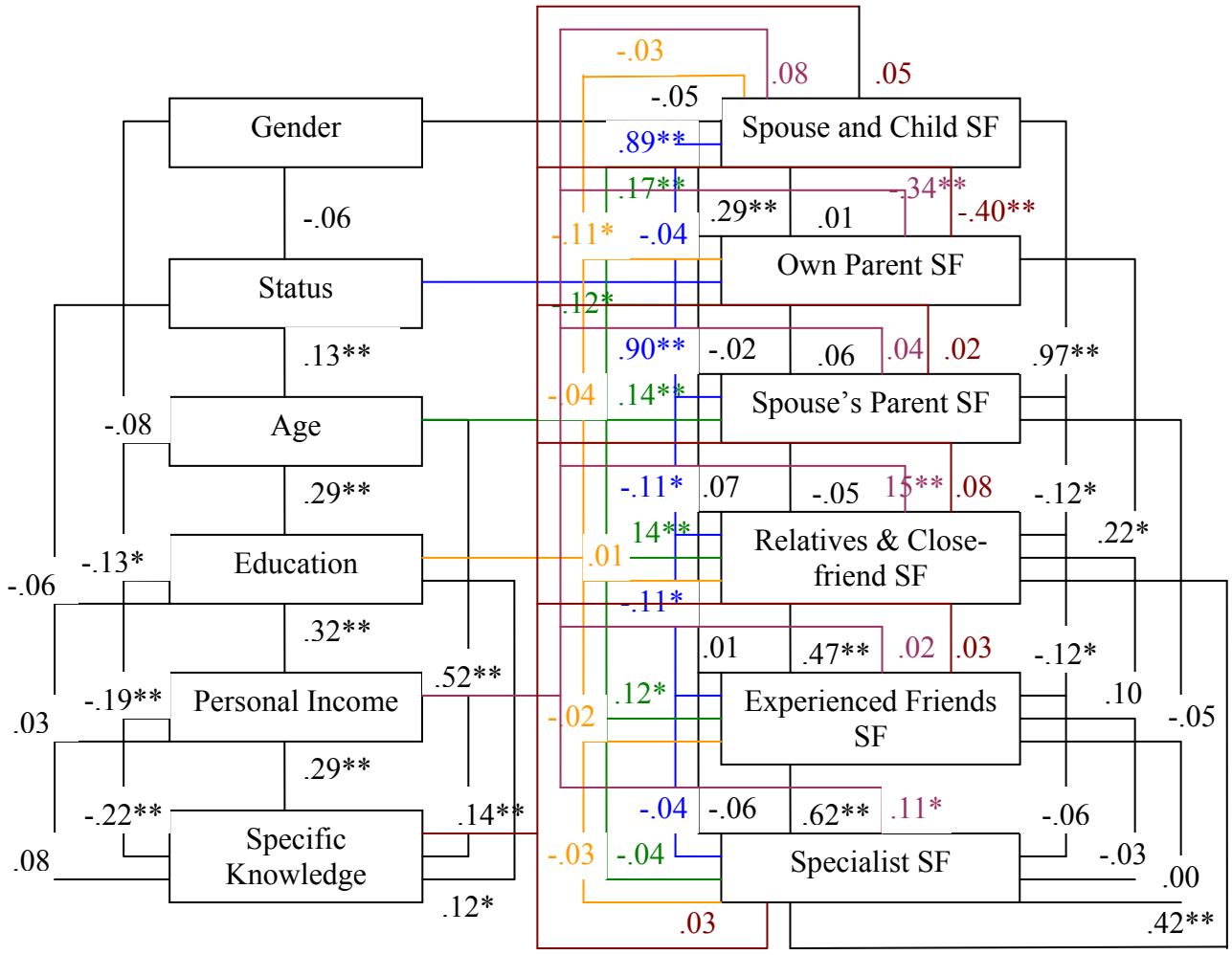
3.1 Spearman's Rank Correlation Coefficient of Personal Factors

Spearman's rank correlation coefficient discloses ten pairs of significant correlations between personal factors. Firstly, gender has a significant negative correlation with the level of formal education ($r = -0.13$, $p \leq 0.05$). Gender is also have a strongly significant negative correlation with personal income ($r = -0.19$, $p \leq 0.01$) and with specific knowledge ($r = -0.22$, $p \leq 0.01$). Secondly, the marital status has a notably significant correlation with age ($r = 0.13$, $p \leq 0.01$). Three strongly significant correlations are found between age and education ($r = 0.29$, $p \leq 0.01$), personal income ($r = 0.52$, $p \leq 0.01$), and specific knowledge ($r = 0.14$, $p \leq 0.01$).

Fourthly, the level of formal education correlates to personal income (r = 0.32, p ≤ 0.01) and specific knowledge (r = 0.12, p ≤ 0.05). In addition, a strong correlation is also found between personal income and specific knowledge (r = 0.29, p ≤ 0.01).

FIGURE 4.1

SPEARMAN'S RANK CORRELATION COEFFICIENT



3.2 Spearman's Rank Correlation Coefficient of Social Factors

There are seven significant correlations revealed within the social factors. The spouse and child in social factors is found to have three significant correlations with the spouse's parent (r = 0.97, p ≤ 0.01), relatives and closed friends (r = -0.12, p ≤ 0.05) and experienced friends (r = -0.12, p ≤ 0.05). The strong significance and high

correlation show the level of similarity among variables, which might affect the predictability of independent variables. As spouse and child, and spouse's parent in social factors are highly correlated, this study desires to delete them from the multiple regression analysis.

The variable of their own parents in social factors is found to have a significant correlation with the relatives and closed friend in social factors ($r = 0.22$, $p \leq 0.05$). Meanwhile, the relative and closed friend in social factors also has a strongly significant correlation with the experienced friends in social factors ($r = 0.47$, $p \leq 0.01$) and the specialist in social factors ($r = 0.42$, $p \leq 0.01$). A notable significant point regarding the relatively high correlation is the correlation between the experienced friends and specialist in social factors ($r = 0.62$, $p \leq 0.01$). However, both variables are not removed from multiple regressions, because this correlation is acceptable and the deletion might affect the result.

3.3 Spearman's Rank Correlation between Personal Factors and Social Factors

Additional to the correlations between variables within the same group, there are also significant correlations between personal and social factors. The correlation between gender and own parent in social factors is found to be strong significance ($r = 0.29$, $p \leq 0.01$). Age has a significant negative correlation with three social factors, which are own parent ($r = -0.12$, $p \leq 0.05$), relative and closed friends ($r = -0.14$, $p \leq 0.01$), and experienced friends ($r = -0.12$, $p \leq 0.05$). Meanwhile, age has a significant positive correlation with the social factors in the group of spouse and child ($r = 0.17$, $p \leq 0.01$) and spouse's parent ($r = 0.14$, $p \leq 0.01$). Education has a negative significant correlation with the own parent in social factors ($r = -0.11$, $p \leq 0.05$). Three correlations are also found between personal income and the own parent group ($r = -0.34$, $p \leq 0.01$), relative and closed friends ($r = -0.15$, $p \leq 0.01$) and specialist ($r = 0.11$, $p \leq 0.05$). Moreover, specific knowledge has a strong negative correlation with the own parent in social factors ($r = -0.40$, $p \leq 0.01$).

There are two strong correlations found between marital status and spouse and child, and spouse's parent in social factors. Those correlations are both strong and

highly correlated at 0.89 ($p \leq 0.01$) and 0.90 ($p \leq 0.01$) respectively. There are the tendencies that too high correlations of independent variables might affect the predictability of independent variables on the dependent variable from the multiple regression analysis. The intervention between highly correlated independent variables can differ the results from multiple regression analysis. Hence, the status is deleted from the analysis using multiple regression.

4. Multiple Regression Analysis

Multiple regression analysis shows a number of significant relationships between dependent and independent variables. This section reports the results from multiple regression analysis following the order of the hypotheses. This section begins with the results from multiple regressions between personal factors and the marketing mixes, and follows by the results between both personal factors and each group of social factors and the marketing mixes.

4.1 Multiple Regression of Personal Factors and Marketing Mixes

This section shows the results from multiple regression analysis that answers the research question one: Do personal factors affect the marketing mixes of single detached-house buying decision making and how? In sum, every personal factor has a significant impact on the level of preference in the marketing mixes of single detached-house customers as demonstrated in table 4.3.

There are both positive and negative relationships revealed from the multiple regression analysis. The relationships between personal factors and marketing mixes are strong. Gender has a significant, positive relationship with the product ($ß= 0.09$, $p \leq 0.05$) and the physical evidence ($ß= 0.10$, $p \leq 0.05$), while the relationships with promotion and process are negative though insignificant. Age is found to have a strong, positive impact on product ($ß= 0.15$, $p \leq 0.01$). The level of formal education is found to have a positive relationship with physical evidence ($ß= 0.11$, $p \leq 0.05$).

The strong, significant negative relationships are shown among personal income and product ($ß= -0.22$, $p \leq 0.01$), physical evidence ($ß= -0.29$, $p \leq 0.01$), promotion ($ß= -0.19$, $p \leq 0.01$), and process ($ß= -0.15$, $p \leq 0.05$). Similarly, two

notably negative significant relationships are revealed among specific knowledge and product (ß= -0.38, $p \leq 0.01$), and physical evidence (ß= -0.35, $p \leq 0.01$).

According to the literature, the coverage of the results of the regression model is shown through the level of R^2 and adjusted R^2. This depends on the number of respondents (Jones, 1972, pp. 203-218; McDonald, 2009). R^2 is used for data collected from the population specified in the research, while the adjusted R^2 is used for the data gathered from the samples. Hence, this study examines the coverage of results through adjusted R^2. The value of adjusted R2 in the model of product and physical are acceptable at 0.22 and 0.24 whereas in the model of promotion and process is too low at 0.01 and 0.00 respectively.

4.2 Multiple Regression of Personal and Social Factors and Marketing Mixes

The results of second research question: do social factors affect the marketing mixes of customers' home buying decision making and how, are shown in this section. In line with the literature, social factors impact a person's behaviour. However, the impact of social factors occur concurrently with other factors, such as personal factors, as they play an external role of influencer instead of the main internal driver of a person. Thus, this study examines the impact of social factors together with personal factors. In addition, the social factors are separately examined in an attempt to identify their impacts both on the change of personal factors' effect and on marketing mixes preferences.

1. Influences of Personal Factors and Parents in Social Factors toward Marketing Mixes Preferences

The analysis from multiple regression shows that the parents in social factors has a relationship with all four marketing mixes. Moreover, it changes the level of relationships between personal factors and the marketing mixes as well as increases the value of adjusted R^2. The parents in social factors has a remarkably high positive impact on the preferences of the marketing mixes, which are: product (ß= 0.56), physical evidence (ß= 0.51), promotion (ß= 0.39), and process (ß= 0.13), at a p-value of less than 0.01. The relationships of personal factors and the marketing mixes are also changed in this model. In general, the level of relationship with the marketing mixes decreases in most personal factors such as, gender, age and formal education.

However, there are some pairs of higher relationship that are revealed. While the relationships of age and product, physical and promotion is decreased, the impact on the process is increased (see table 4.3). Similarly, the levels of impact from personal income and specific knowledge to the marketing mixes are also increased, except for the process.

TABLE 4.3

MULTIPLE REGRESSION OF PERSONAL FACTORS AND PARENT IN SOCIAL FACTORS ON MARKETING MIXES

Variables:	**Product**		**Physical**		**Promotion**		**Process**	
	Model 1	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**
Personal Factors								
Gender	.09*	-.01	.10*	.00	-.05	-.12*	-.06	-.06
Age	.15**	.13**	.08	.06	.11	.10	.10	.13*
Formal Education	.04	.01	.11*	.08	.01	-.01	-.01	-.00
Personal income	-.22**	-.09	-.29**	-.17**	-.19**	-.10	-.15*	-.17**
Specific Knowledge	-.38**	-.21**	-.35**	-.20**	-.04	.09	-.02	-.06
Social Factor: Own Parent		.56**		.51**		.39**		.13**
R^2	.23	.46	.25	.44	.03	.14	.02	.04
Adjusted R^2	.22	.45	.24	.43	.01	.13	.00	.03
F	23.34**	56.08**	26.21**	52.28**	2.10	10.99**	1.36	2.95**
N	404	404	404	404	404	404	404	404

* $p \leq .05$

** $p \leq .01$

2. The Influence of Personal Factors and Relatives and Closed Friends in Social Factors Toward the Marketing Mixes Preferences

The relatives and closed friends in social factors is found to have a significant relationships with product (ß= -0.10, $p \leq 0.05$), promotion (ß= 0.13, $p \leq 0.01$) and process (ß= 0.29, $p \leq 0.01$), but the positive relationship with physical evidence is found to be insignificant (ß= 0.02, $p \geq 0.05$). Unlike the impact of the

parent in social factors, relatives and closed friends has only a slight effect on both adjusted R^2 and relationships between personal factors and the marketing mixes. As shown in Table 4.4, most of the relationships of personal factors and the marketing mixes and the adjusted R^2 remain nearly the same except for the relationships with the promotion and, especially the process.

TABLE 4.4

MULTIPLE REGRESSION OF PERSONAL FACTORS AND RELATIVES AND CLOSED FRIENDS IN SOCIAL FACTORS ON MARKETING MIXES

Variables:	**Product**		**Physical**		**Promotion**		**Process**	
	Model 1	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**
Personal Factors								
Gender	.09*	.10*	.10*	.10*	-.05	-.06	-.06	-.11*
Age	.15**	.14*	.08	.08	.11	.13*	.10	.10
Formal Education	.04	.05	.11*	.10*	.01	-.00	-.01	-.03
Personal income	-.22**	-.23**	-.29**	-.28**	-.19**	-.17**	-.15*	-.08
Specific Knowledge	-.38**	-.37**	-.35**	-.36**	-.04	-.06	-.02	.07
Social Factor: Relatives & Closed Friends		-.10*		.02		.13**		.29**
R^2	.23	.24	.25	.25	.03	.04	.02	.08
Adjusted R^2	.22	.22	.24	.24	.01	.03	.00	.07
F	23.34**	20.41**	26.21**	21.82**	2.10	2.95**	1.36	5.91**
N	404	404	404	404	404	404	404	404

* $p \leq .05$

** $p \leq .01$

3. Influence of Personal Factors and Experienced Friends in Social Factors Toward Marketing Mixes Preferences

According to the results, the experienced friends in social factors has a slight impact or no impact on the marketing mixes as well as on the level of relationships of personal factors. There are only two significant positive relationships

found with physical evidence (ß= 0.10, $p \leq 0.05$) and promotion (ß= 0.11, $p \leq 0.05$) while the relationships with product and process are found to be insignificant at 0.03 and 0.02 ($p \geq 0.05$) respectively. Furthermore, the experienced friends in social factors has little impact on the adjust R^2 as well as on all personal factors.

TABLE 4.5

MULTIPLE REGRESSION OF PERSONAL FACTORS AND EXPERIENCED FRIENDS IN SOCIAL FACTORS ON MARKETING MIXES

Variables:	**Product**		**Physical**		**Promotion**		**Process**	
	Model 1	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**
Personal Factors								
Gender	.09*	.09*	.10*	.09*	-.05	-.05	-.06	-.06
Age	.15**	.15**	.08	.10	.11	.13*	.10	.11
Formal Education	.04	.04	.11*	.11*	.01	.01	-.01	-.01
Personal income	-.22**	-.22**	-.29**	-.30**	-.19**	-.21**	-.15*	-.15*
Specific Knowledge	-.38**	-.38**	-.35**	-.35**	-.04	-.04	-.02	-.02
Social Factor: Experienced Friends		.03		.10*		.11*		.02
R^2	.23	.23	.25	.26	.03	.04	.02	.02
Adjusted R^2	.22	.22	.24	.25	.01	.02	.00	.00
F	23.34**	19.50**	26.21**	23.03**	2.10	2.55*	1.36	1.16
N	404	404	404	404	404	404	404	404

* $p \leq .05$

** $p \leq .01$

4. Influence of Personal Factors and Specialists in Social Factors Toward Marketing Mixes Preferences

The specialist in social factors has nearly no impact on the change of relationships between personal factors and the marketing mixes. The relationships of personal factors and the marketing mixes are slightly lower when specialists are involved, except for the relationships of age with promotion and process that have a

little higher impact. The specialist in social factors alone has a significant positive relationship with product (ß= 0.09, $p \leq 0.05$) and also has a strong, significant positive relationship ($p \leq 0.01$) with physical evidence (ß= 0.17), promotion (ß= 0.17) and process (ß= 0.15).

TABLE 4.6

MULTIPLE REGRESSION OF PERSONAL FACTORS AND SPECIALIST IN SOCIAL FACTORS ON MARKETING MIXES

Variables:	**Product**		**Physical**		**Promotion**		**Process**	
	Model 1	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**
Personal Factors								
Gender	.09*	.09*	.10*	.10*	-.05	-.05	-.06	-.06
Age	.15**	.15**	.08	.10	.11	.13*	.10	.12
Formal Education	.04	.04	.11*	.11*	.01	.01	-.01	-.01
Personal income	-.22**	-.23**	-.29**	-.30**	-.19**	-.21**	-.15*	-.16*
Specific Knowledge	-.38**	-.39**	-.35**	-.37**	-.04	-.05	-.02	-.03
Social Factor: Specialists		.09*		.17**		.17**		.15**
R^2	.23	.24	.25	.28	.03	.05	.02	.04
Adjusted R^2	.22	.22	.24	.27	.01	.04	.00	.03
F	23.34**	20.28**	26.21**	25.35**	2.10	3.83**	1.36	2.71*
N	404	404	404	404	404	404	404	404

* $p \leq .05$

** $p \leq .01$

This chapter explains the statistical technique employed in the analysis of data and reports the results of the data gathered from data analysis. The discussion regarding these results together with their comparison to the literature will be shown in chapter five.