# 5. Research findings

## 5.1 Chapter overview

In this section, the findings from the research will be presented and it begins with a summary on respondent demographic follow by a descriptive summary on the data collected. Normality test was performed to ensure that all the observations within the dataset are normally distributed. In ensuring the validity of the construct, verimax rotation factor analysis was deployed and the coefficient value was suppressed at 0.5 to enable a better interpretation of the data output. Multiple regression analysis is carried out to examine the model using independent t-test and one way ANOVA .

## 5.2 Result of sampling

The questionnaires were mainly distributed to undergraduate and postgraduate students from University Malaya in light of the constraint in time and resources. In addition, approximately 10% of the sample population is off campus and is mainly collected during an investment seminar take place in Kuala Lumpur. All in all, a total of 250 questionnaires are distributed and 212 responses were collected which represent a response rate of 80%. However, there are 12 outliers found in the data set and all of these abnormal observations are discarded to ensure accuracy in research findings and also as part of compliance to the criteria of regression analysis which required the data to be normally distributed. After removing the outlier, there are 200 observations remain in the dataset and were used for data analysis.

## 5.3 Respondent demographic

A simple demographic data on respondent is being analyzed in this section and the collective demographic profiles of the survey participants are shown in the following:

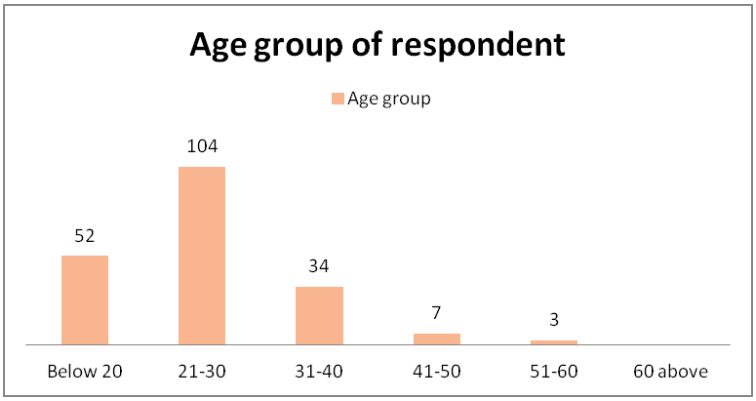


***Diagram 5.1 Age group of respondent***

Since the survey is mostly conducted in the City campus and PJ campus of University Malaya, most of the respondents fall into the age group of 21-30 and 31-40. Although there is 5% of respondent aged over 41 years, the number is relatively small compare to the main stream of the sample population. Consistent with the general scene in domestic higher education institution, approximate 49% of the respondents are female.

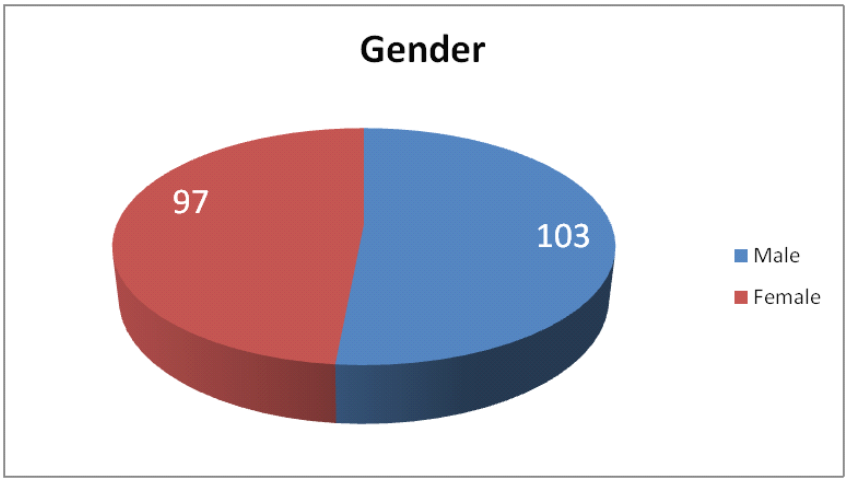


***Diagram 5.2 Gender of respondent***

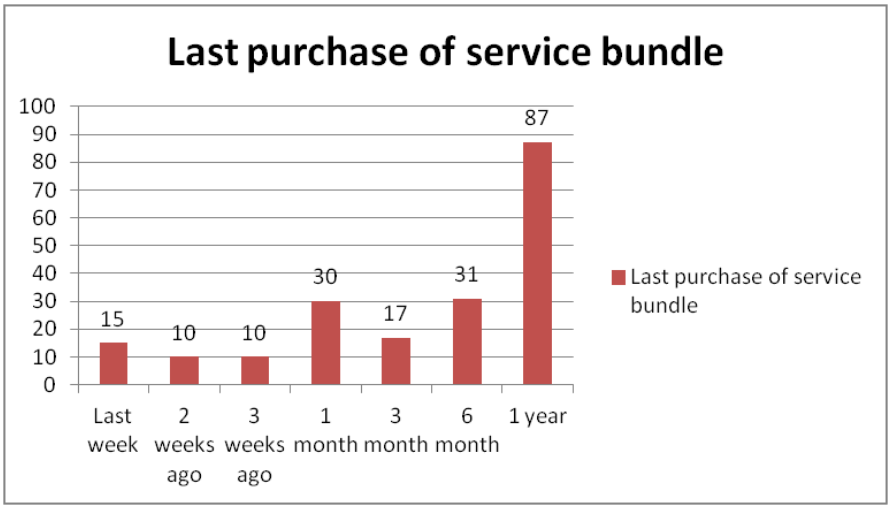


***Diagram 5.3 Previous service bundle purchase of respondent***

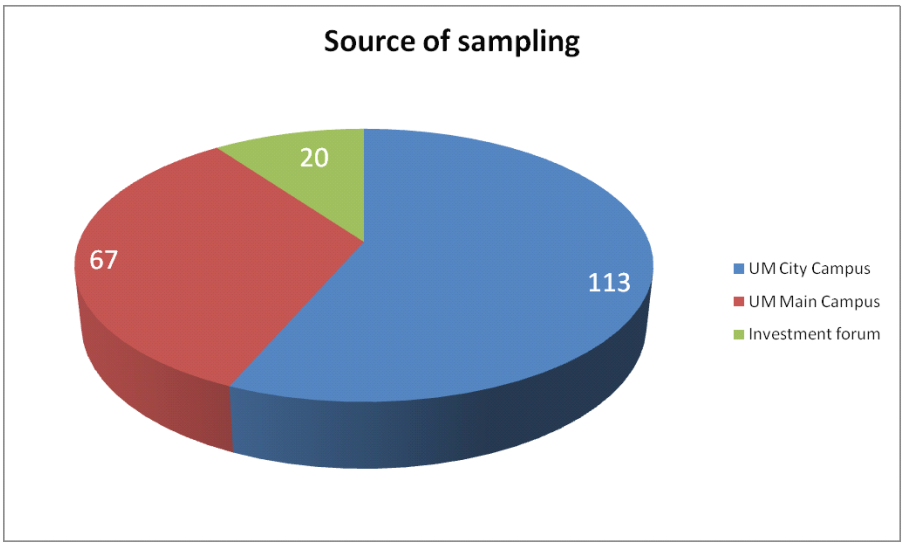


***Diagram 5.4 Source of sampling***

## 5.4 Normality test

Normality tests are detrimental in determining whether a dataset is normally distributed (Gujarati 2002) and is pre-requisite for most of the vital data analysis instrument (Wooldridge 2009). In this study, the full set of normality tests such as box-plot, Stem-and-Leaf plot, histogram and descriptive statistic are attached in the Appendix 3. From the normality test, a number of outliers were identified and these observations are removed from the dataset. A summary on the normality test is in

**Table 5.2**.

### *5.4.1 Normality test - Boxplot*

The boxplot test manages to identify 12 outliers from the dataset and all these outlier are removed in accordance to the indication from the boxplot (refer to Diagram 5.5). After this normalization exercise, the distribution of boxplot indicating that the sample is normally distributed with the absent of the outliers. The new boxplot of the dataset can be found in Appendix 3 (Note: The boxplot in Appendix 3 is after removal of outliers).

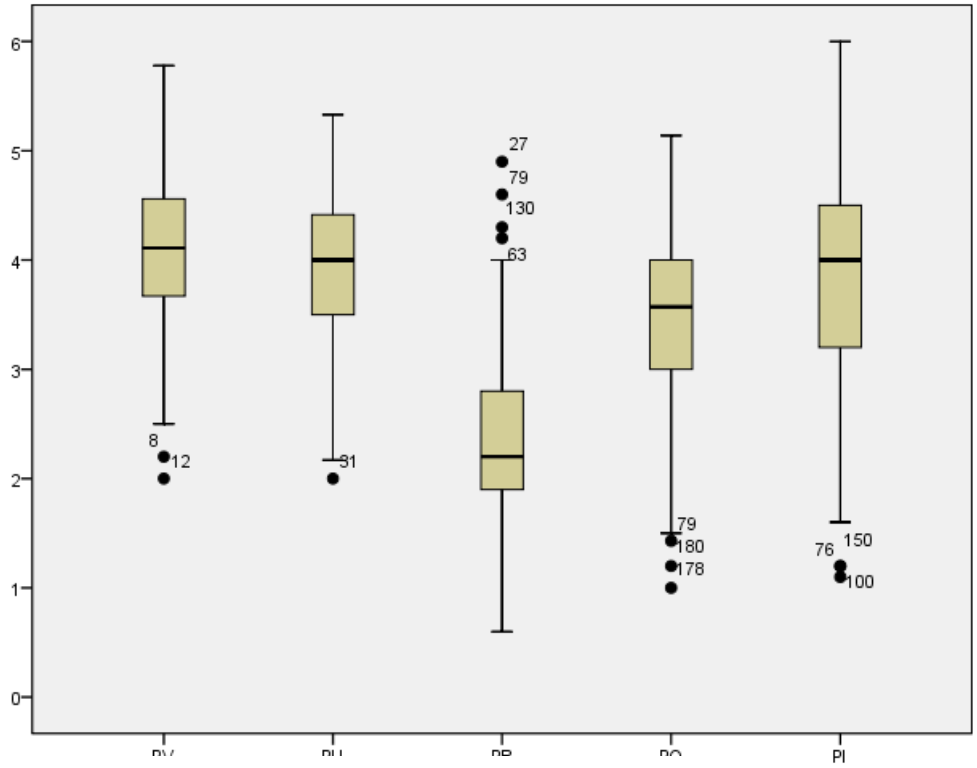


***Diagram 5.5 Boxplot test (Before removing outliers)***

### *5.4.2 Normality test - Histogram*

All the remaining observations within the dataset display a normally distributed bell

curve in the histogram and this result suggest that the sample is normally distributed. The histogram of this study can be found in Appendix 3.

### *5.4.3 Normality test - Stem-and-Leaf plot*

The Stem-and-Leaf plots of the dataset are resemblance of normal distribution and this result indicates that the sample is normally distributed. The Stem-and-Leaf plot of this study can be found in Appendix 3.

### *5.4.4 Normality test - Descriptive statistics*

Sekaran (2003) is of opinion that the normality of sample can be deduced from interpreting the results of the Skewness and Kurtosis test and any value that fall between -2 to 2 can be considered as normal. Hence, judging from the Skewness and Kurtosis results of this study, the normality of the sample is within the range as described by Sekaran (2003). The details of the Skewness and Kurtosis test are summarized in **Table 5.1**.

| | | PV | PU | PR | PQ | PI |
|---|---|---|---|---|---|---|
| Mean | | 4.17 | 3.90 | 2.34 | 3.64 | 3.81 |
| Median | | 4.11 | 4 | 2.2 | 3.57 | 4 |
| Variance | | 0.38 | 0.06 | 0.54 | 0.51 | 0.772 |
| Std. Deviation | | 0.61 | 0.73 | 0.74 | 0.72 | 0.88 |
| Minimum | | 2.67 | 1 | 0.6 | 1.4 | 1.2 |
| Maximum | | 5.78 | 5.17 | 4.6 | 5.1 | 6 |
| Skewness | | **-0.072** | **-0.706** | **0.278** | **-0.062** | **-0.252** |
| Kurtosis | | **-0.345** | **1.121** | **0.105** | **-0.297** | **0.182** |

***Table 5.1 Normality statistics on the sample***

### *5.4.6 Normality test - Summary*

Base on the outputs from normality tests, the results suggest that the dataset employed in this study met the requirement of multiple regression and is of normally distributed. **Table 5.2** provides a summary on the results from normality test.

| Test | Distribution of sample |
|---|---|
| | |
| Histogram | Normally distribute |
| | |
| Stem-and-Leaf plot | Normally distribute |
| | |
| Boxplot | Normally distribute |
| | |
| Descriptive statistic - Skewness & Kurtosis | Normally distribute |
| | |

***Table 5.2 Summary of normality tests***

## 5.5 Descriptive analysis

The mean and standard deviation of all the items belonging to the variables are summarized into **Table 5.3**. Majority of the items are having a mean of 3.5 and above meaning that the findings of this study suggest that majority of the respondents agreed with the items for both dependent and independent variables, and are of view that these factors are important in their purchase intention on a service bundle. With the exception of perceived risk which negatively related to purchase intention.

## Descriptive Statistics

| | Mean | Std. Deviation |
|---|---|---|
| **Perceived value:** | | |
| PV1 The service is valuable for me | 4.0800 | .94768 |
| PV2 Buying in bundle is cheaper | 4.4200 | .91531 |
| PV3 Given the components in service bundle, it is worth the money i will pay for | 4.2400 | .80974 |
| PV4 In general, i find service bundle cost less | 4.2400 | .88107 |
| PV5 I woukd consider that service bundle to be a good value | 4.1950 | .83092 |
| PV6 The service bundle is considered to be a good buy | 4.1200 | .85396 |
| PV7 I save time when buying a service bundle | 4.4100 | .98323 |
| PV8 The service bundle meets my specific needs in term of convenient | 3.9250 | .91847 |
| PV9 The value of service bundle is higher than buying them individually | 3.8550 | 1.14916 |
| | | |
| **Perceived usefulness:** | | |
| PU1 I can better decide which service that i needed than in the past | 3.9850 | .76662 |
| PU2 I can acquire the necessary product(s) more easily through service bundle | 3.8900 | .78804 |
| PU3The service bundle prodives a wide variety | 3.7250 | .97165 |
| PU4 The components of the bundle complement each other | 3.9100 | .85178 |
| PU5 Service bundle offers advantages that stand-alone product cannot | 3.9600 | .99162 |
| PU6 Overall i find service bundle useful | 4.2950 | .74211 |
| | | |
| **Perceived risk:** | | |
| PR1 I believe that buying the service bundle is less risky and will met my expectation | 2.4500 | .78138 |
| PR2 I believe that buying the service bundle is less risky and will deliver good service | 2.4100 | .80943 |
| PR3 I believe that buying the service bundle is less risky and will get the product i order | 2.2100 | .91107 |
| PR4 I believe that buying the service bundle is less risky and will get the product on time | 2.24 | .887 |
| PR5 I feel safer using credit card on Serice bundle | 2.4750 | 1.10702 |
| | | |
| **Perceived quality:** | | |
| PQ1 Bundle product looks more reliable | 3.6350 | .89205 |
| PQ2 Bundle product looks more durable | 3.5750 | .89351 |
| PQ3 Bundle product looks more high quality | 3.3950 | .80761 |
| PQ4 I have the feeling that service bundle is trustworthy | 3.5600 | .86029 |
| PQ5 I have favourable opinion about the service bundle | 3.8050 | .80011 |
| PQ6 I have confidence in the service bundle | 3.8000 | .82669 |
| PQ7 The performance of the service bundle meet my expectation | 3.7350 | .84757 |
| | | |
| **Perceived intention:** | | |
| PI1 I would recommend the service bundle to a family member, friend or acquaintance | 3.9600 | .89577 |
| PI2 My willingness to buy a service bundle is very high | 3.7600 | .92557 |
| PI3 I intend to buy a service bundle in neaar future | 3.8800 | 1.01030 |
| PI4 I intend to buy the service bundle more regularly | 3.6950 | 1.04279 |

| | | |
|---|---|---|
| PI5 Likely to choose service bundle in the next purchase | 3.8600 | 1.00771 |
| | | |

***Table 5.3 Summary of descriptive statistics***

## 5.6 Validity test

According to Sekaran (2003), factor analysis is pivotal for collecting primary data. It ensured that all the items in the questionnaire are coining the correct concept and the construct is valid for the subject study. Pallant (2007) pointed out that there are two important considerations in determining whether a dataset is fit for factor analysis; the number of sample population and the magnitude of relationship between the items. In order to run the factor analysis in SPSS program, a minimum observation of 100 is required.

DeCoster (1998) added that factor analyses are performed by examining the pattern of correlations between the observed measures. Measures that are highly correlated (either positively or negatively) are likely influenced by the same factors, while those that are relatively uncorrelated are likely influenced by different factors.

**Rotated Component Matrix[a]**

| | Component | | | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| PV1 | | .657 | | |
| PV2 | | .786 | | |
| PV3 | | .762 | | |
| PV4 | | .737 | | |
| PV5 | | .641 | | |
| PV6 | | .616 | | |
| PV7 | | | | |
| PV8 | | | | |
| PV9 | | | | |

| | | | | |
|---|---|---|---|---|
| PU1 | | | | .556 |
| PU2 | | | | .567 |
| PU3 | | | | .759 |
| PU4 | | | | .519 |
| PU5 | | | | .630 |
| PU6 | | | | |
| PR1 | | | .645 | |
| PR2 | | | .693 | |
| PR3 | | | .761 | |
| PR4 | | | .690 | |
| PR5 | | | .559 | |
| PQ1 | .773 | | | |
| PQ2 | .778 | | | |
| PQ3 | .744 | | | |
| PQ4 | .645 | | | |
| PQ5 | .722 | | | |
| PQ6 | .716 | | | |
| PQ7 | .712 | | | |
| Extraction Method: Principal Component Analysis. | | | | |
| a. Rotation converged in 7 iterations. | | | | |

***Table 5.4 Rotation component matrix for all independent variables***

For this study, only items with factor loading greater than 0.5 were considered and the complete rotation matrix table on all independent variables is summarized into **Table 5.4.** Based on the rotation matrix, 4 factors have been identified and they are presented in **Table 5.5**:

| Component | Factor |
|---|---|
| | |
| I | Perceived Quality |
| | |
| 2 | Perceived Value |
| | |
| 3 | Perceived Risk |
| | |
| 4 | Perceived Usefulness |
| | |

***Table 5.5 Summary of the components***

Factor 1 consisting "Bundle product looks more reliable", Bundle product looks more durable", "Bundle product is more high quality", "I have the feeling that service bundle is trustworthy", "I have a favorable opinion about the service bundle", "I have confidence in the service bundle", "The performance of the service bundle meet my expectation". All these items are categorized into the independent variable named "Perceived quality".

Factor 2 consisting "The service bundle is valuable for me ", Buying in bundle is cheaper ", "Given the components in the Service bundle, it is worth the money I will pay for", "In general, I find service bundle cost less", "I would consider that service bundle to be a good value", "The service bundle is considered to be a good buy", I save time when buying a service bundle", "The service bundle meets my specific needs in terms of convenient.", "The value of the service bundle is higher than buying them individually". "The service bundle is considered to be a good buy", I save time when buying a service bundle", "The service bundle meets my specific needs in terms of convenient.", "The value of the service bundle is higher than buying them individually" will not be included as the factor loading was below 0.5. All the remaining items are categorized into the independent variable named "Perceived value".

5 items are included in factor 3 namely "I believe that buying the Service bundle is less risky and will meet my expectation.", "I believe that buying the Service bundle

is less risky and will deliver good services.", "I believe that buying the Service bundle is less risky and i will get the product that i order", "I believe that buying the Service bundle is less risky and i will get the product on time", "I feel safer using credit card on Service bundle. (take 1 transaction  compare to multiple transaction when buying item individually)". All these items fall under the independent variable of ""Perceived risk".

Factor 4 comprises "I can better decide which service that I needed than in the past", "I can acquire the necessary product(s) more easily through the service bundle", "The service bundle provide a wide variety", "The component of the bundle complement each other", "Service bundle offers advantages that stand-alone product cannot.", "Overall, I find service bundle useful". All these items are known as "Perceived usefulness".

Overall, the results from factor analysis on all the independent variables are reasonable and support the proposed construct in examining the subject of study. The 4 factors accounted for 65.1% of the total variance explained. Hence, all the proposed item of independent variables in this study is valid as the factor analysis shown an acceptable result. In other words, the measurements adopted in this study measured what it is supposed to measure.

## 5.7 Reliability test

The reliability test mainly assesses how consistent is a construct in measuring a specific conceptual framework. Sekaran (2003) is of view that reliability test signal the stability of the survey instrument in assessing the concept and is useful in ascertain the "goodness" of an instrument.

For this research project, the *author* adopts the Cronbach's alpha in measuring the internal consistency of the instruments employed in this study. Result of the Cronbach's alpha for each variable as follow:

| **Variables** | | **Cronbach Alpha** |
|---|---|---|
| Independent | | |
| | | |
| Perceived value | 9 | 0.841 |
| | | |
| Perceived usefulness | 6 | 0.839 |
| | | |
| Perceived risk | 5 | 0.844 |
| | | |
| Perceived quality | 7 | 0.933 |
| | | |
| Independent | | |
| | | |
| Purchase intention | 5 | 0.940 |
| | | |
| | | |

***Table 5.6 Summary of Cronbach's Alpha value for independent and dependent variables***

The above results have clearly demonstrated that all variables adopted in this study have a Cronbach's Alpha value above the 0.80 level and as suggested by DeVellis

(2003) the scale of a research study can be considered as high reliability upon achieving a minimum value of 0.70.

As a conclusion, results from both validity test and reliability test have supported the goodness of the survey instruments used for this study. The items in both independent and dependent variables are valid and reliable in measuring the concept as intended.

## 5.8 Correlation analysis

The correlation analysis is widely use in social science study in determining the strength and direction of the relationship between a set of variable (Cohen J, Cohen P, West and Aiken 2003). The interpretation of correlation analysis rely on the correlation coefficient (r) which ranges from +1.0 to -1.0 and the closer the coefficient is to the absolute value of 1, the stronger is the relationship between the variables (Pallants 2007). In addition, a positive correlation coefficient value signifies a positive relationship between the variables and vice versa for a negative correlation coefficient value. The findings of Pearson's correlation analysis between the variables for the regression model are presented in **Table 5.7**.

**Correlations**

| | | PV | PU | PR | PQ | PI |
|---|---|---|---|---|---|---|
| PV | Pearson Correlation | 1 | .678** | .481** | .571** | .610** |
| | Sig. (2-tailed) | | .000 | .000 | .000 | .000 |
| | N | 200 | 200 | 200 | 200 | 200 |
| PU | Pearson Correlation | .678** | 1 | .552** | .660** | .596** |
| | Sig. (2-tailed) | .000 | | .000 | .000 | .000 |
| | N | 200 | 200 | 200 | 200 | 200 |
| PR | Pearson Correlation | .481** | .552** | 1 | .720** | .536** |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Sig. (2-tailed) | .000 | .000 | | .000 | .000 |
| | N | 200 | 200 | 200 | 200 | 200 |
| PQ | Pearson Correlation | .571** | .660** | .720** | 1 | .774** |
| | Sig. (2-tailed) | .000 | .000 | .000 | | .000 |
| | N | 200 | 200 | 200 | 200 | 200 |
| PI | Pearson Correlation | .610** | .596** | .536** | .774** | 1 |
| | Sig. (2-tailed) | .000 | .000 | .000 | .000 | |
| | N | 200 | 200 | 200 | 200 | 200 |

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

***Table 5.7 Correlation Coefficient for the independent and dependent variables***

Judging from the output of the correlation analysis, there is a significant and positive correlation between the independent variables (PV, PU, PR, PQ) and dependent variable (PI). The findings in correlation analysis suggest that the higher the independent variables are, the higher the consumer's intention to purchase the service bundle.

## 5.9 Multiple regression

In a nutshell, Multiple regression analysis may be used whenever a quantitative variable, the dependent variable (Y) is to be studied as a function relative to the independent variable (X). Historically, Multiple regression is applied in the study of biological and behavioral sciences around 1900 in the study of the natural covariation of observed characteristics of samples of subjects, including Galton's studies of the relationship between the heights of fathers and sons and Pearson's and Yule's work on educational issues. (Cohen 2003)

Multiple regression is capable of establishing a set of independent variables explains a percentage of the variance in the dependent variable at a specific significant level and also pinpoint the relative predictive importance of the independent variable via Beta coefficient (Garson 2005). In testing the construct of this study, the *author* performed multiple regression analysis on the linear model between perceived value, perceived usefulness, perceived risk, perceived quality and purchase intention.

Allison (2003) is of view that multiple regression contribute to social science study from two perspectives. For instance, in prediction studies, multiple regression makes it possible to combine many variables to produce optimal predictions of the dependent variable. On causal analysis, it separates the effect of independent variables on the dependent variable so that researcher can examine the unique contribution of each variable.

One of the pre-requisite conditions for multiple regression is on the selection of independent variables that it should be based on their theoretical relationship to the dependent variable (Hair, Anderson, Tatham, and Black 1998). In light of the well chosen variables in this study based on past research done by other researcher, the condition should be fulfilled. In order to investigate the factors influencing the purchase intention in service bundle context, multiple regression analysis is adopted to test the conceptual framework of this study and the results are shown in the following:

| Model Summary | | | | |
|---|---|---|---|---|
| Model | R | R Square | Adjusted R Square | Std. Error of the |
| 1 | .803[a] | .644 | .637 | .52947 |
| a. Predictors: (Constant), PQ, PV, PR, PU | | | | |

***Table 5.8 Coefficient of determination for the model***

The coefficient of determination for the model is 0.64, indicating that 64% of variation in dependent variable (purchase intention of service bundle) can be explained by the independent variables included in the regression. On a side note, a total of 36% of the variance of the criterion is unaccounted for. The results suggest that the model of this study is well constructed and it explained more than 50% of the purchase intention on services bundle.

| ANOVA[b] | | | | | | |
|---|---|---|---|---|---|---|
| Model | | Sum of Squares | df | Mean Square | F | Sig. |
| 1 | Regression | 98.941 | 4 | 24.735 | 88.233 | .000[a] |
| | Residual | 54.666 | 195 | .280 | | |
| | Total | 153.608 | 199 | | | |
| a. Predictors: (Constant), PQ, PV, PR, PU | | | | | | |
| b. Dependent Variable: PI | | | | | | |

***Table 5.9 Significance of the overall model***

| Coefficients[a] | | | | | | |
|---|---|---|---|---|---|---|
| Model | | Unstandardized Coefficients | | Standardized | t | Sig. |
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | -1.044 | .486 | | -2.147 | .033 |
| | PV | .349 | .085 | .244 | 4.090 | .000 |
| | PU | .043 | .090 | .031 | .480 | .632 |
| | PR | .100 | .075 | .084 | 1.343 | .181 |
| | PQ | .827 | .086 | .674 | 9.637 | .000 |
| a. Dependent Variable: PI | | | | | | |

***Table 5.10 Significance of independent variables***

From ANOVA analysis, the model has overall significant ($F_{4, 195} = 88.23$, $P < .01$) and therefore we reject the null hypotheses ($H_0$) since the F Value of the model 88.23 is higher than the F critical value of 2.45. In conclusion, null hypothesis which state that none of the independent variables is significant predictor of the criterion was rejected and confirm that at least one of the coefficient in the model is not equal to zero.

***$H_0$: B1 = B2 = B3 = B4 = 0 (Reject)***

***$H_1$: B1 ≠ B2 ≠ B3 ≠ B4 ≠ 0***

Referring to **Table 5.10**, the t-test indicates that only two significant predictor out of four independent variables are positively related to the criterion in the regression namely PV (Perceived value) with $t = 4.09$, $p < .01$ and PQ (Perceived quality) with $t = 9.637$, $p < .01$. The perceived quality has the highest coefficient of 0.83 followed by perceived value (PV) 0.35. The remaining predictors are insignificant predictors in the purchase intention. These silent predictors are perceived usefulness and perceived risk.

Since the effect from perceived usefulness and perceived risk are insignificant based on the t-test analysis, these two predictors are not included in the regression equation and hence the equation is best illustrated as follow:

PI = -1.044 + 0.35PV + 0.83PQ (Original model)

Judging from the regression equation, the constant value (also known as intercept value) is - 1.04, which implies that respondents are unlikely to purchase the service bundle if there is no perceived value and perceived quality derived from the service bundle. In addition, both of the independent variables' coefficient values are higher compare to the constant value and these suggest that the predictors in the regression equation have strong influence on the purchase intention of service bundle.

The Beta coefficient value implies that one unit increase in perceived value will result in respondent's intention to purchase a particular service bundle by 0.35 unit. In the event that perceived quality increased by 1 unit, the respondent's intention to purchase the service bundle will increase by 0.83 unit. When both perceived value and perceived quality of the service bundle equal to zero, the purchase intention of the respondent's will become -1.04 unit since they are of view that the service bundle is not relevant to them.

Taking into account the findings of multiple regression, the present study concludes that the proposed variables have a positive relationship toward Malaysian consumer purchase intention on services and all proposed variables appear to be important attribute in understanding purchase intention of service bundle. Among the four independent variables, only 2 variables are statistically significant and contribute greatly to the study of purchase intention.

Based on the results of the above mention multiple regression analysis, the first and fourth hypothesis (H1 and H4) are accepted while the second and third hypothesis (H2 and H3) are rejected.

### *5.9.1 Multiple regression with dummy variables (Full result in Appendix 9)*

To examine whether the demographic profile of respondents affect the result of this study, the author conduct additional regression analysis that include gender, age and source of sampling as dummy variable D1, D2, D3. The findings are summarized into **Table 5.11** as follow:

| | Without dummy variable | With dummy variable |
|---|---|---|
| Adjusted $R^2$ | 0.637 | 0.647 |
| | | |

***Table 5.11 Comparison of Adjusted $R^2$ of regression model with and without dummy variable***

Through comparing the Adjusted $R^2$ of regression model with and without the dummy variables, we found that the inclusion of additional three dummy variable (namely gender, age and source of sampling) do not tell us much about the purchase intention of service bundle since the Adjusted $R^2$ only increased by 0.01. Hence, we are justified to conclude both gender, age do not explain more variation in the criterion base on the sample population of this study.

## 5.10 Multiple Regression compliance test

In this section, the output from Multiple regression analysis will be subjected to further examination to ensure model appropriateness through a thorough study on the variance and multicollinearity of the variables.

### *5.10.1 Collinearity*

Lapin (1993) pointed out that model stability will be jeopardized in the presence of collinearity problem amongst the independent variables. According to Gujarati (2002), multicolinearity would nullify a regression analysis when its main intention is to examine a causal relationship of a model. To determine the degree of collinearity on the model, instruments such as the Step wise regression, Variance Inflation Factor, Tolerance and correlation are commonly used in detecting collinearity problem.

### *5.10.2 Step wise regression (Full result in Appendix 10)*

| | | | Significance (5% level) | | | |
|---|---|---|---|---|---|---|
| | $R^2$ | F | PV | PU | PR | PQ |
| PI-PV | 0.37 | 117.27 | 0.000 | - | - | - |
| PI-PV-PU | 0.43 | 75.37 | 0.000 | 0.000 | - | - |
| PI-PV-PU-PR | 0.48 | 59.03 | 0.000 | 0.002 | 0.000 | - |
| PI-PV-PU-PR-PQ | 0.64 | 88.2 | 0.001 | 0.632 | 0.181 | 0.000 |

***Table 5.12 Summary on step wise regression.***

When the model is regressed with Perceived value, Perceived usefulness and Perceived risk, all the independent variables are significant predictor for Purchase intention and it explained 48% variance in the dependent variable. This finding is consistent with the research findings of other researcher in the price bundling and purchase intention literature.

However, when we include Perceived quality into the model, it resulted in higher R square despite having only 2 independent variables remain significance. Technically speaking, with only two variables being significance in the model, it does not make sense for the higher R square of 0.64 (compare to previous model with 3 significance independent variables at 0.48) and it is likely due to multicollinearity problem which inflate the R square while affecting the overall appropriateness of the model.

| | Beta coefficient | | | | T value | | | |
|---|---|---|---|---|---|---|---|---|
| | PV | PU | PR | PQ | PV | PU | PR | PQ |
| PI-PV | 0.91 | - | - | - | 11.84 | - | - | - |
| PI-PV-PU | 0.49 | 0.56 | - | - | 4.651 | 5.479 | - | - |
| PI-PV-PU-PR | 0.48 | 0.323 | -0.30 | - | 4.645 | 3.117 | -3.919 | - |
| PI-PV-PU-PR-PQ | 0.349 | 0.043 | 0.10 | 0.83 | 4.09 | 0.48 | 1.343 | 9.637 |

***Table 5.13 Summary on Beta Coefficient & T Value of new model.***

In addition, the inclusion of Perceived quality will also result in a positive beta coefficient of 0.10 for Perceived risk which literally means the purchase intention will

increase when the Perceived risk is higher. This result is not consistent with the literatures which held that the Perceived risk is negatively related to Purchase intention (Pavlou, 2001 and Paraschiv et al, 2002) and also it does not make much business sense either.

Hence, it is justified to drop Perceived quality from the model and the estimated equation become as follow:

**PI = 1.265 + 0.475PV + 0.323PU - 0.3PR (New estimated model)**

### *5.10.3 Tolerance*

In essence, tolerance measures the proportion of variability in each predicting variable that remained unexplained by its linear relationship with the other predictors in the model. Since tolerance is calculated and expressed in percentage, the value can range from 0 (perfect collinearity) to 1 (no collinearity). In the event that tolerance is closer to the zero, it signifies that inter correlation among independent variables is high and as such implied that multicollinearity problem exist in the model (Bryman and Cramer, 1997). With tolerances of 0.524; 0.475; and 0.674 for perceived value, perceived usefulness, perceived risk (as in the new estimated model), the likelihood of multicollinearity in the new estimated model is low. (Refer to Appendix 11)

### *5.10.3 Variance inflation factor (VIF)*

The Variance Inflation Factor is calculated through the formula of $\frac{1}{(1-R^2)}$ and is related to tolerance that we have discussed earlier since Tolerance is the inverse version of VIF (Tolerance = 1/VIF, Gujarati 2004). As a rule of thumb, Gujarati (2004) assert that VIF on social science research should not exceed 3 to be free from the collinearity problem and VIFs for the three significant independent variables the new estimated model are low at 1.908, 2.107 and 1.483. This finding provides further support that the exit of Perceived quality from the model has mitigated the multicollinearity problem in the original model and it is consistent with the finding on tolerance.

## 5.11 Limitation of Multiple regression

While multiple regression is widely used in the study of causal relationship between the dependent and independent variable, the *author* is also well aware on some of the limitations that associated with multiple regression.

### *5.11.1 Overfitting:*

According to Gujarati (2004), the amount of variance explained in a model can be artificially increased through introducing more variable. Despite that the addition of new variable does not really explain much of the model, introduction of additional variables can inflate the value $R^2$ to a superficial level. Hence, the statistical ability of a model in testing causal relationship will erode as the number of variable increase. It

is advisable to decide on number of variable within the model in accordance to previous research.

### *5.11.2 Multiple comparisons:*

In addition, the crucial problem associated with multiple regression is that when two predictors are correlated both with each other and with the criterion, the shared variance will be included in the multiple regression analysis when the first of the predictors is introduced. The order of the introduction of the predictors into the stepwise analysis is therefore vital as it determines the apparent influence of a given variable.

Citing the Gilhooly et al (1979) Experiment 4 for instance, the researcher found that frequency correlated with recognition memory with beta coefficient of -0.45 and with age of acquisition AI. Similarly, frequency and age intercorrelate by -0.68. By beginning the stepwise multiple regression with frequency and following with age, Gilhooly et al (1979) concluded that frequency accounts for 21% of the criterion variance and age only 2%. If they had begun with age of acquisition, age would have apparently accounted for 17% of the variance and frequency only 5%. Clearly, very different interpretations might be drawn from these two analyses. Gilhooly et al (1979, p.222) concluded no effect was found for age of acquisition in Experiment 4. This conclusion is valid only if there is good reason for considering frequency to be the primary variable, any influence of age of acquisition is due to the result of covariation