CHAPTER 5 DATA ANALYSIS AND RESULTS

5.1 Introduction

In this chapter, descriptive statistics was performed using SPSS (version 16.0). Structural Equation Modeling (SEM) statistical technique was used to test the research model of this study. In this study, among SEM statistical techniques, Smart PLS (Partial Least Squares) was applied to validate and test the structural model. First, the assessment of fits, reliability, and convergent validity were performed to confirm the adequacy of measurement model. Second, the full structural model was tested and followed by a separate examination of independent variables for comparison. Lastly, results and hypotheses test were discussed.

5.2 Descriptive analysis

Table 5.1 shows some descriptive for the constructs, namely minimum (min), maximum (max), mean, standard deviation, tolerance index (TI) and Variance Inflation Factor (VIF). Minimum and maximum values show that all the constructs were consistently measured within the point on the scale that they had been measured on, *i.e.,* from 1 to 7, where respondents to the items were measured on a seven point Likert scale where 1 means “Strongly Disagree” and 7 means “Strongly agree”. TI and VIF were presented for the examination of multicollinearity and singularity (refers to section 4.7.6).

The descriptive statistics in **Table 5.1** shows that of the three factors of perceived trusting belief, perceived competence receives the highest score (with a mean score of 4.84). The mean score of integrity and benevolence are lower, *i.e.*, 4.14 and 4.10 respectively. Perceived competence of Internet vendors with a highest mean score show the ability of Internet vendors in managing online business may has highest influence on the attitude of initial trust in Internet shopping compared to integrity and benevolence. Perceived technical competency on Internet vendors scored a mean score of 4.20. Perceived technical competency on Internet vendors reflect security control and privacy control influence initial trust in Internet shopping positively. Perceived competency and perceived technical, may share a common characteristic of Internet vendors that is to demonstrate ability, expertise and knowledge in managing online business and such competency include security control and privacy control on the web-site.

Of the two perceived organizational compliance dimensions, third party recognition is perceived to be higher (with a mean score of 4.27) than legal framework (with a mean score of 3.87). Among the two dimensions of organizational compliance, respondents may show a higher positive opinion on third party recognition compared to legal framework toward initial trust in Internet shopping. The mean score of propensity to trust is 3.89 indicative that propensity to trust may positively influence initial trust in Internet shopping. Of the two antecedents to propensity to trust, experience receives higher score (with a mean score of 5.10) than cultural environment (with a mean score of 4.38). Cultural environment and experience showed positive influence on the propensity to trust.

The result from **Table 5.1** shows that all constructs and sub-constructs are scored a mean score of above 3.5. The findings indicated that respondents may show a positive opinion toward attitude of initial trust in Internet shopping. The mean scores of Initial trust in Internet shopping and intention to purchase are 4.27 and 4.57 respectively indicative that respondents may behave positively on intention to purchase online. The standard deviation for all constructs showed above 1.0, within the range of 1.00 to 1.32, this is indicated that there was variation among respondents' opinion to each variable.

Table 5.1: Descriptive analysis of items (*N*=305)

Constructs	Min	Max	Mean	Std. Deviation	TI	VIF
Perceived Trusting Belief on Internet Vendors						
-Perceived Integrity of Internet vendors	1.33	7.00	4.14	1.08	0.580	1.724
-Perceived Competence of Internet vendors	2.00	7.00	4.84	1.02	0.706	1.417
-Perceived Benevolence of Internet vendors	1.33	7.00	4.10	1.16	0.498	2.009
Perceived Technical Competency on Internet Vendors	1.33	7.00	4.20	1.06	0.382	2.619
Perceived Organisational Compliance						
-Third Party Recognition	1.00	7.00	4.27	1.12	0.577	1.732
-Legal Framework	1.00	7.00	3.87	1.21	0.597	1.675
Propensity to Trust	1.00	7.00	3.89	1.32	0.611	1.638
Cultural Environment	1.33	7.00	4.38	1.09	0.631	1.585
Experience	1.33	7.00	5.10	1.05	0.768	1.302
Initial Trust in Internet Shopping	1.25	7.00	4.27	1.00	0.422	2.368
Intention to Purchase Online	1.00	7.00	4.57	1.20	-	-

5.3 Ranking order of importance antecedents

During the data collection process, respondents were asked to rank the factors in terms of their importance of influencing Malaysian consumers' trust on intention to purchase online. The 7 antecedents were measured based on numerical order, in an increasing order, ranging from 1 "extremely important" to 7 "least important". The

ranking order of each factor is determined by the total score obtained. Total score of individual factor derived from multiplied the ranks with number of respondents (refers to **Appendix III**). Those scores were sorted in an ascending order, the lowest total score indicating the first rank, and the highest total score indicating the last rank. The result of ranking order of each factor is presented in **Table 5.2**.

Table 5.2: The ranking order of each factor ranked by respondents (*N*=305)

Rank	Factors	Total score
1	Security control	701
2	Privacy control	904
3	Integrity of Internet vendor	1186
4	Competence of Internet vendor	1297
5	legal framework	1328
6	Benevolence of Internet vendor	1541
7	Third party recognition	1583

The result from **Table 5.2** indicating that security control, privacy control and integrity of Internet vendors are factors perceived by respondents to be importance in influencing the formation of initial trust in Internet shopping in Malaysia. On the other hand, benevolence of Internet vendors and third party recognition are factors that perceived to be least importance by respondents.

5.4 Analytic Method-PLS path modeling

Partial Least Squares Analysis (PLS) is used to evaluate the psychometric properties of all measures and to examine tie structural relationship proposed in the structural model, as illustrated in **Figure 4.1**. PLS is a latent SEM technique that uses a component-based approach to estimation. The main reason that PLS is employed is its minimal demand on samples size and residual distribution (Barclay *et al*., 1995) PLS is second generation statistical tool that enables researchers to answer a set of interrelated research questions in a (a) single, (b) systematic, and comprehensive analysis by modeling the relationships among multiple independent and dependent constructs simultaneously (Gerbing and Anderson, 1988).

Furthermore, Gefen *et al*., (2000) stated PLS assesses the measurement model and the structural model simultaneously. Measurement model assess the reliability and validity of the constructs, whereas assessment of structural model shows the assumed causation among a set of latent constructs and their manifest variables. In other words, assessment of structural model provides prediction of relationship on latent endogenous construct and latent exogenous constructs or other latent endogenous constructs. In PLS, the proposed research model is analysed and interpreted sequentially in two stages, first the assessment of the adequacy of measurement model that aimed to assess the validity and reliability of the model, followed by the assessment of the structural model. This sequence is planned in such a way that reliability and validity of the measures are ensured before further attempt is made in drawing conclusion on the structural model. **Figure 5.1** shows overviews of Partial Least Squares analysis procedures.

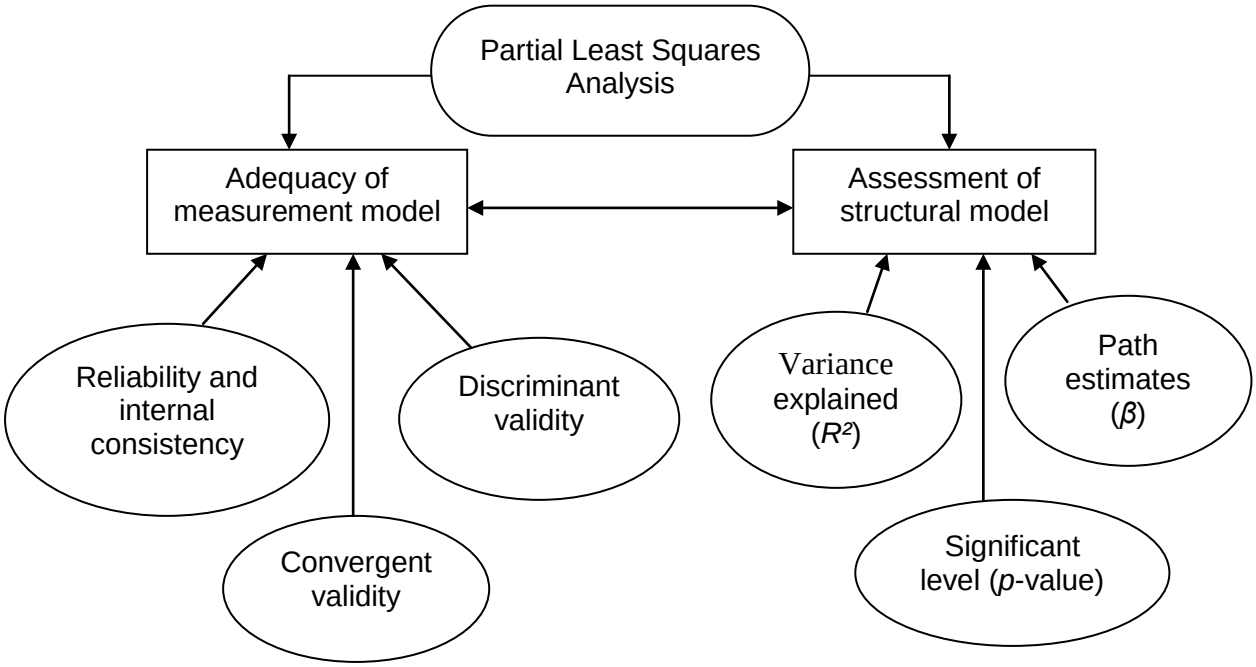


Figure 5.1: Partial Least Squares Analysis Procedures

5.5 Assessment of Measurement Models

Reliability and validity are the two important tests will be performed in the adequacy of measurement model to ensure the reliability and validity of the scales employed to measure the latent constructs. Measure reliability was assessed using individual item reliability from SPSS and internal consistency scores, calculated by composite reliability scores (Werts *et al*., 1974). Validity was assessed using scale validation that proceeding in two phases, convergent validity and distriminant validity analyses. These two validities, convergent validity and distriminant validity capture some of the aspect of the goodness of fits of the measurement model (Gefen ad Straub, 2005). The following sub-sections are discussing the procedures used in assessment of adequacy of each measurement model, followed by the data analysis and results.

5.5.1 Internal Consistency and Reliability of Measures

According to Mitchell (1996), reliability is defined as the degree to which measurements are free from error and therefore, yield consistent results. Two statistical measures, individual item reliability, and composite reliability were employed to assess the reliability psychometric properties of the measures. SPSS program was used to assess individual item reliability by examining the simple correlations of the measures with their respective construct. All cronbach's alphas value showed in **Table 4.3** are greater than .70, which is exceeded the benchmark of acceptable reliability recommended by Nunnally (1978) and DeVellis (2003). Composite reliability is recommended by Werts *et al.,* (1974) to measure the reliability of the constructs. According to Hulland, (1999), composite reliability is able to provide a better estimation as the measure uses item loadings obtained from causal model, therefore, it is an appropriate measure to use with a survey instrument that generally tackles a number of constructs. The interpretation of the values obtained is similar to Cronbach's alpha, and Fornell and Lacker (1981), recommended the acceptable value of composite reliability for each construct should be greater than 0.70 and they are reported in **Table 5.4**. The results show that internal consistencies of all constructs exceeded the recommended benchmark 0.70.

5.5.2 Convergent Validity of Measures

Hulland (1999) refers convergent validity as whether each measurement items comprising a scale correlates strongly with a common underlying construct, while correlating weakly or not significantly with other constructs. Fornell and Lacker

(1981) recommended three criteria to assess convergent validity of scale items. Firstly, all items factor loading (λ) with a significant *t*-value on its latent construct should be significant and exceed 0.70. The *p*-value of this *t*-value should be significant at least at the $p < 0.05$. Secondly, composite reliability for each construct should be greater than 0.70. Lastly, Average Variance Extracted (AVE) for each construct should exceed the variance attributable to measurement error (AVE ≥ 0.50).

Table 5.3 shows factor loading for all scale items were significant at $p < 0.05$ and exceed the minimum loading criterion of 0.70 (Fornell and Lacker, 1981) which is satisfied the first criteria. From **Table 5.4**, composite reliability of all constructs also meeting the second criteria by exceeded the required minimum of 0.70. Furthermore, **Table 5.4** shows the average variance extracted (AVE) values of all constructs exceeded the threshold value of 0.50 where the third criteria was satisfied. In short, all three criteria required for convergent validity were met.

Table 5.3: Factor loading and cross loading

	PTT	PB	PC	IPO	EXP	IT IS	PI	CE	LF	PTC	TP
A1	**0.9080**	0.2334	0.1264	0.1105	0.1858	0.3377	0.3045	0.5233	0.3095	0.1603	0.2084
A2	**0.8867**	0.2180	0.0925	0.1185	0.1517	0.2428	0.2291	0.4727	0.2719	0.0971	0.1486
A3	**0.8884**	0.2873	0.1094	0.1987	0.0898	0.3704	0.2921	0.4573	0.3997	0.1976	0.1669
A4	**0.8811**	0.2512	0.0671	0.1939	0.1406	0.2902	0.2076	0.4881	0.3324	0.1238	0.1856
B1	0.2701	**0.9137**	0.4260	0.4701	0.2083	0.5337	0.5550	0.2736	0.4043	0.5771	0.4169
B2	0.2233	**0.9287**	0.4080	0.4855	0.2102	0.5248	0.5102	0.2669	0.3571	0.5464	0.4130
B3	0.2728	**0.9027**	0.4118	0.4046	0.1570	0.4529	0.5113	0.2733	0.4176	0.5174	0.3704
C1	0.0502	0.3904	**0.8445**	0.3461	0.2229	0.2634	0.3947	0.1216	0.1775	0.3603	0.2943
C2	0.0973	0.3879	**0.9354**	0.3082	0.3037	0.2956	0.3572	0.1951	0.1949	0.3500	0.2516
C3	0.1424	0.4368	**0.9037**	0.3215	0.2953	0.3341	0.3831	0.2014	0.2532	0.3492	0.2559
D1	0.1860	0.4371	0.3152	**0.9172**	0.4164	0.5876	0.3963	0.2328	0.2369	0.4894	0.2846
D2	0.1580	0.4880	0.3433	**0.9569**	0.4002	0.6088	0.4404	0.1777	0.2658	0.5139	0.3255
D3	0.1488	0.4806	0.3630	**0.9507**	0.4422	0.6001	0.4372	0.1955	0.2422	0.4956	0.3240
E1	0.1039	0.2076	0.3016	0.3887	**0.8937**	0.2959	0.2636	0.2676	0.0406	0.1793	0.1683
E2	0.1721	0.1883	0.2826	0.4180	**0.9568**	0.3295	0.2811	0.2814	0.0584	0.1841	0.1811
E3	0.1553	0.2023	0.2875	0.4351	**0.9422**	0.3094	0.2510	0.2864	0.0445	0.1694	0.1780
G1	0.3792	0.4499	0.2625	0.5537	0.3492	**0.8035**	0.4701	0.4832	0.3089	0.4841	0.3647
G2	0.1997	0.3952	0.3696	0.4730	0.3246	**0.7929**	0.3670	0.2791	0.2262	0.4628	0.2986
G3	0.2622	0.4561	0.2690	0.5322	0.2544	**0.8590**	0.4170	0.2301	0.3794	0.5846	0.4531
G4	0.3086	0.5195	0.2328	0.5444	0.2045	**0.8584**	0.4264	0.2237	0.4631	0.7204	0.4709
I1	0.1637	0.3375	0.2849	0.3295	0.2217	0.3705	**0.7504**	0.1302	0.2216	0.4110	0.2854
I2	0.2504	0.5325	0.3619	0.3973	0.2231	0.4545	**0.9028**	0.2240	0.2673	0.4276	0.3097
I3	0.3214	0.5840	0.4263	0.4277	0.2842	0.4756	**0.9112**	0.2656	0.3210	0.4645	0.3940
K1	0.4679	0.2579	0.1459	0.1817	0.2433	0.2950	0.2199	**0.8942**	0.2188	0.1691	0.2456
K2	0.5478	0.3061	0.1717	0.1461	0.1931	0.3377	0.2243	**0.9069**	0.2747	0.1745	0.1709
K3	0.3268	0.1576	0.1914	0.2466	0.3773	0.2873	0.1741	**0.7104**	0.1210	0.1629	0.1953

Table 5.3: Factor loading and cross loading (Continue)

	PTT	PB	PC	IPO	EXP	IT IS	PI	CE	LF	PTC	TP
L1	0.3437	0.4127	0.2329	0.2938	0.1013	0.4081	0.3031	0.2506	**0.9271**	0.4625	0.4944
L2	0.3490	0.3975	0.2400	0.2446	0.0577	0.4023	0.3214	0.2439	**0.9556**	0.4434	0.4807
L3	0.3441	0.3901	0.1873	0.1986	-0.0162	0.3805	0.2649	0.2193	**0.9227**	0.4216	0.4797
P1	0.0917	0.5096	0.3238	0.4591	0.1227	0.5725	0.3934	0.1228	0.3811	**0.8276**	0.4638
P2	0.1646	0.3641	0.2821	0.2194	0.0314	0.4245	0.2949	0.1906	0.3692	**0.7598**	0.3548
P3	0.2285	0.4977	0.2682	0.4300	0.1414	0.5826	0.4678	0.2128	0.4772	**0.8448**	0.5180
S1	0.0653	0.5267	0.4141	0.4473	0.1557	0.5523	0.3875	0.1285	0.3383	**0.7967**	0.3766
S2	0.0808	0.4737	0.2941	0.4299	0.1932	0.5279	0.4121	0.1127	0.3285	**0.7986**	0.5020
S3	0.1541	0.4681	0.2959	0.4994	0.2326	0.5994	0.4356	0.1850	0.3644	**0.8217**	0.4842
T1	0.1268	0.3968	0.3086	0.3120	0.1835	0.4384	0.3331	0.2333	0.4342	0.5039	**0.8947**
T2	0.1299	0.3884	0.2476	0.2834	0.1768	0.4113	0.3598	0.2025	0.4521	0.5237	**0.9286**
T3	0.2782	0.4055	0.2490	0.3024	0.1544	0.4654	0.3582	0.2088	0.5187	0.5202	**0.8957**

Legend:

PTT: Propensity to Trust

PB: Perceived Benevolence of Internet vendors

PC: Perceived Competence of Internet vendors

IPO: Intention to Purchase Online

EXP: Experience

ITIS: Initial Trust in Internet Shopping

PI: Perceived Integrity of Internet vendors

CE: Cultural Environment

LF: Legal Framework

PTC: Perceived Technical Competence on Internet vendors

TP: Third Party Recognition

Table 5.4: Composite reliability, AVE and Inter-construct correlations

			Inter-Construct Correlations										
Construct	**Composite reliability**	**AVE**	**PI**	**PC**	**PB**	**PTC**	**TP**	**LF**	**PTT**	**CE**	**EXP**	**ITIS**	**IPO**
Perceived Integrity of Internet vendors (**PI)**	0.89	0.74	**0.86***										
Perceived Competence of Internet vendors **(PC)**	0.92	0.80	0.42	**0.90**									
PB Perceived Benevolence of Internet vendors **(PB)**	0.94	0.84	0.57	0.45	**0.92**								
Perceived Technical Competence on Internet vendors **(PTC)**	0.91	0.63	0.51	0.39	0.60	**0.79**							
Third Party Recognition **(TP)**	0.93	0.82	0.39	0.30	0.44	0.57	**0.91**						
Legal Framework **(LF)**	0.95	0.87	0.32	0.24	0.43	0.47	0.52	**0.94**					
Propensity to Trust **(PTT)**	0.94	0.79	0.29	0.11	0.28	0.16	0.20	0.37	**0.89**				
Cultural Environment **(CE)**	0.88	0.71	0.25	0.20	0.30	0.20	0.24	0.25	0.55	**0.84**			
Experience **(EXP)**	0.95	0.87	0.28	0.31	0.21	0.19	0.19	0.05	0.16	0.30	**0.93**		
Initial Trust in Internet Shopping **(IT IS)**	0.90	0.69	0.51	0.34	0.55	0.69	0.49	0.42	0.35	0.36	0.36	**0.83**	
Intention to Purchase Online **(IPO)**	0.96	0.89	0.45	0.36	0.50	0.53	0.33	0.26	0.17	0.21	0.45	0.64	**0.94**

*Diagonal elements (in bold) represent square root of AVE for that construct. Off-diagonal elements are the correlations among constructs. For discriminant validity, diagonal elements should be larger than off-diagonal elements**.**

5.5.3 Discriminant Validity of Measures

Discriminant validity complement convergent validity, and shown when each measurement item correlated weakly with, or differ from all other constructs in the same model. (Gefen and Straub, 2005). Discriminant validity between constructs was accessed using the two criterions recommended by Hulland (1999) and Chin (1998). Firstly, all the loadings of measurement items should be more strongly on their corresponding construct than on other constructs in the model. Secondly, square root of AVE for each construct is greater than the correlations between that construct and other constructs. This is to indicate that the construct shares more variance with its own measures than it shares with other constructs.

The factor loading and cross loading reported in **Table 5.3** demonstrate sufficient discriminant validity. From **Table 5.4**, it is obvious that the square root of AVE for each construct is greater than the correlations between that construct and other constructs. Thus, the discriminant validity criterion was met, that provide further confidence in the adequacy of measurement scales.

5.6 Assessment of the Structural Models.

According to Loehlin (1998), the structural model is able to specify the pattern of relationship among the latent constructs. In other words, structural model provides information as to how well the conceptual model predicts the hypothesized paths. In addition, structural model is employed to capture both, the linear regression effects of the exogenous constructs on the endogenous constructs, and the regression effects of the endogenous constructs upon another (Hair *et al*., 1998). Variance explained (R^2), path coefficients (β), path significant (*p*-value) and are employed separately in the examination of the structural model. The statistical objectives of PLS is overall identical to linear regression that to show high R^2 and significant *t*-values, thus rejecting the null hypothesis of no-effect (Thompson *et al*., 1995).

Variance explained (R^2) and Path coefficients (β) are provided by PLS for each endogenous construct in the model. R^2 value indicated the percentage of a construct's variance in the model, whilst the path coefficients (β) indicate the strength of relationships between constructs. Whilst, the bootstrapping technique (305 re-samples) was employed to produce standard error and t-statistics that enable statistical significant is measured on each path coefficient (β). In this study, any path with a *p*-value of less than 0.10 (*i.e.,* $p < 0.10$) are considered to be significant (Gujarati, 1995). The *T*-value needs to be significant to support the hypothesized paths by showing above 1.65, 1.96 or 2.58 for alpha levels of 0.10, 0.50 and 0.01 respectively. Two-tail-t-test was employed to evaluate the significance and effect sizes of the path coefficients. Result of the analysis for the overall model, including path coefficient (β), path significant for all independent constructs (*p*-values) and

variance explained (R^2) for dependent construct is examined and hypotheses were tested.

5.7 Results and hypothesis test

5.7.1 Overall Model

Figure 5.2 summarises the results of the PLS analysis of overall model that including Path coefficients (β) were presented with the associated p-value and R^2 Coefficients are significant at 99% and 90% significant levels to provide support for the hypothesized relationships.

Figure 5.2: PLS Analysis of Proposed Structural Model

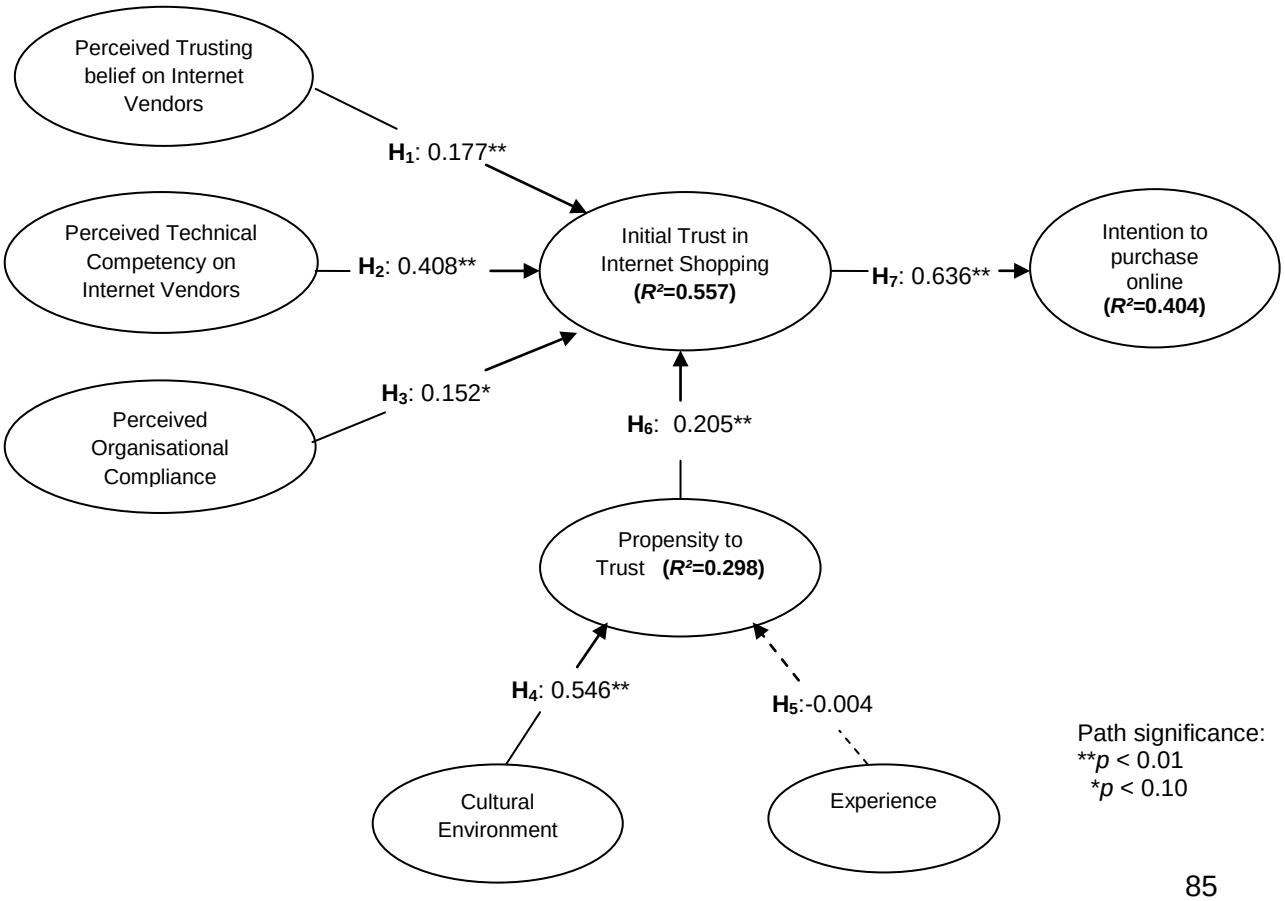


Figure 5.2 shows that the hypothesized path from perceived trusting belief on Internet vendors to initial trust in Internet shopping was positive and significant (β = 0.177, p < 0.01), thus, hypothesis $\mathbf{H_1}$ is supported. The hypothesized path from perceived technical competency on Internet vendors to initial trust in Internet shopping was positive and significant (β = 0.408, p < 0.01), thus, hypothesis $\mathbf{H_2}$ is supported. The hypothesized path from perceived organizational compliance to initial trust in Internet shopping was positive and significant (β = 0.152, p < 0.10), thus, hypothesis $\mathbf{H_3}$ is supported. However, $\mathbf{H_3}$ should be treated with cautious as the relationship found to be weak. Taken together perceived trusting belief on Internet vendors, perceived technical competency on Internet vendors, perceived organizational compliance and propensity to trust combined explained 55.7 percent of the variance in initial trust in Internet shopping (R^2 = 0.557).

The hypothesised path cultural environment to propensity to trust was significant (β = 0.546, p < 0.01). Thus, hypothesis $\mathbf{H_4}$ is supported. In contrast, the hypothesised path experience to propensity to trust was not significant (β = -0.004, p > 0.10). Thus, hypothesis $\mathbf{H_5}$ is not supported. Nonetheless, taken together cultural environment and experience together explain 29.80% of the propensity to trust (R^2 = 0.298). The hypothesised path propensity to trust to initial trust in Internet shopping was significant (β = 0.205, p < 0.01). Thus, hypothesis $\mathbf{H_6}$ is supported. Finally, the hypothesised path Initial trust in Internet shopping to intention to purchase was significant (β = 0.636, p < 0.01). Thus, hypothesis $\mathbf{H_7}$ is supported. Initial trust in Internet shopping explains 40.40% of the intention to purchase online (R^2 = 0.404).

5.7.2 Examining the Separate Perceived Trusting Belief on Internet vendors and Perceived Organisational Compliance

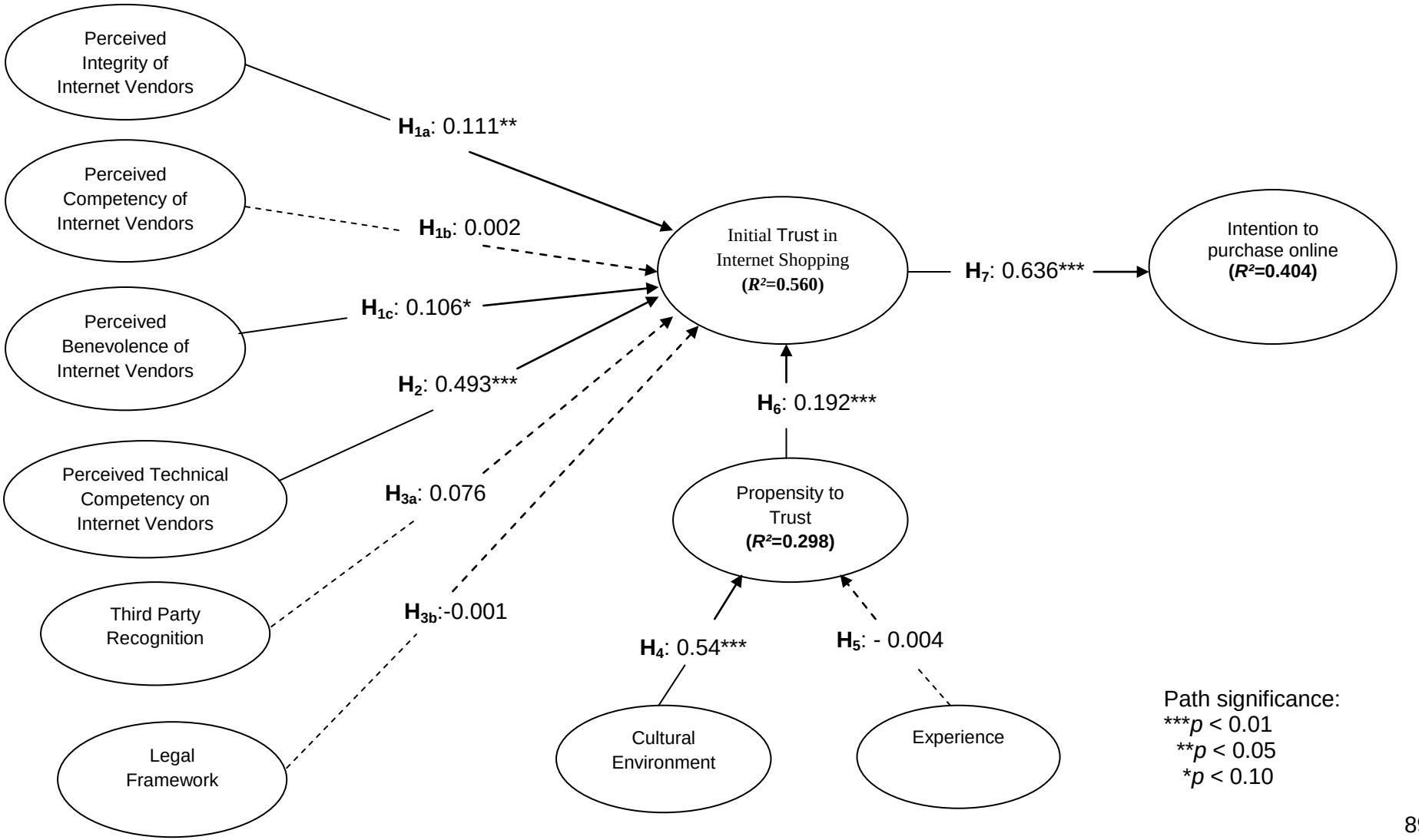
Figure 5.3 summarises the results of the PLS analysis on that including Path coefficients (β) were presented with the associated p-value and R^2 Coefficients are significant at 99%, 95% and 90% significant levels to provide support for all the hypothesized relationships.

Figure 5.3 shows that the hypothesized path from perceived integrity of Internet vendors to initial trust in Internet shopping was positive and significant (β = 0.111, p < 0.05), thus, Hypothesis $\mathbf{H_{1a}}$ is supported. The hypothesised path from perceived benevolence of Internet vendor to initial trust in Internet shopping was significant (β = 0.106, p < 0.10), hence, hypothesis $\mathbf{H_{1c}}$ is supported. However, the hypothesised path from perceived competency of Internet vendors to initial trust in Internet shopping was not significant (β = 0.002, p > 0.10), Thus, hypothesis $\mathbf{H_{1b}}$ is not supported.

The hypothesised path third party recognition to initial trust in Internet shopping was not significant (β = 0.076, p > 0.10), hypothesis, $\mathbf{H_{3a}}$ is not supported Similarly, the hypothesised path legal framework to initial trust in Internet shopping was not significant (β = -0.001, p > 0.10), hypothesis, $\mathbf{H_{3b}}$ is not supported. Taken together perceived integrity of Internet vendors, perceived benevolence of Internet vendor, perceived competency of Internet vendors, perceived technical competency on Internet vendors, third party recognition and legal framework combined explained

56% of the variance in initial trust in Internet shopping variable (R^2 = 0.56). The results of hypothesised paths from **H_4** to **H_7** are explained in overall model (refers to 5.7.1).

Figure 5.3: PLS Analysis of Proposed Structural Model (Perceived Trusting Belief and Perceived Organisational Compliance Examined Separately)



5.8 Chapter Summary

Data analysis was presented in Chapter 5 that focus on the assessing the moderated conceptual model in **Figure 4.1**. This chapter is organized in two major sections, first, the adequacy of measurement model and assessment of structure model, second the result and hypothesis tests. PLS was employed in this study to test the hypothesed relationships in the structural model. The next chapter will present the discussion based on results from data analysis.