FACTORS INFLUENCING THE ACCEPTANCE OF MOBILE BANKING SERVICES AMONG STUDENTS OF HIGHER EDUCATION AT KLANG VALLEY IN MALAYSIA

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ABSTRACT

The mobile banking in Malaysia is still in its infancy stage and the reason to explain the acceptance as well as the understanding of the actual usage level of mobile banking services still remains unclear. Various models have been developed and proposed to increase the understanding of this issue. The proposed model of Decomposed Theory of Planned Behaviour was empirically evaluated by decomposing the attitude, perceived behavioural control, subjective norm, perceived risk and perceived trust. The decomposition approach adopted by models provide a detailed set of antecedents that could better explain the intention to adopt mobile banking. Data was collected through self administered survey questionnaire from 302 full time students in local public universities in Klang Valley, Malaysia. Structural Equation Modeling is the main statistical technique applied in this study. This study revealed that actual use of mobile banking recorded low level of usage. In particular, the study found that the attitude, perceived behavioural control and perceived trust are found to have a significant effect on the students' intention to use mobile banking except for subjective norm and perceived risk which were partially supported. However, on the antecedent effect of the main belief, the perceived ease of use and perceived security was found to have insignificant result. Overall, the result signifies that the model support a good understanding of the factors that influence the intention to use and actual usage of mobile banking. As expected, the main belief provides more decomposition of the specific factors that influence behaviour. Finally, limitations of the research and recommendations for future research are presented.

Keywords: decomposed theory of planned behavior, mobile banking services, acceptance, perceived risk, perceived trust and actual use.

ABSTRAK

Perbankan mudah alih di Malaysia masih di peringkat awal dan penjelasan terhadap penerimaan serta pemahaman kepada tahap penggunaan sebenar perkhidmatan perbankan mudah alih masih tidak begitu jelas. Pelbagai model telah dibangunkan dan dicadangkan untuk meningkatkan pemahaman terhadap isu berkenaan. Model yang dicadangkan adalah Teori Penguraian Gelagat Terancang yang menilai secara empirikal dengan menguraikan sikap, kawalan gelagat ditanggap, norma subjektif, risiko ditanggap dan kepercayaan ditanggap. Pendekatan penguraian diterima pakai oleh model yang menyediakan satu set terperinci dari latar belakang yang menjelaskan niat dengan lebih baik dalam mengamalkan perbankan mudah alih. Data kajian dikumpulkan melalui tinjauan soal selidik tadbir kendiri terhadap 302 orang pelajar sepenuh masa di universiti awam tempatan di Lembah Klang, Malaysia. Persamaan Permodelan Struktur adalah teknik statistik utama yang digunakan dalam kajian ini. Kajian ini mendedahkan bahawa penggunaan sebenar perbankan mudah alih mencatatkan tahap penggunaan yang rendah. Khususnya, kajian mendapati bahawa sikap, kawalan gelagat ditanggap, dan kepercayaan ditanggap mempunyai kesan yang signifikan ke atas niat pelajar untuk menggunakan perbankan mudah alih kecuali norma subjektif dan risiko ditanggap yang disokong secara sebahagian. Walau bagaimanapun, kesan latar belakang kepada kepercayaan utama, kemudahan penggunaan ditanggap dan keselamatan ditanggap didapati mempunyai kesan yang tidak ketara. Secara keseluruhannya, dapatan kajian menunjukkan bahawa model yang digunakan membantu pemahaman yang baik tentang faktor-faktor yang mempengaruhi niat untuk menggunakan dan penggunaan sebenar perbankan mudah alih.Seperti yang dijangka, kepercayaan utama menyediakan lebih penguraian tentang faktor-faktor khusus yang mempengaruhi tingkah laku. Akhir sekali, batasan kajian dan cadangan untuk penyelidikan lanjut turut dibincangkan.

Kata kunci: teori penguraian gelagat terancang, perkhidmatan perbankan mudah alih, penerimaan risiko ditanggap, penerimaan kepercayaan ditanggap, penggunaan sebenar.

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LIST OF ABBREVIATIONS

AMOS	: Analysis of Moment Structures
ANOVA	: Analysis of Variance
AVE	: Average Variance Extracted
BTOS	: Bartlett Test of Sphericity
B2C	: Business to Consumer
CFA	: Confirmatory Factor Analysis
CFI	: Comparative Fit Index
CR	: Critical Ratio
DF (df)	: Degree of Freedom
DTPB	: Decomposed Theory of Planned Behavior
EFA	: Exploratory Factor Analysis
GFI	: Goodness of Fit Index
GOF	: Goodness of Fit
ICT	: Information Communication Technology
IDI	: ICT Development Index
IDT	: Innovation Diffusion Theory
IS	: Information System
IT	: Information Technology
ITU	: International Telecommunication Union
KMO	: Kaiser-Meyer-Olkin
MCMC	: Malaysian Communications and Multimedia Commission
MSA	: Measure of Sampling Adequacy
MI	: Modification Index
MSE	: Mobile Self-Efficacy

NFI : Normed Fit Index

PBC : Perceived Behavioral Control

PCA : Principal Component Analysis

PEOU : Perceived Ease of Use

RMSEA : Root Mean-square Error of Approximation

SEM : Structural Equation Modeling

SMC : Squared Multiple Correlation

SPSS : Statistical Package for the Social Sciences

TAM : Technology Acceptance Model

TB : Trusting Beliefs

TI : Trusting Intention

TLI : Tucker-Lewis Index

TPB : Theory of Planned Behavior

TRA : Theory of Reasoned Action

UIA : Universiti Islam Antarabangsa

UPM : Universiti Putra Malaysia

UKM : Universiti Kebangsaan Malaysia

UM : Universiti Malaya

VIF : Variance Inflation Factor

WAP : Wireless Application Protocol

CHAPTER 1
INTRODUCTION

1.1 Background

Mobile banking is defined as provisions and specific banking and financial services with the supports by mobile telecommunication devices. The scope of services offered include carrying out bank transactions including to administer accounts and to get specific information. One of the academic conceptual models (as seen in Table 1.1) for mobile banking consists of three interrelated concepts which are mobile accounting, mobile brokerage, and mobile financial information services. Mobile banking is a new strategy for banks to enhance their latest technology in a new dynamic marketing environment. With the technology, bank will facilitate their online transactions and information (Aboelmaged & Gebba, 2013). In the meantime, technological advances in the field of information technology and telecommunications has continued to transform the banking industry (Al-Jabri & Sohail, 2012). According to Ensor and Wannemacher (2012), there are advantages and opportunities to the bank clients when using mobile banking transactions such as funds transfer and checking of account balance anywhere at any time. According to Devlin and Devlin (2006), customers only need a lesser time to conduct their banking activities such as visiting a bank and also want a high expectation in term of comfort and accessibility.

Table 1.1 Mobile Banking Conceptual Model
Mobile Banking Conceptual Model

Account Transaction	**Transaction**	**Investment**	**Support**
Checking of account history and view of account statements	Transfer of funds between the customer's linked accounts	Portfolio management services	Status of requests for credit, including mortgage approval, and insurance coverage
Alert on account activity or approval threshold set out	Third party funds transfer and payment of bill for third party	Real-time stock quotes	cheque book and card requests
Monitoring of term deposits	Check remote deposit	Personalized alerts and notifications on security prices	Data exchange messages and e-mail, including submission of a complaint and tracking
Access to loan statements			Location of ATM
Access to card statements			
Equity and mutual fund statements			
Insurance policy management			

The mobile banking is benefited from the positive growth of the mobile terminal technology (Li, 2013). Currently, mobile banking is a tool for banks to maintain their existing and common basic transactions to customers by offering value-added and innovative solutions. As soon as the customers are satisfied with the application, the word of mouth will attract more customers (Tiwari, Buse, Herstatt, & Herstatt, 2006). Mobile devices such as mobile phone and gadgets are always switched on and are usually attended to as the because people carry them everywhere they go (Smutkupt, Krairit, & Esichaikul, 2010). In fact, it allows clients to switch from traditional counter to a mobile store and that are free from hustle in carrying out their transactions.Meanwhile, banks could reduce their operation cost significantly and

facilitate change in retail banking (Laukkanen, 2007). This is also similar with other public service (Shih-Chih Chen, Chen, & Chen, 2009). Besides, the banks can gain benefits and advantages in terms of maintaining the existing of their branches (Shih & Fang, 2004).

With mobile banking, customers can perform their banking transactions twenty four hours daily using their hand phones without having to visit their banks. “It is very convenient because they could do their banking transactions at their preferred time” (Mohd Daud, Mohd Kassim, Wan Mohd Said, & Mohd Noor, 2011).

Recent statistics by ITU World Telecommunication Report (2013) reveal that the subscription of mobile-cellular is fair with the number of the world population. Asia contributes 3.5 billion to the total subscription (6.8 billion). Particularly, the global subscription of mobile-cellular was 3.5 billion against total subscription (6.8 billion). Meanwhile, the global mobile cellular penetration rate was 96%, in which 89% of it lies in developing countries and 128% lies in developed countries. Meanwhile, the report by the Ministry of Communication and Multimedia Malaysia (2013) reveals that the subscriptions and penetration rates of cellular telephone in Malaysia is high, as seen in Table 1.2.

Table 1.2
Number of Cellular Telephone Subcription and Penetration Rate in Malaysia

Year	Qtr	Postpaid ('000)	Prepaid ('000)	Total ('000)	Penetration rate per 100 inhabitants
2012		7,375	33,950	41,325	142.5
2013	1	7,471	34,974	42,445	143.3
	2	7,534	35,070	42,604	143.4
	3	7,595	36,006	43,601	146.2
	4	7,645	35,311	42,956	143.6

Source: Ministry of Communication and Multimedia Malaysia, 2013

Table 1.2 indicates that the subscription and penetration rate of cellular telephone in quarter three last year was 146.2%.It is greater than the total population.

This supports the ITU World Telecommunication Report (2013) that anticipates for a total mobile phone subscription (6.8 billion) by the end of 2013, which is similar with the number of people on earth. By the end of 2013, 2.7 billion people are estimated to use the Internet around the world. This shows that, there are still 4.4 billion people need to be online. When analyzing the cellular phone subscription and penetration rate of the Internet in Asia (ITU World Telecommunication Report, 2013) in Figure 1.1, it could be noticed that Malaysia is among the highest.

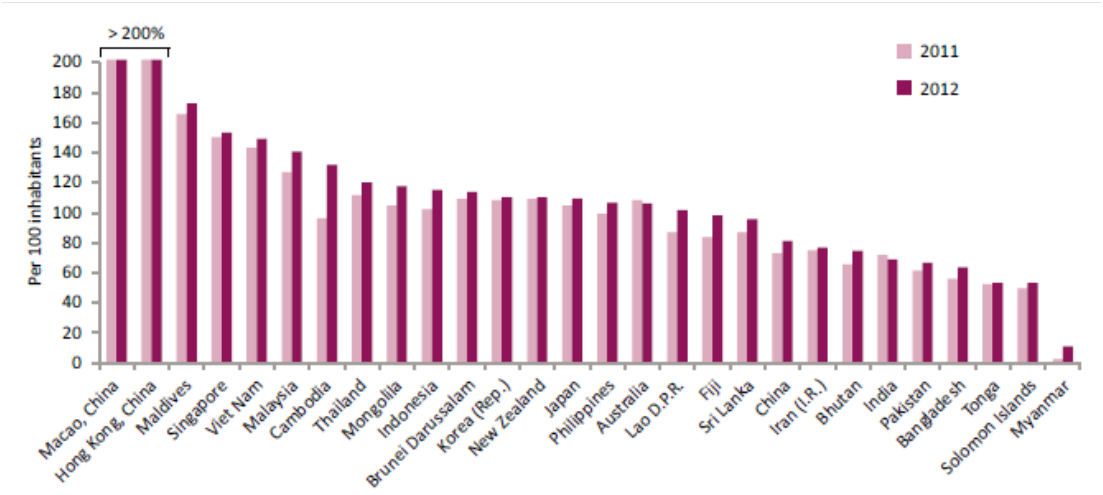

Figure 1.1
Mobile Cellular Telephone Subscription, Asia And The Pacific, 2011 and 2012

1.2 ICT Development Index (IDI)

The ICT development index (IDI) published by the United Nations International Telecommunications Union based on information and communication technology indicators has been agreed upon at the international level. IDI is a standard government, entrepreneurs, government agencies, researchers and others can be used to measure the digital divide and compare the performance of ICT within and across countries.

The main objectives of the IDI are to measure:

- The level and the evolution over time of the events in the countries and in relation to other countries

- Progress in developing countries and the ICT development in both the developed countries: the index should reflect changes in the global and in countries at different stages of ICT development

- The digital divide, i.e. the differences between countries with different levels of ICT development

- The potential development of ICTs or a description of where the countries can use the ICTs'to improve growth and development, based on the skills and capacity available.

1.2.1 Top IDI countries

The IDI 2012 includes a total of 157 countries as detailed in Table 1.3. The top ten IDI countries are predominantly located in the Europe, Asia, and Asia Pacific. Korea with the highest IDI value (8.57) leads the world in terms of ICT developments. It is followed by the Nordic countries (Sweden, Iceland, Denmark, Finland and Norway). The Netherlands, the United Kingdom, Luxembourg, and Hong Kong (China) also rank in the top ten. A comparison with the 2011 ranking shows that there is a hard change in terms of the countries with the highest ICT level. Based on the details. It is understandable that The United Kingdom joined the top ten groups (up from 11th position in 2011) replacing Japan. The Republic of Korea, together with Finland and Sweden, were leaders in terms of mobile broadband uptake, and all three have passed

the 100% penetration rate for active mobile broadband subscriptions in 2012 (ITU World Telecommunication Report, 2013).

Table 1.3

ICT Development Index (IDI), 2011 and 2012

Economy	Rank 2012	IDI 2012	Rank 2011	IDI 2011
Korea (Rep.)	1	8.57	1	8.51
Sweden	2	8.45	2	8.41
Iceland	3	8.36	4	8.12
Denmark	4	8.35	3	8.18
Finland	5	8.24	5	7.99
Norway	6	8.13	6	7.97
Netherlands	7	8.00	7	7.85
United Kingdom	8	7.98	11	7.63
Luxembourg	9	7.93	9	7.76
Hong Kong, China	10	7.92	10	7.66
Australia	11	7.90	15	7.54
Japan	12	7.82	8	7.77
Switzerland	13	7.78	12	7.62
Macao, China	14	7.65	13	7.57
Singapore	15	7.65	14	7.55
New Zealand	16	7.64	18	7.31
United States	17	7.53	16	7.35
France	18	7.53	19	7.26
Germany	19	7.46	17	7.33
Canada	20	7.38	20	7.14
Austria	21	7.36	21	7.10
Estonia	22	7.28	25	6.74
Ireland	23	7.25	22	7.10
Malta	24	7.25	24	6.85
Belgium	25	7.16	23	6.85
Israel	26	7.11	26	6.70
Spain	27	6.89	27	6.65
Slovenia	28	6.76	28	6.60
Barbados	29	6.65	36	6.01
Italy	30	6.57	29	6.43
Qatar	31	6.54	30	6.41
Greece	32	6.45	33	6.21
United Arab Emirates	33	6.41	45	5.68
Czech Republic	34	6.40	31	6.30
Latvia	35	6.36	37	6.00
Portugal	36	6.32	35	6.07
Poland	37	6.31	32	6.22
Croatia	38	6.31	34	6.14
Bahrain	39	6.30	42	5.79
Russian Federation	40	6.19	38	5.94
Belarus	41	6.11	46	5.57
Hungary	42	6.10	39	5.91
Slovakia	43	6.05	40	5.85
Lithuania	44	5.88	41	5.79
Cyprus	45	5.86	43	5.71
Bulgaria	46	5.83	47	5.50
Uruguay	47	5.76	50	5.38
Kazakhstan	48	5.74	49	5.41
Antigua & Barbuda	49	5.74	44	5.70
Saudi Arabia	50	5.69	48	5.46
Chile	51	5.46	52	5.08
Lebanon	52	5.37	61	4.62
Argentina	53	5.36	53	5.06
Oman	54	5.36	58	4.80
Romania	55	5.35	54	5.05
Serbia	56	5.34	51	5.38
TFYR Macedonia	57	5.19	55	4.93
Brunei Darussalam	58	5.06	56	4.93
Malaysia	59	5.04	57	4.81
Costa Rica	60	5.03	65	4.47
Azerbaijan	61	5.01	60	4.62
Brazil	62	5.00	62	4.59
St. Vincent and the Gr.	63	4.81	59	4.71
Seychelles	64	4.75	70	4.36
Moldova	65	4.74	67	4.46
Trinidad & Tobago	66	4.73	63	4.54
Bosnia and Herzegovina	67	4.71	64	4.49
Ukraine	68	4.64	69	4.38
Turkey	69	4.64	66	4.47
Panama	70	4.61	68	4.38
Georgia	71	4.59	73	4.24
Mauritius	72	4.55	74	4.23
Maldives	73	4.53	71	4.31
Armenia	74	4.45	75	4.18
Saint Lucia	75	4.43	72	4.28
Jordan	76	4.22	77	3.90
Colombia	77	4.20	78	3.89
China	78	4.18	79	3.86
Venezuela	79	4.17	76	4.00

Economy	Rank 2012	IDI 2012	Rank 2011	IDI 2011
Albania	80	4.11	80	3.80
Ecuador	81	4.08	83	3.73
Fiji	82	3.99	81	3.79
Mexico	83	3.95	82	3.78
South Africa	84	3.95	85	3.67
Mongolia	85	3.92	90	3.59
Egypt	86	3.85	87	3.65
Suriname	87	3.84	84	3.73
Viet Nam	88	3.80	86	3.65
Morocco	89	3.79	89	3.59
Iran (I.R.)	90	3.79	88	3.61
Tunisia	91	3.70	92	3.58
Peru	92	3.68	91	3.58
Jamaica	93	3.68	93	3.54
Dominican Rep.	94	3.58	95	3.36
Thailand	95	3.54	94	3.42
Cape Verde	96	3.53	96	3.18
Indonesia	97	3.43	97	3.14
Philippines	98	3.34	98	3.14
Bolivia	99	3.28	102	3.08
El Salvador	100	3.25	103	3.06
Tonga	101	3.23	101	3.09
Syria	102	3.22	99	3.13
Paraguay	103	3.21	100	3.10
Uzbekistan	104	3.12	104	3.02
Guyana	105	3.08	106	2.96
Algeria	106	3.07	105	2.98
Sri Lanka	107	3.06	107	2.92
Botswana	108	3.00	108	2.83
Namibia	109	2.85	111	2.60
Honduras	110	2.74	109	2.70
Cuba	111	2.72	110	2.66
Gabon	112	2.61	112	2.46
Ghana	113	2.60	114	2.30
Nicaragua	114	2.54	113	2.39
Zimbabwe	115	2.52	119	2.16
Kenya	116	2.46	116	2.23
Swaziland	117	2.44	115	2.27
Bhutan	118	2.40	117	2.19
Sudan	119	2.33	118	2.19
Cambodia	120	2.30	121	2.05
India	121	2.21	120	2.13
Nigeria	122	2.18	123	1.96
Lao P.D.R.	123	2.10	122	1.99
Senegal	124	2.02	125	1.88
Solomon Islands	125	1.97	124	1.91
Lesotho	126	1.95	126	1.84
Yemen	127	1.89	129	1.76
Gambia	128	1.88	127	1.79
Pakistan	129	1.83	128	1.78
Uganda	130	1.81	130	1.72
Djibouti	131	1.77	131	1.71
Zambia	132	1.77	137	1.64
Mauritania	133	1.76	133	1.70
Myanmar	134	1.74	132	1.70
Bangladesh	135	1.73	139	1.62
Cameroon	136	1.72	136	1.66
Côte d'Ivoire	137	1.70	135	1.66
Comoros	138	1.70	134	1.68
Angola	139	1.68	138	1.63
Congo	140	1.66	140	1.58
Rwanda	141	1.66	143	1.54
Tanzania	142	1.65	141	1.57
Benin	143	1.60	142	1.57
Mali	144	1.54	144	1.43
Malawi	145	1.43	145	1.41
Liberia	146	1.39	148	1.27
Congo (Dem. Rep.)	147	1.31	146	1.30
Mozambique	148	1.31	149	1.26
Madagascar	149	1.28	147	1.28
Guinea-Bissau	150	1.26	152	1.19
Ethiopia	151	1.24	150	1.22
Guinea	152	1.23	151	1.20
Eritrea	153	1.20	153	1.15
Burkina Faso	154	1.18	154	1.11
Chad	155	1.01	156	0.94
Central African Rep.	156	1.00	155	1.00
Niger	157	0.99	157	0.93

Source: International Telecommunication Union, 2013

Table 1.4
Top 12 Global Banks

Forbes rank	**Bank**	**HQ location**	**Mobile banking customers**	**Annual mobile growth**	**Online banking customers**	**Total customers**	**Percentage (%) of mobile banking customers**
1	Industrial and Commercial Bank of China	China	100 million	49.5%	390 million	432 million	23.2%
2	China Construction Bank	China	117 million	38.9%	150 million	291 million	40.2%
3	Agricultural Bank of China	China	83.0 million	N/A	110.9 million	320 million	25.9%
4	JPMorgan Chase	USA	16.4 million	24%	35.0 million	N/A	N/A
8	Wells Fargo & Company	USA	12.5 million	23%	23.8 million	70 million	17.9%
9	Bank of China	China	52.1 million	24.6%	101.1 million	N/A	N/A
13	Bank of America	USA	14.4 million	19.8%	30.0 million	50 million	28.8%
14	HSBC Holdings	UK	2.5 million	N/A	N/A	60 million	4.2%
16	Citigroup	USA	N/A	N/A	N/A	100 million	N/A
24	BNP Paribas	France	1 million	N/A	N/A	N/A	N/A
37	Mitsubishi UFJ Financial	Japan	N/A	N/A	N/A	N/A	N/A
43	Banco Santander	Spain	2.6 million	N/A	11.6 million	106.6 million	2.4%

Source: Banks 2013 annual reports

Table 1.4 reveals the top 12 banks globally with the highest number of mobile banking users. China has recorded among the top country in the world with the highest total number of users.

Countries in Asia and Asia Pacific, with a well developed ICT infrastructure display high levels of fixed (wired)-broadband penetration. These include, Hong Kong (China) (31.5%), New Zealand (28%), Singapore (26%), and the Republic of Korea (38%). While Fixed (wired)-broadband penetration is generally low in developing countries, China is an exception, with a fixed (wired)-broadband penetration of 13%. This represents a total of close to 176 million subscriptions at the end of 2012, over 20 million more than that in 2011. Also, China has a lot of fiber optic and occupies relatively high in the world in terms of its fiber to the home or building penetration (about 5% in mid-2012). Apart from China, only Malaysia (8%), Maldives (5.5%) and Thailand (6%) have a penetration of fixed-broadband above the average of the developing countries (5% by the end of 2012).

1.3 Current State of Mobile Banking in Malaysia

The banking sector in Malaysia is vital due to the substantial banking sector that supports the economic growth in its excellent services. The changes is needed by the banks (at both procedure and information) in their transactions. That is part of the reasons to transfer the conventional operation channels to computerized operation channels (Daud et al., 2011). Currently, thirteen banks in Malaysia have provided mobile banking services (Financial Stability and Payment System Report, 2013). A review on Malaysian budget 2014 has discovered a highlight on the budget for internet access. It mentions on the issue of implementing the second phrase of high-speed broadband project with the involvement of an investment (RM1.8 billion) by the private sector. It involved the local telecommunication company, namely Telekom Malaysia Berhad to manage the project. Another issue is to expand the coverage of the Internet in rural areas, in the next three years, 1,000 telecommunication

transmission towers planned to be built, with RM1.5 billion investments. The budget for the Internet line in Sarawak and Sabah also increased with a total budget of RM850 million for a new underwater cable and will be located within three years. Further, Table 1.5 reveals detailed statistics by Bank Negara Malaysia 2013. The statistics compare the total usage of mobile banking and internet banking. It is seen that in 2013, the penetration rate for mobile banking in Malaysia is still low (at 12.7%) against the total population and the internet banking penetration rate (52.2%).

Table 1.5
Internet Banking And Mobile Banking Subscribers, 2013

Internet Banking

million	Number of Subscribers			Penetration to population (%)
	Total	Individual	Corporate	
2005	2.6	2.5	0.1	9.8
2006	3.2	3.2	0.0	12.0
2007	4.6	4.5	0.1	16.9
2008	6.2	6.1	0.1	22.5
2009	8.1	8.0	0.2	28.9
2010	9.8	9.6	0.2	34.4
2011	11.9	11.6	0.2	41.0
2012	13.7	13.4	0.2	46.3
2013	15.6	15.3	0.3	52.2
Mar-08	5.0	4.9	0.1	18.0
Jun-08	5.4	5.3	0.1	19.4
Sep-08	5.8	5.7	0.1	21.1
Dec-08	6.2	6.1	0.1	22.5
Mar-09	6.7	6.5	0.1	23.8
Jun-09	7.2	7.0	0.1	25.6
Sep-09	7.5	7.3	0.2	26.7
Dec-09	8.1	8.0	0.2	28.9
Mar-10	8.3	8.1	0.2	29.0
Jun-10	8.9	8.7	0.2	31.1
Sep-10	9.4	9.2	0.2	33.0
Dec-10	9.8	9.6	0.2	34.4
Mar-11	10.2	10.0	0.2	35.3
Jun-11	10.9	10.7	0.2	37.6
Sep-11	11.3	11.1	0.2	39.1
Dec-11	11.9	11.6	0.2	41.0
Mar-12	12.4	12.2	0.2	42.1
Jun-12	12.6	12.3	0.2	42.6
Sep-12	13.1	12.8	0.3	44.4
Dec-12	13.7	13.4	0.2	46.3
Mar-13	14.0	13.8	0.3	46.9
Jun-13	14.6	14.3	0.3	48.8
Sep-13	15.1	14.8	0.3	50.5
Dec-13	15.6	15.3	0.3	52.2

Mobile Banking

000	Number of subscribers	Penetration rate (%)	
		To population	To mobile subscribers
2005	127.6	0.5	0.7
2006	246.7	0.9	1.3
2007	367.6	1.4	1.6
2008	574.6	2.1	2.1
2009	675.0	2.4	2.2
2010	898.5	3.1	2.6
2011	1,560.3	5.4	4.3
2012	2,446.2	8.3	5.9
2013	3,793.0	12.7	8.8
Mar-08	397.5	1.4	1.6
Jun-08	423.5	1.5	1.7
Sep-08	536.2	1.9	2.0
Dec-08	574.6	2.1	2.1
Mar-09	627.4	2.2	2.2
Jun-09	566.1	2.0	2.0
Sep-09	621.4	2.2	2.1
Dec-09	675.0	2.4	2.2
Mar-10	751.2	2.6	2.4
Jun-10	823.5	2.9	2.6
Sep-10	834.6	2.9	2.6
Dec-10	898.5	3.1	2.6
Mar-11	998.2	3.4	2.9
Jun-11	1,131.0	3.9	3.2
Sep-11	1,261.5	4.3	3.5
Dec-11	1,560.3	5.4	4.3
Mar-12	1,731.2	5.9	4.7
Jun-12	1,889.1	6.4	4.8
Sep-12	2,129.8	7.2	5.3
Dec-12	2,446.2	8.3	5.9
Mar-13	2,898.1	9.7	6.8
Jun-13	3,245.6	10.8	7.6
Sep-13	3,520.1	11.8	8.1
Dec-13	3,793.0	12.7	8.8

Source: Financial Stability and Payment System Report, Bank Negara Malaysia, 2013

Malaysia must venture into value added industries, high knowledge to maintain competitiveness, and economic prosperity. Hence, the government is aggressively promoting the development plan of industries under the vision 2020, which aims to transform the country into a developed country by 2020. Consequently, Malaysian firms are accustomed to the challenges of change and the use of technology, as the country has experienced decades of economic transformation brought about by trade, global competition, and rapid growth (Le & Koh, 2002). Generally, changes in the business landscape in Malaysia are influenced by two developments, liberalization of trade (development) and the speed of technology development. This is significantly obvious in the banking sector (Ramayah et al., 2003), in which the utilization of

technology gets better. As an example, the use of internet technology keeps increasing because not only it reduces cost, but also it provides good services .

Recently, the Minister of Communication and Multimedia stated “Malaysia can take pride in its broadband penetration rate of just over 67%, but the country must strive to achieve 100%” (BERNAMA, 2014). The Minister further added that Malaysia with its vast expanse of land, had to incur heavy expenditure in establishing a good communications network, particularly in Sabah and Sarawak. In support for that, the government seeks for the cooperation of various parties to push the broadband penetration to a higher rate.

1.4 Problem Statement

Mobile banking is still in the beginning stage, leaving a lot to an extensive progress. It is a requirement, hence, to further explain the adoption of mobile banking among customers and to find out the determinant factors that influence the intention to use mobile banking (Luarn & Lin, 2005). Currently, a wide range of mobile marketing (i.e. mobile search, mobile phone instant messaging, and mobile music) has become very famous among users. This service is the most common part of communications, information, and entertainment applications. However, the transactions inmobile banking and mobile service have been used by only a limited group of users (Tao Zhou, 2011).

Although many studies have investigated the driving factors or antecedents of mobile banking, no critical research has reviewed the results of previous efforts and evaluate the results in this field for the benefits of current researchers and practitioners (Ha, Canedoli, Baur, & Bick, 2012). There is a very limited studies examining the

acceptance of mobile banking and integrated with the decomposed Theory of Planned Behavior especially in the Malaysian context.

In Malaysia, even the statistic of mobile phone services utilization is enormous, the penetration rate was at only 12.7% last year compared to the total number of population (Financial Stability and Payment System Report, 2013). This can lead to a conclusion that the usage of mobile banking services is still at the minimum level. Therefore, the truly existing consumption is not fair with the large numbers of the population and the number of cell phone users. However, the internet banking users in Malaysia show a great penetration rate (52.2%) against the total population. The government is expected to increase the number of internet users to 25 million in 2015, compared to 18 million in 2013 (Economic Report, 2013). Consequently, Bank Negara Malaysia highlighted that extra efforts are needed to guarantee the improvement of the mobile banking usage (Financial Stability and Payment System Report, 2013).

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improvement of the mobile banking usage (Financial Stability and Payment System Report, 2013).

Although mobile banking is infancy in Malaysia, correlated with electronic banking, it is substantial for the service providers to determine the factors influencing consumer intention to receive and adopt, studies are essential to highlight the matter and eventually attracts many bank clients to adopt this system. In reality, mobile banking is still at the beginning and quite new to the people in Malaysia. Therefore, there is a possibility that mobile banking is still unknown to and unused by the bank customers. Hence, there is a requirement to identify the level of its adoption and to determine the factors that influence its usage for financial transactions (Baba & Muhammad, 2012). This evidences that the usage and acceptance among consumers remain unclear. When traversing the literatures, it is found that trust concept is a probable significant factor to individual agreement, either agree or not agree, to adopt the mobile banking (Kim, Shin, & Lee, 2009).

Mobile banking users are worried about the risks of the effect of the wireless technology. Hence, some customers addressed that "….we thus argue that the perception of trust and the risk by users is likely to affect and influence their acceptance of mobile banking services" (Luo, Li, Zhang, & Shim, 2010). Besides, trust is related, in which Mayer, Davis, and Schoorman (1995), found that the needs for trust only arise in risky situation. Morrison and Firmstone (2000) also found similarly, that risk and trust are the components which cannot be separated in decision making. Besides, trust is considered as an efficient approach to address concerns related to the perceived uncertainty and risk (Gefen, 2000), and has beneficial

consequences towards customers' intention to purchase (Jarvenpaa, Tractinsky, & Vitale, 1999).

Accordingly, this study includes Perceived Risk and Perceived Trust as new constructs and tries to explore the respective roles of Perceived Risk and Perceived Trust as additional factors towards the intention to use mobile banking. Trust has a compelling effect on the users' willingness to participate in online trade of money and personal conscious information (Hoffman, Novak, & Peralta, 2002). In conjunction, clients concern that the disclosure of private information to a web page may be wrongly used by the third party through the Internet, especially for private transactions (Sathye, 1999). Thus, they have questioned about the ability of trust of the privacy policies in the electronic bank (Gerrard & Cunningham, 2003a). Mostly, customers refuse to provide their personal data to the mobile banking system for the entry of bank transaction because they do not trust the safety in the system. They are worried that their personal information is manipulated by an third partied without their consent (Luarn & Lin, 2005).

While the previous paragraphs outline about trust, this paragraph and the remaining discuss about risk factor. Privacy and security are two important dimensions in risk factor that might affect the user's intention to adopt electronic transaction. Encryption technology is the most common technique used by all banks for securing information. Information is coupled with a mixture of different unique identifiers, such as mother's name, password, a date that cannot be forgotten or a few minutes of inactivity leads to automatic logout (Poon, 2008a). Howcroft, Hamilton, and Hewer (2002) found that although the customers' confidence in their bank was firm, their certainty in technology was poor. It agrees with Sathye (1999) who found that the main affecting

factors of the absorption of internet banking users in Australia was the concerns on the security and less awareness on the benefit of internet banking.

The importance of privacy and security of online banking has been noticed in a few studies (Sathye, 1999; Tan & Teo, 2000). Particularly, lack of security and privacy were found to be serious obstacles to the online banking adoption (Chen & Barnes, 2007; Sathye, 1999). In addition, Roboff (1998) discovered that clients have a poor understanding of the risk of online banking although they are aware of the risk. Nevertheless, although the clients' trust in their banks are strong, their trust in the technology is weak (Howcroft et al., 2002).

Meanwhile, Perceived Ease of Use, Perceived Usefulness, Compatibility, Personal Innovativeness, and Perceived Enjoyment may not completely explain the customer's attitude towards their intention and actual behavior to use mobile banking. Another aspect that influences customer motive on usage of mobile banking is perceived complexity. Also, studies in the area of customer experience with the technology in general is still lacking. Hence, these additional constructs will allow and increase the understanding of individual's behavior in the adoption of mobile banking in the context of wireless technical acceptance.

The perception of the complexity involved in carrying out financial transactions through mobile networks is often related with user experience with the technology. The use of complex products depends on the practitioners and the ability to build new knowledge and new patterns of experience (Mattila, 2002). In this context, complexity refers to the characteristics of the user and perception towards the use of the technology and not the consequence of using the technology. It can be seen as a faith in either easy or difficult to perform behavior (Cheung, Chang, & Lai, 2000). Gerrard

and Cunningham (2003) conducted a survey covering 129 non-adopters and 111 adopters of internet banking in Singapore to understand the spread of internet banking and measure characteristics among the adopters and non-adopters. Their study revealed that, it was slightly a comparison between users and non-users of complexity factor. Eun-Ju (2003) agrees with that when discovered that the factors of complexity have an impact on banking computer usage. In fact, the factors of complexity play a major role in the electronic banking usage. However, the previous studies on mobile banking mostly focus on intention to use only (Kolodinsky, Hogarth, & Hilgert, 2004).

Similarly, Balasubramaniam, Peterson, and Jarvenpaa (2002) found that research explaining the acceptance of mobile commerce and the understanding of usage behavior is still lacking. Specifically, the behavior of Malaysian consumers is a major obstacle for the banks to engage in mobile banking. Thus, this study extends the existing research to determine whether the intention to use influences the actual usage behavior in Malaysian culture. Empirical investigations have been carried out by Srite (2006), in which a review on the acceptance of technology issue across the cultures of two countries (i.e.United States and China) has taken place. Besides, Bandyopadhyay and Fraccastoro (2007) used Hofstede's cultural dimensions to compare a developing country i.e. India and a developed country i.e. United States, and they had found that culture also affects customers' behavioral intention through social influence perception (ie. individuals with different cultures will react differently based on what other people think). On top of that, according to Baker, Al-Gahtani, and Hubona (2007), language is another factor that will influence the adoption of technology, especially in countries where their official language is not English (like Arab countries or countries in Africa).

There is very limited study focusing on the effect of trust and risk and its antecedents in mobile banking and to determine the acceptance and usage especially in Malaysian context. Thus, this study attempt to that direction. The fundamental problems in this study is to know what are the factors influencing the acceptance of mobile banking services.

1.5 Research Questions

This study is important for several reasons. It can produce a valuable guideline in terms of developing and increasing the number of mobile banking users in Malaysia. Therefore, as a consequence to the issues discussed in Section 1.4, the following questions need urgent answers:

1) What is the level of Actual Usage Behavior of mobile banking?
2) Does Intention To Use influence the Actual Use Behavior of mobile banking?
3) Does Subjective Norm, Attitude, Perceived Behavioral Control, Perceived Risk and Perceived Trust influence the Intention To Use mobile banking?
4) What will be the most influencing antecedents factors that will influence Subjective Norm, Attitude, Perceived Behavioral Control, Perceived Risk and Perceived Trust?

1.6 Research Objectives

The study intends to examine the influencing factors to the intention of the customer to use the mobile banking system in Malaysia. This study will investigate the factors influencing a bank customer to accept and used the mobile banking services. The research objectives are as follows:

1) To identify the level of Actual Use Behavior of mobile banking.

2) To determine the relationship between Intention To Use and Actual Use Behavior.

3) To investigate whether Attitude, Subjective Norm, Perceived Behavioral Control, Perceived Risk and Perceived Trust influence the Intention To Use mobile banking.

4) To identify which are the antecedents factors that influence Subjective Norm, Attitude, Perceived Behavioral Control, Perceived Risk and Perceived Trust.

1.7 Scope of the Study

This study focuses on investigating the factors that influence users' intentions to use and actual use behavior of mobile banking system in Malaysia. The small penetration rate against the population may be considered as a limitation to this study. This study analyzes primary data, gathered from locations with high usage of mobile and internet banking. Accordingly, full time students in public universities in Klang Valley, Malaysia has been set as the population. While the population is too large, sampling is used to gather data. In the end, this study managed to gather data from a sample of 380 respondents. As the foundation to this study, Decomposed TPB has been used as the supporting theory to support the research model.

1.8 Significance of the Study

This study provides an explanation and understanding on the customer acceptance of mobile banking in a number of ways. In terms of theoretical contribution, this study improves the existing literature, in which the findings and the proposed framework

serve as a practical guideline for researchers to enhance their future research. In addition, this study contributes to the body of knowledge especilly on the ability to predict the intention of adoption and behavior within the framework.

In addition, it provides the latest information to the academics and researchers on the acceptance and actual usage of mobile banking in the banking sector. Also, this study contributes to an excellent understanding of the factors correlated with the acceptance of new technologies. Particularly, this study clarifies the understanding of the Decomposed TPB. Besides, the inclusion of complexity into the model contributes to the body of knowledge that complexity plays an important role in determining individual acceptance of the existing mobile banking. This is because the complexity may reduce the number of users and prospective users to use mobile banking services. The more one has, the less likely one is to accept mobile banking.

From the view of practical perspective, the results of this study also assist the practitioners in recognizing the various drivers and challenges leading to the acceptance of mobile banking services. Meanwhile, the implications for management, in terms of accuracy in determining the acceptance and consumer's interest is very important..

1.9 Organization of the thesis

The thesis is divided into six chapters. The first chapter presents the introduction, the background, problem statement, research question, research objectives, scope of the study and the significance of the study. The literature review in Chapter 2 addresses the definition, concept and features of mobile banking. The Intention to Use and Actual Use Behavior are also explained with supports of relevant literatures. Besides

the Technology Acceptance Model is also discussed with other related theories. Then, Chapter 3 introduces the theoretical framework and hypotheses development. This chapter is structured into three parts. The first part outlines related underlying theories. Next part outlines the theoretical framework and the final part explains the hypotheses development. Further, research design and methodology are detailed in Chapter 4. It includes the alternatives for research design, operationalization of variables, unit of analysis, population and sampling, data collection method, and method of analysis. The analysis and results are briefed in Chapter 5. It is followed by Chapter 6 that discusses the findings and concludes the study by addressing the limitation of this study and suggestions for future enhancement.

CHAPTER 2
LITERATURE REVIEW

2.1 Introduction

This chapter begins with the definition of mobile banking and overview of the consequence of the Intention To Use and Actual Use Behavior. Also, this topic reviews related theories and literatures on the variables in this study, especially the Actual Use Behavior, Intention To Use, Attitude (i.e. Compatibility, Perceived Usefulness, Perceived Ease of Use, and Complexity), Subjective Norm (i.e. Family, Friends Influence and Media Influence), Perceived Behavioral Control (i.e. Resources, Technology and Self-efficacy), Perceived Risk (i.e. Perceived Security and Perceived Privacy) and Perceived Trust (i.e. Institutional Trust, Disposition to Trust, and Interpersonal Trust).

2.2 Definition of Mobile Banking

Mobile banking refers to the usage of any mobile devices to perform banking transactions such as to view account statement, checking on account balance, fund transfer, and bill payment through mobile equipment such as smart phones, mobile phones, and any other gadgets (Tommi Laukkanen, 2007). It is also refers to the provisions and specific financial services and banking through the assistants of mobile telecommunication tools. The capacity of services award including stock market and facilities to deal with banks, manage account and to get specific information (Okiro & Ndungu, 2013). Mobile banking is the biggest innovation, or clusters of innovation in retail banking.

In developing economies that lack a dense infrastructure of branches, fixed line telecommunications, and ATM, mobile banking will bring in millions of people into the formal banking system for the first time user. In advanced and developed economies, the impact is lower but still profoundly as mobile banking will be the primary and main way of many, perhaps most, customers interact with their banks (Ensor & Wannemacher, 2012). In addition, Barati and Mohammadi (2009) discovered that in an increasingly competitive market, mobile banking can be identified as an effort to give added value by offering much more convenience to its client.

Generally, previous studies show that the factors that contribute to the use of mobile banking are related to convenience, access to the service regardless of time and place, savings in time and effort, and also privacy (Suoranta, 2003). The most essential contributor to mobile banking seems to be the ability to use this service in any situation, related to the ability to immediate and time savings in the use of the service. This means that the use of mobile banking will help the customers to improve access to banking transactions without need to visit the bank (Amin Hanudin, 2012). It is far more beneficial than the use of online systems on personal computers (Riivari, 2005).

2.3 Customer Acceptance

Customer acceptance in this study refers to a demonstrable willingness in the user group for the use of technology information for the job it is designed to support (Dillon & Morris, 1996). They have also declared that the concept does not mean for situations where users who plan to use it alone, but should also give evidence of using it. In other words, it's origins from the actual use of the technology. In fact, the

acceptance is deemed to be an important field of research since the mid-1990s (Bauer, Reichardt, Barnes, & Neumann, 2005). According to Poon (2008), internet convenience is a benefit for user's satisfaction in adopting electronic banking services. In view of the importance of consumer behavior research, Bhatti (2007) focuses on the category of technology acceptance by the individuals and revealed it has been observed that the perception of the individual level, personal predispositions, consumer tendencies, and attitudes influence the consumer acceptance. Thus, the consumer's acceptance of mobile banking services as measured by their behavioral intention and actual usage behavior is the key outcome variable in this study. Considering the importance of consumer behavior research, this study focus on the individual's acceptance of the technology.

Most of the previous studies focusing on the general conceptualization in understanding mobile banking. In addition, previous studies concentrate on the content delivery and service provider's control. However, there is very scant research that gives an intention on the individual's perception of mobile banking acceptance. There is a need, thus, to understand the degree of acceptance of mobile banking among customers and to examine factors affecting the intention to use it for financial transactions (Baba & Muhammad, 2012). To fill these gaps, this study focuses on the consumer's acceptance of mobile banking services which measured by the behavioral intention to use and actual use behavior. Bauer et al. (2005) had mentioned that, the individual's acceptance is also important to determine the successful of the product or services.

In fact, there is another factor influencing the acceptance of mobile banking, which is social and cultural status. The culture of the customers and the conditions of the

society are important factors in the acceptance of mobile banking. Widespread use of the new technology affects the acceptance of that (Barati & Mohammadi, 2009). With regard to the new technology acceptance, the literature points out that unless the specific need of a consumer is fulfilled, consumers may not be willing to change in current familiar ways of operating (Sathye, 1999).

Moreover, many designers believe that the main obstacle to user acceptance is less user friendly of current system, and that adding a user interface that enhances usability is the key to success (Branscomb & Thomas, 1984).

Nevertheless, even though many researchers has conducted their studies in this area, there are still many factors or variables that is remain unexplored in determining the behavioral intention to use and the relationship between intention to use and actual usage behavior.

2.3.1 Behavioral Intention and Actual Behavior

There are many studies focusing on the intention of the behavior to use or behavioral intentions and interpreted in relation to the context of the study. They are factors in Theory of Planned Behavior (TPB) and Technology Acceptance Model (TAM), which were developed as an extended versions of Theory of Reasoned Action (TRA) by Ajzen and Fishbein (1980). TRA is understood as a normal structure developed to clarify almost all person's behavior based on the importance of a person's beliefs for indicator of behavior (Fishbein & Ajzen, 1975a). Based on a model of intention as the behavior of individual views, TPB is mainly determined by the intention of their behavior, which in turn, is predicted by three trust structure that is Attitude, Subjective Norms and Perceived Behavioral Control.

Akinci, Aksoy, and Atilgan, (2004) suggest that “the basic factors that influence consumer buying behavior and has attracted a lot of attention from researchers whom examine the behavior of the bank's customers and their relationships with these institutions”. The research on consumer has no clear evidence of how the user's behavior, motivation and attitude affect the acceptance of online and mobile banking users (Karjaluoto, Mattila, & Pento, 2002). Their study further points out that prior to computer experience, attitudes and technology toward computers, affect both attitudes in actual behavior and online banking. Meanwhile, Behavioral Intentions to Use is jointly driven by the attitude of the person toward using the system and its Perceived Usefulness. Furthermore it will be persistent with the actual use of the system (Sek, Lau, Teoh, Law, & Parumo, 2011).

Many studies have proven that the Intention to Use is a close antecedent of specified behavior, and there is a relationship between the Specified Behavior and Intention (Ajzen, 1985). Intention to Use is the understanding of individuals that certain behavior will be done (Fishbein & Ajzen, 1975a). Therefore, when a particular behavior is performed, an individual will form the intention, which is estimated to capture a motivation factors imposing the level of effect on behavior (Ajzen, 1985).

In other studies of the behavior intention to use mobile banking, Luarn and Lin (2005) extending the TAM in examining consumer’s intention to use mobile banking in Taiwan. The results revealed that Perceived Ease of Use, Self-Efficacy, Financial Cost, Credibility and Perceived Usefulness seem to have an effect on the Behavioral Intention to Use mobile banking.

2.3.2 Actual Use

Actual use is defined as individual's actual direct usage of system (Davis, Bagozzi, & Warshaw, 1989a). In TAM, the actual use is determined by the behavioral intention of using it, which is influenced by the Perceived Ease of Use and Perceived Usefulness. Bomil Suh and Han (2002a) when studying internet banking discovered that Attitude has a significant relationship with Behavioral Intention. Also, the impact of Behavioral Intention to Actual Usage of the system is significant.

The most important contributor to mobile banking seems to be the ability to use the service in preferred way, related to the ability to immediate and savings in the use of the services (Tommi Laukkanen, 2007). Sek et al. (2011) when determining the user's acceptance and use of smart phones for learning, revealed that the actual use of the smart phones in their study was influenced by the user's intention to use. Also, they found that the Behavioral Intention is a good predictor of Actual use, which has been very famous in the field of information technology (Davis et al., 1989a; Viswanath Venkatesh, Davis, & College, 2000), instant messaging (Lu, Chou, & Ling, 2009) and internet usage (Moon & Kim, 2001). Another, Saravanan (2004) found that it is very important in understanding the actual consumption because of the costs involved in developing mobile technology services is very high. Besides, user acceptance has also been underlined as a key factor in determining the success or failure of any information technology projects (Davis, 1993).

2.4 Theories on Technology Acceptance

Having reviewed the literatures, this study found a number of competing models that have been extensively used by information systems to anticipate the intention to adopt

them. Innovation Diffusion Theory (IDT) by Rogers (1983), TPB by Ajzen (1991a), TAM by Davis, Bagozzi, and Warshaw (1989), TRA by Fishbein & Ajzen (1975a) and decomposed theory of planned behavior (DTPB) by Taylor and Todd (1995) are among the theories.

2.4.1 Innovation Diffusion Theory (IDT)

The earlier theory of technology acceptance is based on IDT by Rogers (1983). The theory is the best to suit the investigation of the use of technology in higher education and environmental education (Sahin, 2006). Based on the theory, the acceptance of innovation is a method of reducing the conviction. According to Rogers (1983), adoption is the results of the full use of innovation as "the available actions" and rejection is a results "not practicing innovation". Innovation, time, social system and communication channels are four major components of the IDT.

1. Innovation: Innovation is an idea, practice or projects that are considered as new by an individual or other unit of adoption. The originality characteristics of an adoption are more connected to the three steps (knowledge, persuasion, and decision) of the innovation process.
2. Time: The time aspect is ignored in most of behavioral research. Rogers (1983) contends that including the time dimension in diffusion research shows one of its strengths
3. Social system: The social system is defined as a set of interrelated units involved in the solution to achieve the same common problem. Rogers (1983) further claims that the nature of the social system affects individual innovation, which is the main criteria for adopters category.

4. Communication channel: The communication channels can also be categorized as a locality channels and channel cosmopolite who communicate with the individual social system and external resources.

Further, Rogers (1995) suggests five main characteristics involving the use of any innovation:

1. Relative advantage: it refers to "the point of which an innovation is recognized as the best idea that it replaces" (p. 212). It needs a practitioner to analyze the costs and profit by using innovation, which can express the economic, social, or by other means.
2. Compatibility: it refers to "the degree to which an innovation is perceived as in line with the current values, needs, and experience of potential" (p. 224). It is assessed relative to the values of beliefs and socio cultural to adopter, earlier recommended ideas and requirements for innovation.
3. Complexity: it refers to "the degree to which an innovation is perceived as quite difficult to understand and use" (p. 242). It reflects the level of physical or mental needs to use innovation to attempt.
5. Trialability: it refers to "the extent to which innovation can experiment with limited basis" (p. 243). It allows practitioners to examine direct innovation, therefore it gives meaning to the adopter.
6. Observability: it refers to "the extent to which innovation results are visible to others" (p.244). More innovations shall be presented by someone else, which creates greater observability.

The IDT has been widely used in research on the acceptance of information technology (Agarwal, 2000), and has been tested in a few studies such as the acceptance of information technology (Karahanna, Straub, & Chervany, 1999a), internet banking (Gerrard & Cunningham, 2003b; Khalil, M. N., & Pearson, 2008), mobile gaming (Kleijnen, Wetzels, & de Ruyter, 2004), and smartphone banking (J. B. Kim & Kang, 2012). It has also been used in the expansion of a broad instrument designed to analyze the decision to adopt innovative IT (Moore & Benbasat, 1991). Besides, many studies have used the theory as the antecedents towards using technology (Khalil, & Pearson, 2008; Mohammad Ismail & Razli, 2011; Taylor & Todd, 1995; Teo & Pok, 2003).

Moore and Benbasat (1991) have used the IDT in their study to develop an instrument for measuring perception of the use of innovations in information technology. Besides using the major components of the theory, they further added another two additional constructs (i.e. voluntariness and image) and observability were tapped into different constructs (i.e. result demonstrability and visibility). It resulted in a valid and reliable instrument of 38 items, consist of eight unique scales.

Later, Taylor and Todd (1995) applied the attributes of IDT (ease of use, relative advantage and compatibility) to examine the attitude of the potential users of computer center. It involved 786 students of business school. The result of their study shows about 76% variance in attitude. Then, Karahanna, Straub, and Chervany (1999b) combined IDT with TRA in examining the factors that influence the use of Microsoft's package Windows 3.1 software involving two groups; adopters and potential users. They added another three attributes to the IDT (i.e. visibility, image, and result demonstrability). The results show that the attributes of IDT (visibility, ease

of use, demonstrability results, and trialability) are only important for the potential users group.

Meanwhile, Teo and Pok (2003) found similar results with Taylor and Todd (1995). When they included three attributes of IDT (i.e. ease of use, relative advantage, and compatibility) as antecedents of attitude in examining the behavioral intention to adopt WAP-enabled mobile phones, The results revealed that only the relative advantages influenced the attitude of the users. Next, Kleijnen et al. (2004), used the attributes of IDT (relative advantage, complexity and compatibility) as a model, which was filtered based on the explanation of the use of mobile game.. The findings indicated that complexity and compatibility influenced the use of mobile games.

Later, Khalil and Pearson (2008) when studying about the adoption of internet banking has used the attributes of IDT (perceived compatibility, perceived relative advantage, Perceived Ease of Use (complexity), and trialability) . They found that the attributes had a significant influence on attitude. It was followed with an initiative in mobile marketing by Mohammad Ismail (2011) In his study, Perceived Ease of Use, Perceived Usefulness and Perceived Compatibility attributes were used to measure the acceptance of mobile marketing. In the end, the results revealed that Perceived Usefulness significantly influenced the attitude.

While the previous paragraphs explain the study briefly, more detailed characteristics of these studies are exhibited in Table 2.1. Basically, the table details the respondents and structures the attributes.

Table 2.1
Related Studies in IDT

Originating author	**Respondents**	**Findings**
Moored and Benbasat (1991)	540 individuals in seven companies from a variety of industries	A 38-item instrument with eight scales; Compatibility, Relative Advantages, Perceived Ease of Use, Result Demostrability, Image, Visibility, Trialability and Voluntariness
Taylor and Todd (1995a)	786 students of business school	Only Perceived Usefulness found to have a significant determinant of Attitude. Compatibility and Perceived Ease of Use insignificantly influenced the attitude.
Karahanna *et al*. (1999)	230 bank employees	Perceived Usefulness, Perceived Ease of Use, Visibility, Trialbility, and Result Demonstrability were found to have a significant effect on Attitude for the new users. For existing users, Perceived Usefulness and Image were found to have a significant effect on Attitude
Teo and Pok (2003)	1012 young adults and internet users	Relative Advantage was found to have significant influence on Attitude. Perceived Ease of Use also has a significant influence on Attitude
Kleijnen *et al*. (2004)	105 users of wireless financial services	Relative Advantage was found significantly influenced Behavioral Intention, but with slighter significant compared to Compatibility and Complexity
Khalil and Pearson (2008)	1164 students of local university	Relative Advantage, Compatibility, Perceived Ease of Use, and Trialability were found to have a significant influence on Attitude.

Table 2.1 (Continued)

Originating author	Respondents	Findings
Mohammad Ismail and Razli (2011)	277 students of local university	Perceived Usefulness significantly influenced Attitude

2.4.2 Theory of Reasoned Action (TRA)

The TRA, by Fishbein and Ajzen (1975c) was originally introduced in social psychology field, and widely used to describe the human behavior. This theory hypothesizes that the behavior is predicted by the intention of an individual to perform in the behavior. The intentionis predicted by two factors, (1) through the attitude of individual to behavior and (2) through the opinion of the people in the social environment, called subjective norm (Fishbein & Ajzen, 1975c) in which the relationship is illustrated in Figure 2.1. The key principles in the TRA (Figure 2.1) is that the intention of the behavior of an individual in a particular context depends on the subjective norm and attitude towards doing the target behaviors, which point to the person's perception that most of the people who are important to her or him think they will or will not perform the relevant behavior (Fishbein & Ajzen, 1975c).

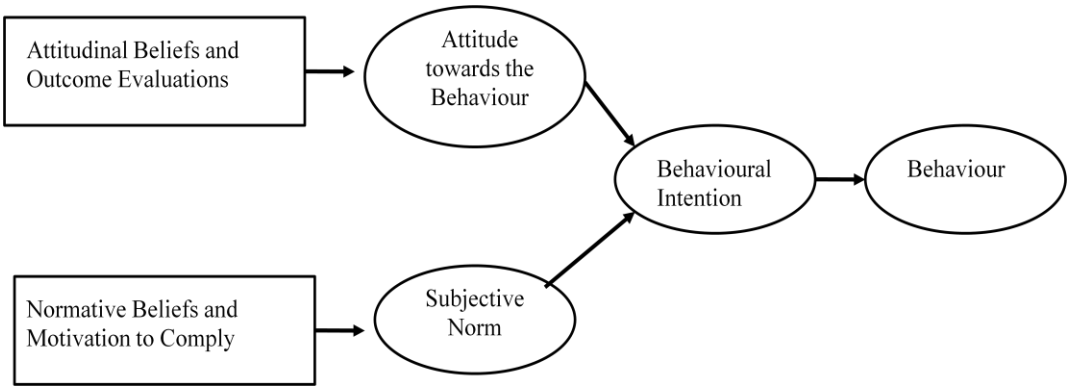

Figure 2.1
Theory of Reasoned Action (TRA)

Attitude towards behavior reflects the individual assessment or a general feeling against the target behavior. It shows a positive or negative relationship to individual assessment about doing the behavior. The attitude toward behavior is a result of the beliefs about individual behavior and the decision resulting from such behavior. As a consequence, the theory hypothesizes that the intention to perform a behavior will be greater when there is a positive rating to the performed behavior (Ajzen, 1991a).

In such context, Subjective Norm is defined as an individual seen social pressure to do or not to do the target behavior. It is a combination of the normative beliefs of an individual behavior to observe others (Fishbein& Ajzen, 1975a). Normative beliefs show the perception of the influence of the opinion between the group of reference while the motivation needs to comply with individual level that needs to show compliance with the necessity of the antecedent (Mathieson, 1991). Thus, the theory proposes that an individual always acts according to their perception of what people think they have to do. Their intention to practice certain behavior may be affected by people who are close to them. TRA has been widely used to explain individual's behavior. The theory postulates that individual behavior is influenced by attitudes and subjective norms.

Davis et al. (1989a) in their study of word processing system compared TAM and TRA. They found that Attitude had a strong significant influence on Behavioral Intention. Meanwhile, Taylor and Todd (1995) in predicting the Intention to Use VCR-Plus^{+TM} found that Attitude was significantly influenced the Behavioral Intention. Later, Karahanna et al. (1999b) when conducting a research on the usage of Microsoft Windows 3.1 with 230 employees of financial institutions found that Attitude significantly influenced Behavioral Intention. To explore the beliefs and

attitudes, Kolekofski and Heminger (2003) used TRA model and found that Attitude influenced the Intention to Use. In was followed by a findings by Ramayah, Rouibah, Gopi, and Rangel (2009)that Attitude is significantly important and has a direct positive relationship towards the Behavioral Intention to Use internet stock trading.

The studies in the previous paragraphs are summarized in Table 2.2. The table details the sample and the findings of each study in a structured manner.

Table 2.2
Related Studies Utilizing TRA

Originating author	**Respondents**	**Findings**
Davis *et al.* (1989)	107 MBA students at University of Michigan	The Attitude has a significant influence on Intention to Use, while Subjective Norm has no serious influence on Intention to Use.
Taylor and Todd (1995)	790 patrons at a shopping mall	Subjective Norm and Attitude were significant determinants of Behavioral Intention.
Karahanna *et al*. (1999b)	230 employees at a large financial institution	For potential adopters: Subjective Norm has a serious effect on Behavioral Intention. For users: Attitude has a significant effect on Behavioral Intention.
Kolekofski and Heminger (2003)	85 faculty and support staffs at Air Force Institute Technology.	TRA was used as a framework to know the influence of Attitude and beliefs on information sharing. Three types of attitudes influenced the intention: attitudes for the stewardship versus ownership of the company information, the instrumentality of shares and the interpersonal feelings of dealing with the potential information-sharing relationships.
Ramayah *et al*. (2009a)	144 current and potential investors in stock trading in Malaysia	Significant positive relationship of Attitude and Subjective Norm towards the Behavioral Intention to Use internet stock trading. The Attitude was significantly influenced by Perceived Usefulness and Perceived Ease of Use.

2.4.3 Theory of Planned Behavior (TPB)

TPB is an extended version of TRA (Fishbein, M., & Ajzen, 1975a) with an additional belief (i.e., Perceived Behavioral Control) making the determinants of intention consists of Attitude, Subjective Norm, and Perceived Behavioral Control as exhibited in Figure 2.2. The theory can measure how a person's actions are guided. It predicts the development of a particular behavior, provided that the behavior is intentionally performed because the behavior could be thoughtful and planned.

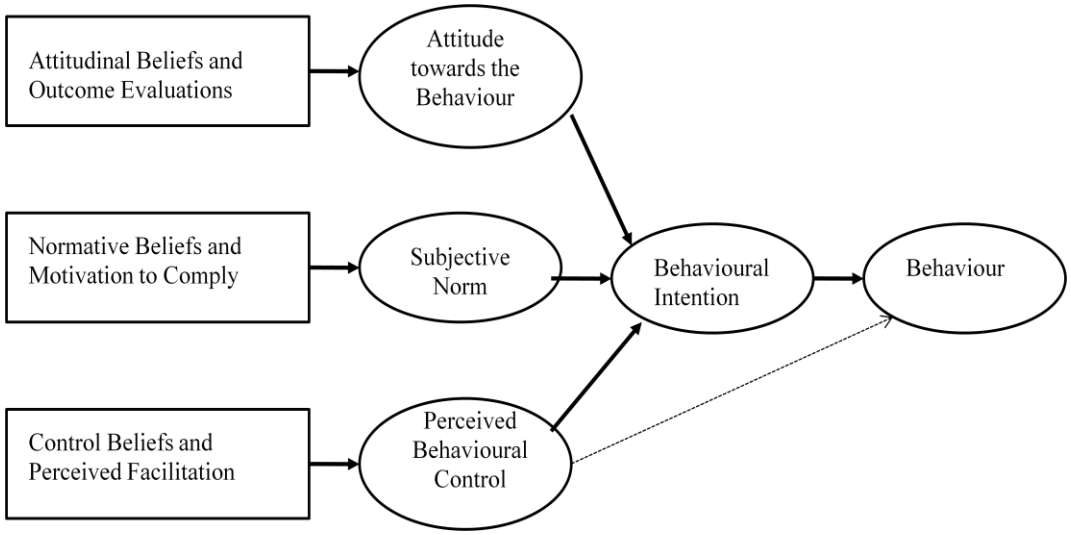

Figure 2.2
Theory of Planned Behavior (TPB)

Figure 2.2 showcases that the three antecedents in the TPB have direct and indirect influence, through a variety of mechanisms of behavior intention, over behavior. Perceived Behavioral Control is adhered to effect both the intention and behavior (see Figure 2.2). A meta-analysis has been carried out, in which the result proves that the TPB is an effective theory (Armitage & Conner, 2001). The rationale behind the addition of Perceived Behavioral Control that allows the prediction of uncontrolled behavior is that it completes the volitional control. In regards with this, in the ability of Perceived Behavioral Control to influence the intention, Ajzen (1991) justified that

“the importance of Subjective Norms, Attitude, and Behavior Control is seen in the expectations that this intention is aimed at changing behavior and situations”.

The TPB has been famously used in various studies. Mathieson (1991) in the study of the spreadsheet usage, found that the Intention To Use was predicted by Attitude and Perceived Behavioral Control. However, the Subjective Norm insignificantly influenced the Intention To Use. Later, Taylor and Todd (1995)revealed that Attitude, Perceived Behavioral Control and Subjective Norm significantly effected the behavior. Then, Harrison, Mykytyn, and Riemenschneider (1997) in a study on executive’s decision to adopt IT had found that Perceived Behavioral Control and Subjective Norm significantly influenced Attitude. Meanwhile, Limayem, Khalifa, and Frini (2000) in online shopping discovered that Attitude, Perceived Behavioral Control, and Subjective Norm were significant with Intention. They had also found that Personal Innovativeness and Perceived Consequences had a significant effect on the online shopping intention.

Interestingly, Riemenschneider, Hardgrave, and Davis (2002) found a significant influence of Attitude and Subjective Norm on intention to adopt a software development while Perceived Behavioral Control was not significant. Nevertheless, in a study that examined the chinese users in instant messaging service in China, Lu, Zhou, and Wang (2009) with their results signified that Attitude, Perceived Behavioral Control, and Subjective Norm significantly affected the Behavioral Intention To Use. All the details of studies in this paragraph and the previous are exhibited in Table 2.3.

Table 2.3
Related Studies Utilizing TPB

Originating author	**Respondents**	**Findings**
Mathieson (1991)	262 students	Intention To Use predicted by Perceived Behavioral Control and Attitude. Menwhile, the relationship between Subjective Norm and Intention was not significant.
Taylor and Todd (1995a)	786 students of a business school	Subjective Norm, Attitude, and Perceived Behavioral Control were important determinants of Behavioral intention. Behavioral intention significantly affected usage behavior.
Harrison *et al.* (1997)	97 senior executives in small businesses	Intention To Use information technology was predicted by Attitude, Perceived Behavioral Control and Subjective Norm.
Limayem *et al.*(2000)	705 online consumers	Subjective Norm, Attitude, and Behavioral Control were significant determinants of online shopping intention.
Riemenschneider, Hardgrave, & Davis (2002)	128 application developers	Attitude and Subjective Norm significantly influenced Intention to adopt the methodology. However, Perceived Behavioral Control was not significant.
Y. Lu, Zhou, & Wang (2009)	250 university students at National University China	Attitude, Perceived Behavioral Control, and Subjective Norm significantly effected the Behavioral Intention To Use.

2.4.4 Technology Acceptance Model (TAM)

TAM was adapted from TRA and provides the basis for previous studies in information systems to handle information technology-related behavioral intentions and usage (e.g. Davis et al, 1989). Two particular beliefs, Perceived Ease of Use and Perceived Usefulness are of paramount importance in the TAM for anticipating the behavior of user acceptance of information technology, in which the relationships are visualized in Figure 2.3.

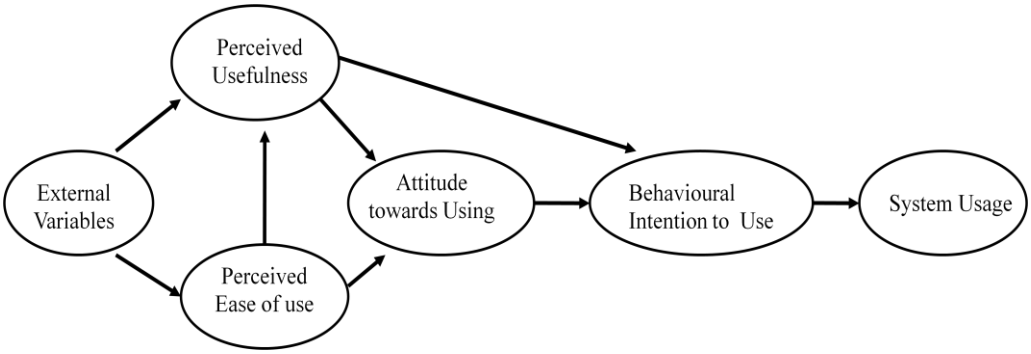

Figure 2.3
Technology Acceptance Model

Davis (1989a) defines the Perceived Usefulness as "the extent to which individuals believe that by using a particular system, can improve the performance of their work", and Perceived Ease of Use as "the extent to the believe of individuals that using a particular system would facilitate". TAM expects that computer usage is persistent by the Behavioral Intention to Use of the system, whilst the use of joint intention is determined by an individual attitude towards the use of the system and opium use. Within all the beliefs, Perceived Ease of Use is hypothesized to be a predictor of Perceived Usefulness. TAM has been one of the theoretical frameworks famously cited to envision the acceptance and use of new information technology in the organization.

Davis (1989a) in his study on the acceptance of word processing program (Write one)found that TAM has explained more variance in behavioral intention as compared to TRA. also It was also found that Perceived Usefulness is a major determinant of individual's Intention to Use when compared to TRA. Another study by Adams, Nelson, and Todd (1992)that evaluated the psychometric properties of the Perceived Usefulness, Perceived Ease of Use, and System Usage in two studies found interesting results. In particular, study 1 involved 118 respondents from 10 different organizations. Their attitude towards two messaging technologies; electronic mail (e-mail) and voice mail; were measured. Meanwhile, study 2 was conducted involving 73 undergraduate and MBA students. In the study, their attitude towards three software applications (Lotus 1-2-3, WordPerfect, and Harvard Graphics) were measured. The results proved that the scales were reliable and valid. Further, study 1 proved that Perceived Usefulness was important in determination of system usage while Perceived Ease of Use was less important. However, study 1 found a slight difference, in which the results proved that Perceived Ease of Use was significant for the three software, leaving Perceived Usefulness significant only for Lotus 1-2-3.

Then, Venkatesh, Michael, Gordon, and Fred (2003) used and analyzed TAM and verified that Perceived Ease of Use and Perceived Usefulness are significant determinations of Intention To Use. Another study was then carried out by Luarn and Lin (2005), involving 180 users in Taiwan. They were studying the Intention To Use mobile banking, which eventually revealed that Perceived Usefulness and Perceived Ease of Use had significant effects on Intention To Use mobile banking. The study also proved that the extended TAM had a high capability in predicting the individual Behavioral Intention to Use the technology. Later, a study was carried out in Malaysia by Hanudin et al. (2008) aiming at investigating the user's intention to use the mobile

banking in the future. It involved 158 banking customers in branches nationwide. Moreover, another study by Hussein Nabil (2012) involving 200 university students in Malaysia. They were studying the adoption of internet banking in Malaysia and found that Perceived Usefulness were significant, instead negative significant result for Trust and Risk. The results proved that the Perceived Usefulness and Perceived Ease of Use significantly influenced the Intention to Use. In addition, a study by Govender and Sihlali (2014) in a study of mobile banking adoption had reveal the Perceived Value and Trust influence the student intention to adopt mobile banking. Having discussed about those studies in this paragraph and the previous, they are detailed in Table 2.4.

Table 2.4
Related Studies Utilizing TAM

Originating author	**Respondents**	**Findings**
Davis (1989a)	112 users at IBM Canada's Toronto Development Laboratory and 40 MBA students	Perceived Ease of Use and Perceived Usefulness were correlated with future usage and self reported current usage. Additionally, Perceived Usefulness had a significantly higher correlation with usage behavior than Perceived Ease of Use.

Table 2.4 (Continued)

Originating author	Respondents	Findings
Adams *et al* (1992)	116 employees from 10 organizations and 73 students	Perceived Usefulness was a significant determinant of usage, but Perceived Ease of Use was not. Further, Perceived Ease of Use to usage was significant (Harvard Graphics, WordPerfect, Lotus 1-2-3) while Perceived Usefulness to usage was significant for Lotus 1-2-3 alone.
Taylor and Todd (1995)	786 students of a business school	Significant paths: Perceived Ease of Use to Attitude, Perceived Usefulness, to Perceived Ease of Use, Perceived Ease of Use to Attitude, Perceived Usefulness to Attitude, and Behavioral Intention to Actual Usage.
Lederer *et al*. (2000)	163 users of work-related Internet newsgroups	The effect of Perceived Ease of Use and Perceived Usefulness on usage was significant. Significant antecedents of Perceived Ease of Use were Ease of Understanding and Ease of Finding. The significant antecedent of Perceived Usefulness was Quality of Information
Venkatesh, Michael, Gordon, and Fred (2003)	215 employees in four firms	Verified that Perceived Ease of Use and Perceived Usefulness are significant determinations of Intention To Use.
Luarn and Lin (2005)	180 users in Taiwan	Perceived Usefulness and Perceived Ease of Use had a significant effect on Intention To Use mobile banking. The study also proved that the extended TAM had a high capability in prediction of the individual Behavioral Intention To Use the technology.

Table 2.4 (Continued)

Originating author	Respondents	Findings
Hanudin *et al*.(2008)	158 bank customers	The results show that Perceived Usefulness and Perceived Ease of Use significantly influenced Intention To Use.
Hussein Nabil (2012)	200 university students	Verified that Perceived Usefulness were significant, instead negative significant result for Trust and Risk
Govender and Sihlali (2014)	71 student of information system and technology	Perceived Value and Trust influence the student intention to adopt mobile banking. The study also proved that the extended TAM had a high capability in prediction of the individual Behavioral Intention To Use mobile banking.

2.4.5 Decomposed Theory of Planned Behavior (DTPB)

DTPB is adapted from Taylor and Todd (1995), consist of Complexity, Relative Advantage, and Compatibility from the IDT by Rogers (1983) and Perceived Behavioral Control. It has its own benefits compared to other theories. Particularly, it identifies the specific features of the belief that is likely to affect the use of information technology. In particular, the model seems to have a better prediction power against traditional TPB and TAM (Ndubisi, 2004). It makes use of the factors from the innovation literatures (such as, Compatibility and Relative Advantage). It also explores (such as Social Influence) Behavioral Control and Subjective Norms more comprehensively by decomposing all into a specific dimension as seen in Figure 2.4. It administers individually in a comprehensive way to understand Attitudes, Behavioral Control and Subjective Norms to understand the influence over the Intention to Use (Tan and Teo, 2000).

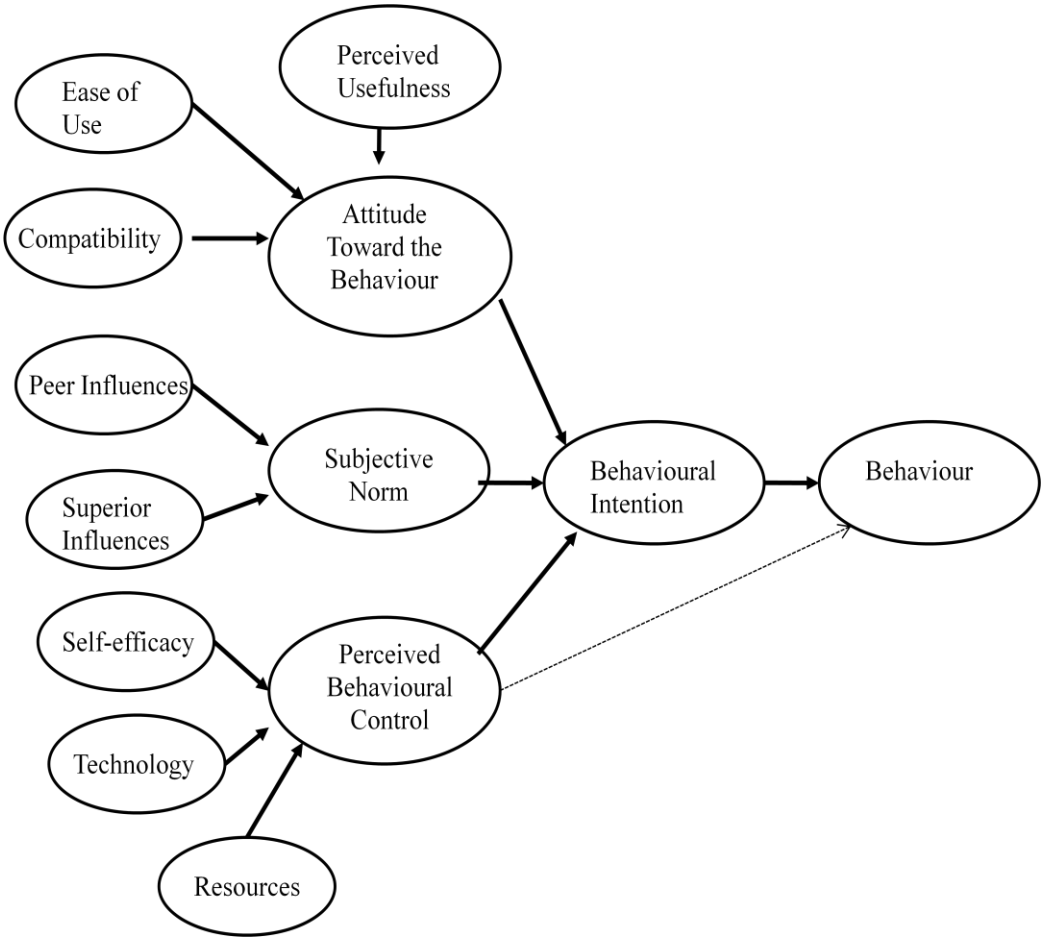

Figure 2.4
The Decomposed Theory of Planned Behavior

Taylor and Todd (1995) have proven that the DTPB has better descriptive competence than the pure TRA and TPB. Therefore, this study argues that mobile banking is a technological innovation and thus the DTPB provides a much better explanation on adoption and intention.

It has been utilized by a number of studies. (Taylor and Todd, 1995) conducted a study involving 786 business students in determining the use of a computer resource center. They discovered that DTPB provided better prediction power compared to TAM and TPB. In detail, their study revealed that Perceived Usefulness significantly affected Attitude and that Resources significantly affected Perceived Behavioral Control. In addition, they also found that Peer and Superior Influences significantly

related to Subjective Norm and Self-Efficacy, while Attitude, Subjective Norm, and Perceived Behavioral Control have significant effects on Behavioral Intention To Use the computer center.

Bhattacherjee (2000) then used DTPB in examining the acceptance of e-brokerage in online investments. The results revealed that Attitude, Subjective Norm, and Behavioral Control have influenced the Intention To Use the e-brokerage system. The results also proved that the decomposition of Attitudinal Belief (i.e., Ease of Use and Usefulness), Social Factors (i.e., normative influence), and the decomposed of Perceived Behavioral Control (i.e., Self-Efficacy and Facilitating Conditions) significantly correlated with Attitude, Subjective Norm and Perceived Behavioral Control.

In a study on the adoption of internet banking in Singapore by Tan and Teo (2000), Attitude was decomposed into Relative Advantage, Compatibility, Trialability, Complexity, and Risk. Meanwhile Perceived Behavioral Control was decomposed into and Facilitating Conditions (availability of government support and availability of technology support) and Self-Efficacy. The results for Attitude after decomposed were proven significantly associated with intention except for Complexity, while the Perceived Behavioral Control has a significant relationship with Intention To Use except for Technology Support. Subjective Norm, however was not supported with Behavioral Intention To Use internet banking services.

Shih and Fang (2004) in their study on the adoption of internet banking in Taiwan found that Perceived Usefulness and Complexity significantly affected Attitude. However, Subjective Norm was found to have a insignificant relationship with intention, while Self-Efficacy significantly affected Perceived Behavioral Control.

Similarly, Facilitating Conditions was also insignificant. In the end, they conclude that Behavioral Intention has a significant effect on Actual Use of Behavior.

Meanwhile, in Malaysian context, Khalil and Pearson (2008) used DTPB in their study on the adoption in internet banking. They found that Attitude, Perceived Behavioral Control, Attitude and Subjective Norm have significant effects on Behavioral Intention. Further, the decomposition of Attitudinal Belief also found to have a significant effect on Attitude. Meanwhile, Self-Efficacy was also found to have a significant effect on Perceived Behavioral Control.

2.4.6 Antecedents of Behavioral Intention

The Actual Use Behavior can be measured by reviewing the literatures on behavioral intention. Behavioral intention is an individual subjective expectation that they will perform specified behavior and major determinant of actual use (Fishbein, M., & Ajzen, 1980b). Intention is pretended to capture the motivational factors that influence behavior. It is an indication of how people are willing to try, from how much effort they plan to impose, in order to perform the behavior (Ajzen, 1991a). Later, the study by Reychav and Weisberg (2010) on knowledge sharing, indentify that the interrelation between intentions and behavior to share knowledge that is implicitly and explicitly important for both the learning organization and competitive advantage of the company, as well as for the individuals in the organization.

Next, Yang-wallentin (2004) when studying the relationship between Perceived Behavioral Control and Behavioral Intention on the issue of public transport in Frankfurt, they justified that the perseverance of joint intention was very clear, the essential idea was when the individuals performed the intention, they consider their

attitude towards the behavior. According to TPB, an individual's behavior can be interpreted by the individual's behavioral intention, which are jointly influenced by Attitude, Subjective Norms, and Perceived Behavioral Control (Luarn & Lin, 2005).

Earlier, Bhattacherjee (2000) in determining the acceptance of e-commerce services, used Attitude, Subjective Norm, and Behavioral Control.The results revealed that Perceived Usefulness and Perceived Ease of Use were the determinants of Attitude. The Behavioral Control was determined by Self-Efficacy and Facilitating Conditions, while Subjective Norm determined Interpersonal Influence and External Influence. The results on the decomposition of all factors were found to have a significant influence on Attitude, Subjective Norm, and Perceived Behavioral Control (i.e. Attitude was decomposed into Usefulness and Ease of Use, Normative Beliefs was decomposed into Interpersonal Influence and External Influence, and Control Beliefs was decomposed into Self-Efficacy and Facilitating Conditions).

Later, Hsu, Wang, and Wen (2006a) analyzed consumer Attitude and Behavioral Intentions towards acceptance of mobile coupons in Taiwan. They found thatAttitude, Subjective Norm, and Perceived Behavioral Control significantly affected the Intention To Use. In detail Attitude was among the most significant influencing factors of intention. Meanwhile, Perceived Usefulness was the most significant influencing factor for Attitude, SelfEfficacy was the most influencing factor for Perceived Behavioral Control, and Primary Group was the most influencing factor for Subjective Norm.

Khalil and Pearson (2008) when determining the adoption of internet banking in Malaysia used Attitude, Subjective Norm, Perceived Behavioral Control, and newly constructed Perceived Trust. In their study, Attitude has been decomposed into

Relative Advantage, Perceived Compatibility, Perceived Ease of Use, Triability, and Perceived Image antecedents, Subjective Norm has been decomposed into three antecedents which are Friends, Family, and Colleague or peers, Perceived Behavioral Control was decomposed into Self-Efficacy and Resource Facilitating Conditions, and Perceived Trust has been decomposed into Disposition of Trust, Perceived Structural Assurance, Perceived Competency, Perceived Benevolence, and Perceived Integrity. In the end they found that Attitude, Perceived Behavioral Control, Subjective Norm, and Perceived Trust significantly positively affected Intention To Use.

Another study in Malaysia was performed by Jayasingh and Eze (2009), who determined the use of mobile coupons in Malaysia. They found that Perceived Ease of Use, Perceived Usefulness, Perceived Credibility, Compatibility, and Social Influence significantly influenced Attitude to use mobile coupons. Besides, Social Influence was also found significant to Behavioral Intention.

Later, Mohammad Ismail (2011) extended the study by determining the acceptence of mobile marketing in Malaysia. The study involved 277 students of a local public university. The results revealed that the antecedents of Attitude shows a positive relationship between Perceived Usefulness, Perceived Ease of Use, Perceived Enjoyment, and Perceived Image. In fact, Perceived Enjoyment strongly influenced Attitude compared with Perceived Usefulness and Perceived Image. Meanwhile for Subjective Norms, they hypothesized that a friend's influence is more towards Subjective Norm if compared with family's influence. They concluded that Attitude and Subjective Norm are positively related to Behavioral Intention. However, Attitude was classified as more influencing to the Behavioral Intention To Use mobile marketing.

2.4.7 Attitude

Attitude refers to the positive or negative perception of individuals (the effects of evaluative) by doing certain specified behavior (Fishbein& Ajzen, 1975a). A study in electronic banking revealed that Attitude and the Real Behavior were affected by factors such as customer satisfaction or dissatisfaction with the present banking services. The effect of reference groups, such as family and others as well as computer attitudes would influence the behavior to the online banking (Laforet & Li, 2005a). In fact, attitude and value do influence consumer behavior. It was also an affective elements, in which the culture influence is the most evidence (Bitner, 1992).

Attitude towards behavior refers to the legal person who does a good or bad behavior (Ramayah et al., 2003)while attitude towards using a particular system is the main factor affecting the intention to use the system, thus, will generate actual usage behavior. The basic argument is that the individuals make a rational decisions and systematically based on the information provided to them (Ajzen, 1991a). Many studies in the context of e-business have shown that individuals were directly and significantly affect the Behavioral Intention to use a particular application of e-business (George, 2002; Gribbins, Shaw, Gebauer, & Shaw, 2003). Puschel and Mazzon (2010) found that Attitude significantly affects intention to adopt mobile banking. Earlier, Mathieson (1991) revealed that Intention to Use a spreadsheet was predicted by the attitude toward it. It supported Davis, Bagozzi, and Warshaw (1989) who found that Attitude strongly significantly influenced Behavioral Intention. Later, Taylor and Todd (1995) also found the same result. Then, Harrison, Mykytyn, and Riemenschneider (1997) found that Attitude significantly influenced Intention To Use.

Similar result was also found in the acceptance of internet banking. Particularly, Bhattacherjee (2000) used DTPB and decomposed the Attitudinal Belief into two antecedents (i.e. Relative Advantage Compatibility and Complexity). In the end, the results proved that Attitude and Perceived Behavioral Control have significant effect on Intention To Use. Later, another study by Khalil and Pearson (2008), revealed that Attitude , Subjective Norm, Perceived Behavioral Control and Perceived Trustrust significantly affected Behavioral Intention To Use the internet banking service. It was followed by Jayasingh and Eze (2009) who studied mobile coupons. They used Perceived Usefulness, Perceived Ease of Use, Perceived Credibility, Social Influence, and Compatibility. The results proved a positive significant relationship on Attitude . The study also confirmed that Social Influence significantly influenced the Behavioral Intention To Use mobile coupons. Also, Ramayah et al. (2009) in their study found that Attitude and Subjective Norm have a significant positive relationship with Intention To Use internet stock trading.

2.4.8 Subjective Norm

Ajzen and Fishbein (1980) define Subjective Norm as social pressure that may affect a person's intention to perform. Their study consisted of two normative beliefs, family influence and mass media influences. Family influence is defined as a group consisting of siblings and parents, from their parents a person acquires the orientation towards politics, religion, politics and economics, and a sense of personal ambition, love, and self-worth. Subjective Norm refers also to the influence of normative, in which it happens when individuals comply with the expectations of others (Rouibah, 2008). Nevertheless,it also refers to the pressure of those that users think are important to them.

Meanwhile, according to Venkatesh, Michael, Gordon, and Fred (2003), Subjective Norm refers to the extent to which a person identifies other important or significant beliefs that they need to use in innovation. The significant impact of Subjective Norm on Behavioral Intention has also been proved in the internet banking studies (Hanudin, 2009). Other studies in different areas have also proven that Subjective Norm significantly influenced Behavioral Intention. A study on information technology for a small business by Harrison, Mykytyn, and Riemenschneider (1997) and Lu et al. (2009) with their study on instant messaging, as well as a study on the use of computer resource centre (Taylor & Todd, 1995) are some examples. Besides, Khalil and Pearson (2008) also found that Subjective Norm significantly affected Behavioral Intention To Use internet banking. In their study, family, friends, and colleagues/peers have been used as antecedents of their decomposition of Subjective Norm.

Previous studies in mobile service also revealed a significant influence of Subjective Norm over Behavioral Intention are two studies that have proven such relationship.

2.4.9 Perceived Behavioral Control (PBC)

Perceived Behavioral Control is defined as the people's perception on the ease or difficulty of doing certain behavior of interest (Ajzen, 1991a). It also refers to the constraints to the use of technology (Taylor & Todd, 1995). However, it is most compatible with Perceived Self-Efficacy, which explains the decision on how individual can implement necessary actions required to deal with specific situation (Bandura, 1982).

Previous studies on the use of online technology propose that Perceived Behavioral Control is a good predictor for the purpose of Intention To Use (Choi, 2001). Besides as important predictor of intention, it also mediates the relationship between experience, ability, computer access to training facilities, technology and desire the use of e-learning (Ndubisi, 2004). In TPB, Perceived Behavioral Control is seen in conjunction with Behavioral Intention, can be used directly to predict behavior achievement (Ajzen, 1991a; Bhatti, 2007a).

In this study, Perceived Behavioral Control is referred to the person's needs, the infrastructure, and facility to access the mobile banking system. It reflects one's confidence about the ability and access to internal (ability) and external factors that may impede the achievement of the behavior (source facilitating conditions and technologies that facilitate the conditions). It also covers the facilitating conditions as the one that reflects the availability of the resources needed to engage in behavior, such as time, money or other resources that specifically (Triandis, 1980). Mathieson (1991) found that Perceived Behavioral Control is important in deciding the intention to adopt technology. Generally, Perceived Behavioral Control consists of individual elements of the obstacles associated with the individual users on the economy, experience, and skills in using the services.

Studies in mobile service context also justify that Perceived Behavioral Control significantly influence Behavioral Intention (Hsu et al., 2006a; Pedersen, 2005; Shin, 2009). Besides, Quan, Hao, and Jianxin (2010) in determining the adoption of mobile service in China also revealed that Perceived Behavioral Control significantly influenced Behavioral Intention To Use. as found in e-learning by Lee (2010). Therefore, this study expects to obtain similar results as in those previous studies. The

decomposition of Perceived Behavioral Control in this study consist of Self-Efficacy, Technology and Resources.

2.4.10 Perceived Risk

In online transactions, Perceived Risk is usually defined as the perception about the risk implicit in using open internet infrastructure that involves the exchange of personal information, and it is often operationalized as multi-dimensional (Chen, 2013). Risk theory was first introduced by Bauer (1960), who describes the behavior of consumers as a risk taking behavior. Generally, in the beginning, consumers have shown hesitancy to complete online transactions (Hoffman, Novak, & Peralta, 1999), mainly due to risk concerns (Jarvenpaa et al., 1999). Thus, the risk is seen as the main barrier to consumer acceptance of e-services in e-commerce environment (Featherman & Pavlou, 2002). A user's perception of the risks is inherent in the products' acceptance and usage has been studied over many years (Bauer, 1960). In fact, the perception of risk is an integral part of the user behavior (Taylor, 1974). Eventually, Perceived Risk in the use of information systems conveys the meaning of uncertainty, inconvenience and/or anxiety (Dowling, 1986).

The literatures have revealed that Zhao, Hanmer-Lloyd, Ward, and Goode (2008) have pointed out that risk associated by Chinese consumers in the use of internet banking services include privacy, security, financial, and performance. Those factors prevented the users from using internet banking. Earlier, Featherman and Pavlou (2002) found that Perceived Risk consists of performance, financial, time, psychology, and security dimensions in the context of retail banking services (i.e.). Besides, Perceived Risk, or user subjective expected loss may provide a convincing

analysis framework that can explain the adoption behavior among users of mobile banking services (Li & Bai, 2010). In respect of consumer attitudes towards online banking and mobile banking, Perceived Risk was a great and important factor that encouraged or discouraged the use of online banking (Laforet & Li, 2005a).

Thus, based on the discussions in the previous paragraph, Perceived Risk is believed an important determinant of consumers adoption willingness research on Perceived Risk of mobile banking services have been conducted to understand the determinants of consumers' adoption willingness, to gain a more profound grasp on the nature of consumer behavior (Li & Bai, 2010). On top of that, a few research also found that Perceived Risk and Perceived Trust have an important positive influence on the commitment (Bhattacherjee, 2000).

2.4.11 Perceived Trust

Mayer, Davis, and Schoorman (1995b) define trust as "*the willingness to be vulnerable to the actions of any other person based on the expectation that others will perform certain actions which are important for trustor, irrespective of the ability to monitor or control the other party*". Trust in mobile banking implicates that users will adopt to use mobile terminals to perform bank transactions such as online payment and any other purposes (e.g. balance inquiries, bill payments, and transference) at any time and from anywhere (Dahlberg, Mallat, Ondrus, & Zmijewska, 2008).

Generally, mobile banking frees the user from the limitations of space and time, and allows them to carry out any payment, which is very convenient for the consumers. However, due to the virtuality and lack of control, mobile banking involves substantial uncertainties and risks. Therefore, users need to have a strong trust in

order to use mobile banking services. Initial trust develops when they start logging in to the mobile banking system for the first time (McKnight, Choudhury, & Kacmar, 2002). In such context, they need to build the initial trust to overcome the Perceived Risk, or alternatively, they will switch back to online banking if they are not able to build-up the initial trust. Therefore, the mobile service providers need to develop the trust effectively and efficiently if they want to acquire and retain their customers (Tao Zhou, 2011). Previous studies in trust have shown significant influence on Behavioral Intention.

As an illustration, Jarvenpaa et al. (1999) in a study on consumer trust in internet store found that the higher the trust, the more favorable attitudes of the consumers toward shopping through the Internet. Similarly, Pavlou, Tan, and Gefen (2003) found that trust were significantly effecing Behavioral Intention in e-commerce and Intention to Use customer website. It agreed the findings by Torkzadeh and Dhillon (2002) who found it as a critical construct for the success of e-commerce.

In internet banking studies, trust has been identified as an important construct in its acceptance, as discovered by Suh and Han (2003). Besides, Tan and Teo (2000) also found that Perceived Security and Perceived Risk were the barrier. Meanwhile, Khalil and Pearson (2008) in their study in acceptance of internet banking found that trust significantly affected Intention to Use.

2.5 Decomposing Attitude

A survey on customer attitudes and usage of electronic banking revealed that there are a number of factors that predeterme the attitude of online and mobile banking, including behavior towards different banking technology, motivation and individual

acceptance of new technologies. Also, it has been revealed that the attitude towards behavior in online banking and real are both influenced by the previous experience in new technologies and computers (Laforet & Li, 2005a). Besides, according Beckett, Hewer, and Howcroft (2006), consumers' usage, behavior and attitude towards electronic and mobile banking concentrate on demographic or socio economic factors. In accordance, Howcroft, Hamilton, and Hewer (2002) revealed that young users appreciate the facilities or the potential time saving in online and mobile banking more than older users. They also considered the inadequacy of face to face contact as less important to old consumers. In addition, Karjaluoto et al. (2002) studied a conventional user in online banking in the Finnish market, they were knowledgeable young and rich people who have good computer and internet experience. Their findings of the study suggested that the demographic factors have an impact on the Behavioral Intention of electronic banking services. This means that it leads to consumer attitude and acceptance of a new technology (Marshall & Heslop, 1988; Zeithaml & Gilly, 1987).

2.5.1 Perceived Ease of Use

According to Davis (1989b), Perceived Ease of Use is define as the extent to which individuals are seen using a simple system or effortless. In addition, Perceived Ease of Use refers to the degree to which individuals are associated the difficulty by using the hassle free service of mobile banking. It is expected that the users Perceived Ease of Use towards technologies that affect their adoption of that a particular technology. If they see the technology is easy to use, then, it will develop a positive attitude toward using the technology. In addition, if the individual perceives the system easy to use,

they will make it mostly preferred to use the system, especially among new users (Sek et al., 2011)

Previous studies on Perceived Ease of Use and Attitude have been proven and recognized (such as by Hong, Thong, Moon, and Tam, 2008; Khalil & Pearson, 2008; Morris & Dillon, 1997; Shih & Fang, 2004; Shin, 2009; Taylor & Todd, 1995). In a study on the adoption of Microsoft's Windows 3.1, Karahanna et al. (1999a) found that Perceived Ease of Use significantly affected Intention To Use. Meanwhile, Bhattacherjee (2000) when studying about the acceptance of e-brokers found a significant effect of Perceived Ease of Use on Attitude. Another study was carried out in mobile context by Cheong and Park (2005), in which they discovered that Perceived Ease of Use has a positive significant influence towards Attitude in using a mobile internet in Korea. It was then carried out in Hong Kong by Hong, Thong, Moon, and Tam (2008) who discovered similar findings.

Meanwhile, a computer concern is a person's characteristics that affect user understanding of the Perceived Ease of Use (Viswanath Venkatesh, 2000). Having discussed at length in the previous paragraphs, when going back to the root, based on the study by Davis (1989a), the two perceptions explaining system usage are Perceived Usefulness and Perceived Ease of Use, in which Perceived Ease of Use is defined as the feel of ease and effortless when using the system.

2.5.2 Perceived Usefulness

Perceived Usefulness is defined as the subjective probability of potential users who use a particular application in improving the performance of their work in the context of the organization (Davis et al., 1989a). In this study, it represents the user

expectation in the use of mobile banking services that will benefit them in term of their time saving, convenient transactions, and proper management of their account. Previous studies have shown that Perceived Usefulness has a great impact on usage than ease of use (Sek et al., 2011). It can also determine the Behavioral Intention To Use (Davis et al., 1989a; Viswanath Venkatesh et al., 2000) and major factors in technology adoption study (Davis et al., 1989a). Nevertheless, Cheng, Lam, and Yeung (2006) discovered that Perceived Usefulness was the key in determining user acceptance of information technology, while Khalil and Pearson (2008) later found that it is one of the predictors in the adoption of internet banking.

Earlier, in a study on WAP-enabled mobile phones among internet users by Teo and Pok (2003) and Morris (1997) also found similar results. , which was agreed by Hu and Chau (1999) when studying on telemedicine and by Chen, Gillenson, and Sherrell (2002) when studying online shopping.

2.5.3 Compatibility

Compatiblity is defined as the extent that individuals recognize certain technology or services as compatible with lifestyle, values, and their needs (Rogers, 1995). According to Rogers (1995), people generally do not like to change. Hence, it has been suggested that innovations that are consistent with the existing value, experience, and current needs are more likely to be adopted. In Tornatzky and Klein's meta analysis on the adoption of innovation, they found that an innovation is possible to be adopted when it is adaptable with the person job value system and responsibilities.

In the meantime, electronic banking is already known as a delivery channel that is

adaptable with the profile of the modern day of banking customer, who is intended to be familiar with the Internet and computer literate. In regards to that, in this study, the technologies were upgraded tremendously by the practitioners in a mission to provide better and convenient services to the consumers. It will benefit the consumers if they can switch and accept the new electronic banking transaction. At the same time, Balasubramaniam, Robert, and Jarvenpaa, (2002) argued that the effect of cell phone technology has become inevitable in our daily lives that lead to an increased access, frequency, and speed of communication in the use of the technology. Furthermore, in actual fact, mobile phone itself has been carried by people anytime, anywhere and everywhere.

Generally, previous studies have proven the connection between compatibility and attitude. As an example, Tan and Teo (2000) in their study on internet banking suggest that users who are aware of internet banking as compatible to its purposes normally develop positive attitude towards the technology. Later, another study was conduct by Gerrard and Cunningham (2003a), in which they found the needs for the banks to highlight positive features such as compatibility of technology to promote its usage. They also found that the users of internet banking felt more compatible with their lifestyle. Similarly, Chen et al. (2002) also discovered that compatibility is one of the important diterminants of Attitude on Intention To Use,which was agreed by Khalil and Pearson (2008) when studying attitude towards using internet banking.

2.5.4 Complexity

Complexity is defined as the extend to which innovation is seen difficult to learn, understand or operate (Rogers, 1983), and the extent to which innovation is seen as

hard to use and understand (Shih & Fang, 2004). Karjaluoto et al. (2002) discovered that previous computer experience has an important impact on the use of electronic banking and experience in personal banking positivly impact on the usage and attitude and tended to fulfill customers needs to compete with the delivery channels.

Innovative technologies which are considered less complex and easier to use has the feasibility of acceptance and used by expected users. Therefore, the complexity is expected to have a significant relationship with Attitude because it has been identified as a key factor in the adoption of certain technology (Davis et al., 1989a). Since online transactions are easy to use with "point and click" interface, it is likely expected that users may prefer appropriate ambience that internet banking services are easier to use.

Previously, in astudy by Kolodinsky et al. (2004), Complexity was discovered a major prediction in adoption of electronic banking. It contradicts with Tan and Teo (2000) who found that all factors significantly affected the adoption of online transactions except Complexity, Technology Support and Subjective Norm which was agreed by Brown, Hoppe, Mugera, Newman, and Stander (2004) and a study on internet banking in Malaysia by Norazah (2010). In contrast, Cheung et al. (2000) when studying the prediction of internet and world wide web usage at work found that Complexity has a direct negative impact on Attitude. Similarly, when studying on mobile banking in Finland, Suoranta (2003) discovered that Complexity and risks of using mobile banking produce some supports as a barrier to adoption.

2.6 Decomposing Subjective Norm

Subjective Norm is defined as the individual perception on social pressure to adopt or not to adopt innovation. Social influence leads to normative influence when a person complies with others (Breu, Guggenbichler, & Wollmann, 1986). Generally, a study by Aboelmaged and Gebba (2013), on the adoption of mobile banking by undergraduate and postgraduate students of UAE university in Dubai found that close friend positively affected the mobile banking adoption. Meanwhile, Limayem, Khalifa, and Frini (2000) discovered that family members, media, and friends influenced consumers to purchase online.

2.6.1 Friends and Family Influences

Parthasarathyand Bhattacherjee (2000) in their study on online services found that colleagues, friends and relatives, which they called interpersonal influence, influenced the users to compose their initial adoption decisions. Meanwhile, Karahanna, Straub, and Chervany (1999) found that senior management, supervisors, peers, MIS department, local computer technology experts, and friends influenced the potential adopter's intention to use of technology. In accordance, this study decomposes Subjective Norm into friends, family, and media to examine whether this group has an influence factor towards the adoption of mobile banking.

Family in this study refers to the individual's kin and it can be any person in a family including parents and siblings. The opinion of important possible reference is the basis for the feeling of the user's related to the utilization of innovations (Rao & Troshani, 2007). Meanwhile, friends refers to the individual contacts of classmates,

roommates, housemates, and others who can influence the decision of individual's to use the technology (Mohammad Ismail & Razli, 2011).

Such grouping has been used by several studies. As an instance, Limayem et al. (2000) discovered that family, friends, and media were the groups that influence online purchasing . Khalil and Pearson (2008) used family members, friends, colleagues or peers in studying internet banking. The groups were found to have significant positive relationships with Subjective Norm. Meanwhile, Karahanna et al. (1999b) found that supervisors and peers influenced Subjective Norm. Al-Majali (2010) in Jordan also agreed that family significantly influenced Subjective Norm supporting the findings by Taylor and Todd (1995) and Chong, Darmawan, Ooi, and Lee (2010).

2.6.2 Media Influences

The decomposition approach that considers media as an external influence was purposely done to improve the non-significant result of Subjective Norm (Bhattacherjee, 2000). In regards to that, Al-Majali (2010b) defines the influence of mass media as a non-personal communication channel of print media (newspapers and magazines), broadcast media (radio and television), and network media (telephone, cable, satellite, wireless). In conjunction, Lichtenstein (2006) made use of mass media theories through individual and group discussions and focused on determining the results of the internet banking usage. The findings revealed that old people in Australia with low income have lack of awareness on internet banking, as well as lack of confidence and internet access. Besides, insufficient knowledge and support or procedure to use or, less risk of trust, security and privacy are among the

reasons for not using the internet banking services. It could be assisted by sources of secondary information, such as television and newspapers (Rogers, 1995). It was supported by Bhattacherjee (2000) who found that media influenced the Subjective Norm towards the Intention To Use and by a study in mobile marketing by Mohammad Ismail (2011) and Venkatesh and Brown (2001). However, a study by Hsu et al. (2006) found that media has no significant effect on Subjective Norm as opposed to family and friends.

2.7 Decomposing Perceived Behavioral Control

Perceived Behavioral Control is defined as the prognosis of actions and intentions. It is instructive when compared with other ideas of control (Ajzen, 1991a). The present view of Perceived Behavioral Control with Bandura (1977) concept of Perceived Self-Efficacy is "*how one can implement the actions required to deal with the situation to be*". The significant of actual Behavioral Control is Self-Evident, the Opportunities, and Resources that are applicable to an individual determined by his or her Behavioral Performance (Yang-wallentin, 2004). Accordingly, in this study Perceived Behavioral Control is decomposed into Self-Efficacy, Technology, and Resources.

2.7.1 Self Efficacy

Bandura (1977) defines Self-Efficacy as the individual confidence of their capability to conduct tasks that have been identified and are expected to influence the work effort, perseverance, real interest, and level of difficulty of preferred goals for performance. Consequently, various kinds of Self-Efficacy appeared from the research conducted by Bandura (1977), such as Computer Self-Efficacy (Deborah &

Christopher, 1995). In particular, Computer Self-Efficacy is defined as a person's judgments on their computer skills. This implies that Computer Self-Efficacy refers to the usage of systems and in assisting people to easily acquire skills together with an effective computer use. As an example, Venkatesh, Davis, and College (2000) modeled and experimentally tested the elements of Perceived Ease of Use and revealed that individual Computer Self-Efficacy is a strong element of Perceived Ease of Use, while objective usability influences ease of use only after having an experience when using the system. In addition, Venkatesh et al. (2000) also identified that a training mechanism that was built to improved the ability of the user, was more likely to have an acceptance from them.

In this study, self-efficacy brief on the user's confidence level in the use of the technology. Bhattacherjee (2000) in his study had found that self-efficacy had significantly effect on perceived behavioral control. Another study in internet banking in Taiwan by Shih & Fang (2004) also found a significant result to the perceived behavioral control. T. Hsu et al. (2006) in their study of sending a mobile coupons by using mobile phone message had proved that self-efficacy had a significant influence to perceived behavioral control. The same result also found by Wang , Wang , Lin , & Tang (2003) in internet banking study, the self-efficacy is positively associated with perceived behavioral control. Khalil, M. N., & Pearson (2008) in internet banking study proved the significant influence of self-efficacy to perceived behavioral control.

In this study, Self-Efficacy briefs on the user's confidence level in the use of technology. As an instance, Bhattacherjee (2000) found that Self-Efficacy significantly affected Perceived Behavioral Control, supported by Shih and Fang

(2004) in their study on internet banking in Taiwan, and by Hsu et al. (2006) in their study on sending a mobile coupons by using mobile phone. Additionally, similar result was also found by Wang, Wang, Lin, and Tang (2003) and Khalil and Pearson (2008).

2.7.2 Technology and Resources

Technology and resources are the two important criteria, especially in the adoption of mobile banking. In this study, technology refers to the application and network service and the infrastructure required to use the technology. Meanwhile, resources includes time, money, and access to the Internet to use the mobile banking service. Taylor and Todd, (1995) discovered that Self-Efficacy and Resources based on Facilitating Conditions are important factors of Perceived Behavioral Control.

Previous studies have proven the effect of Technology and Resources on Perceived Behavioral Control. As an example, Shin (2009) and Bhattacherjee (2000)when studying mobile wallet discovered that Technology and Resources significantly affected Perceived Behavioral Control.. also It has also been found by Khalil and Pearson (2008). However, Hsu et al. (2006) found insignificant relationship between Technology and Resources with Perceived Behavioral Control, which supports the findings by Shih and Fang (2004).

2.8 Decomposing Perceived Risk

Perceived Risk as defined by Featherman and Pavlou (2002) is a common thought of a negative consequence of uncertainty in using certain products or services. According to the Federal Reserve (FRB, 2012) user transactions in mobile banking

and mobile payment technology will be blocked by safety concerns and the possibility of hackers that reach phone users remotely. Consequently, consumers have shown disinclination to complete online transactions (Hoffman et al., 2002) generally due to risk concerns (Jarvenpaa et al., 1999). In such situation, Perceived Risk is seen as the main barrier of consumer acceptance of electronic services in e-commerce environment (Featherman & Pavlou, 2002). Meanwhile, Lee (2009) found that finance, security, social, performance risk, and time, appear as significant factors in the intention to adopt online banking. On the other hand, Wu and Wang (2005) when studying mobile commerce discovered that sixty percent of the respondents having experienced doing online transactions indicated Perceived Risk significantly influenced Behavioral Intention to Use the product. Also, Gupta and Xu, (2010) found similarly, that most of technology usage, such as electronic commerce, e-payments, mobile commerce, internet banking, and mobile banking have basic risks that affect the user adoption. Based on those findings, this study adds Perceived Security and Perceived Privacy as antecedents to Perceived Risk.

2.8.1 Perceived Privacy and Perceived Security

The significance of privacy and security for an acceptance of online banking has been noted in various studies (such as Howcroft et al. 2002; Tan & Teo 2000; Sathye 1999). In fact, Gupta and Xu (2010) found that using the internet banking resulted in easy and efficient banking transactions. However, it increases the risk in security and privacy. Generally, mobile banking drives the banking sector on the move, but increases the risk of loss of security to immoral. To be more accurate, less privacy and security could lead to obstacles in the use of online banking (Sathye, 1999) because customers concern about the financial risks especially the potential of losing their

money in the event of leakage of private information (Yiu et al., 2007; Luarn & Lin, 2005).

Generally, Perceived Security is defined as the individual's perception and concern when they use certain system. It is also defined as the perceptions or beliefs on the security during the transaction of the account and personal information or data that can be intercepted or illegally used by third party (Kim et al., 2008). Earlier, Wang et al. (2003) discovered that lack of security has been recognized as one of the factors that influence the growth and expansion of e-commerce. Thus, user attention of the security level supported by the service provider is very important to ensure the transactions can be carried out with a high security.

Meanwhile, Perceived Privacy refers to the level of inconsistency between the customer and the judgment and actual behavior, as well as the failure of technology to deliver the expected results and subsequent losses (Koenig-Lewis, Palmer, & Moll, 2010). Privacy is very important to develop users' trust upon the system. It is used as an indicator to ensure that user information is not taken to change or use in a way that may be illegal (Kasemsan & Hunngam, 2011).

Previous studies have discovered the importance of Perceived Privacy and Perceived Security. The importance of both factors have been mentioned in studies on the acceptance of online banking (such as Gerrard & Cunningham, 2003b; Howcroft et al., 2002; Khalil & Pearson, 2008; Mohammad Ismail & Razli, 2011; Sathye, 1999; Tan & Teo, 2000).

Particularly, Gerrard and Cunningham (2003b) in studying the adoption of internet banking among Singaporian consumers noticed that security and privacy are the major factors in the adoption of internet banking. It supports the findings by Tan and Teo (2000) who studied the influence of security and privacy on Intention to Use

internet banking. Similarly, Howcroft et al. (2002) when studying the usage and adoption of home-based banking in the United Kingdom also found the importance of security and privacy in their study. Then, Khalil and Pearson (2008) and Mohammad Ismail (2011) also found similar findings when studying about internet banking. Another study on the adoption of internet banking among Australian consumers has been carried out by Sathye (1999), and it produced similar result.

2.9 Decomposing Perceived Trust

Rotter (1967) defines trust as the term held by individuals or group (trustor) in word, promise, and statements (oral or written) other individuals or groups (the trustees) can be used. Trust basically refers to how people experience pressure from voluntarily by other people's behavior rather than controlling it. According to Bromiley and Cummings (1995), trust has to be understood as a belief in an individual (or common belief within the group) that, another individual (or group) makes an effort to act in agreement with any promise, which outright or implied, they honest in early discussions about it, and they did not push the unjustified benefit from others even when there is a chance. Further, customer trust is known as a crucial factor for the benefit of mobile banking. With the explosion of mobile commerce (m-commerce) and electronic commerce (e-commerce), more studies have been administered on the concept of the structure, the establishment of a mechanism of trust and the effects of trust (G. Kim et al., 2009).

The literatures also show that Perceived Trust or credibility of users, in connection to the online systems, has a significant consequence on their willingness to engage in banking, online shopping, and the currency exchange and sensitive private

information (Friedman, Kahn, & Howe, 2000). Muñoz-Leiva, Luque-Martínez, and Sánchez-Fernández (2010) when analyzing trust in a bank and its constancy using a range of "institution-based" trust mechanisms, such as reputation, security of web quality and transaction found that the mere presence of seals is not itself important clarification on the beliefs about the trust and reliability of the website with online banking services. Anyway the manner in which the trust generating mechanism to be submitted, either personally or in a different combination, has different effects on trust. Based on the study by McEvily and Tortoriello (2011), trust seriously influences the interaction between the individual and the organization, but it is often considered a vague trait to describe and evaluate. Consequently, the inadequacy of trust is one of the reasons consumers do not use the mobile banking (Lin, 2011).

2.9.1 Disposition To Trust

Disposition to trust refers to a general tendency to trust others (Khalil & Pearson, 2008). It is a basic weakness of an individual to trust or distrust others. An individual's disposition to trust does not change for particular entities but is a constant characteristic of their personality that controls how they view the trustworthiness of every other person that they encounter (Saadi, Hasan, Pierson, & Brunie, 2007). At the same time Schoorman, Mayer, and Davis (2007) defined disposition to trust as a general tendency to trust others. It is based on the personality that clarifies why some of us have tendency to trust or not to trust others. Schoorman et al. (2007) determine the disposition to trust as they broaden to which a person exhibits a propensity to rely on others across a broad spectrum of situations and people. If a person has a high disposition to trust, he probably believe in human kindness more and more willing to accommodate the trust credit for a nearly mutual effort. It is common that people with

high disposition to trust will be more gullible or naïve (Gefen, 2000). As trust is a major aspect of everyday life, some authors define trust as a wish to depend on other entities and chunking the concept of trust into a few interconnected components such as trust beliefs (e.g., benevolence, efficiency, honesty, and predictability) believe the intention, trusting behaviors, disposition to trust, and the institution-based trust (Vidotto, Massidda, Noventa, & Vicentini, 2012).

2.9.2 Institutional Trust (Structural Assurance)

The structure of guarantee means any circumstantial conditions (i.e.contracts, promises, regulations and warranty) are an ideal area for success. This is due to the online environment that offers extra risks and uncertainties compared to offline environment in which users have to respond well on the structural assurance (Wu, Hu, & Wu, 2010). In regards to that, Zucker (1986) suggests that institutional trust is important to establish trust mode in the impersonal economic environment, where a sense of community with current values is lacking. Furthermore, she describes a two-dimensional institutional trust, other party certification, and escrows that will guarantee expected result . Further, Shapiro (1987) describes trust institution as a belief that a trustor has on the safety situation as security guaranties, nets and other structural performance. Institutional trust has extensive views in e-commerce, possibly because e-commerce brings together organizations which is habitual and equation (Pavlou et al., 2003).

On the other hand, Mcknight and Chervany (2002) mentioned that institution-based trust is a detracting part of online transactions. In particular, they analyze two types of institution-based trusts they argued in relation to the initial situation, namely (1)

structural assurance that they define as the belief that success is possible as there are promises, contracts, regulations or guarantees in place (2) situational normality, which they define as the belief that success is possible because the situation is normal. At the same time, Pavlou (2002) reviewed the role of various structures in building benevolence and credibility in the seller within business to business .

2.9.3 Interpersonal Trust(Perceived Competency, Perceived Benevolence and Perceived Integrity)

Interpersonal trust or trusting beliefs attributes to the trustor's perception that the trustee has characteristics that are advantageous to the trustor (Mcknight & Chervany, 2001a; McKnight et al., 2002). Knowledge-based trust is a trust belief, and is often defined as the individual belief in the trust worthiness of others as determined by their perception on benevolence, competence and integrity (Mayer et al., 1995a; McKnight et al., 2002). It was found to be a necessary element to form consumer behaviour in online platform (Gefen, 2002). Some researchers believe that trust has two interrelated components (Mayer et al., 1995;Mcknight & Chervany, 2002); Trusting Beliefs and Trusting Intention. Trusting beliefs refers to the perceptions of efficiency, the trustee's ability to do what the trustor requires, courtesy, motivation of the trustees to act in the interests of the trustor, and the honesty of the seller (Mcknight & Chervany, 2001b). Meanwhile, Trust Intentions shows the willingness of someone to rely on e-vendor. Generally, they found that someone will trust others, but remains unwilling depending on their actions.

On the other hand, Perceived Competence means that the user believes the bank is fully capable of providing online financial services effectively and conveniently (Khalil & Pearson, 2008). Earlier, Pennington, Wilcox, and Grover (2003) suggests

that customers evaluate the technical competence of a website in terms of their understanding of the basic processes governing online transactions. If customers believe mobile banking firms offer the skills, ability, and expertise in providing convenient transaction services, then they will be more likely to decide on the mobile banking favorably.

Benevolence Belief is defined as the individual perceptions that mobile banking firms concern about them and acts in the customer interest, and Integrity Belief is defined as the individual perceptions that mobile banking firms follows a set of principles (e.g., honesty and keeping promises), which in most cases, accepted by the adopters (Mayer et al., 1995; McKnight et al., 2002). Benevolence is important to trust because it shows the extent that individual is believed to have interpersonal care and concern for others, and are willing to strive to do good for reasons other than ego and profits (Robert, Denis, & Hung, 2009). Bhattacherjee (2002) resist that benevolence of trustee will assist trustor, although not required or rewarded for doing so. If the customer believes that the mobile banking firms are benevolence, they are more acceptable to use mobile banking.

Meanwhile, Perceived Integrity indicates adherence to a set of principles that can be accepted. Integrity is also important because it is still in the trustors confidence in trustees behavior, and reduces uncertainties and potential risks (Bhattacherjee, 2002) in the context of mobile banking, regulations governing the integrity of providing accurate and timely manner, maintaining the commitment of customers and maintain the confidentiality of personal information. The mobile banking firms are considered to have high integrity when the customer believes mobile banking firms exhibit strong justice, objectivity, and honesty. Thus, customers with high integrity, belief in mobile

banking firms are more expected to have a positive attitude toward adopting (or continuing to use) mobile banking.

2.10 Summary of the Chapter

This chapter reviews topics related to this study. It includes the definition of mobile banking, the customer acceptance and Behavioral Intention to use as well as the actual use. Besides, TAM, TPB, and TRA are also discussed, including their implication in this study. That leads to the details of every single variable used in this study. This study focuses on the consumer's acceptance of mobile banking services which measured by the behavioral intention to use and actual use behavior. Moreover, this study includes Perceived Risk and Perceived Trust into the model in determining intention to use mobile banking. Next, Chapter 3 establishes the theoretical framework and the formulates the hypotheses.

CHAPTER 3
RESEARCH THEORETICAL FRAMEWORK AND HYPOTHESIS

3.1 Introduction

This study makes use of DTPB by Taylor and Todd (1995). The decomposition process of attitude, normative and control beliefs into multi-dimensional belief constructs are based on their work. The framework in Figure 3.1 was developed based on the review of literatures and the research problem. This study focuses on the students of local public universities in Klang Valley, Malaysia. As respondents, their acceptance of mobile banking were examined through their intention and actual use behaviors. Besides, Perceived Risk and Perceived Trust as new constructs to enhanced the DTPB. The decomposition of Perceived Trust process is also based on Taylor and Todd (1995) theory as the basis in determining the factors influencing the acceptance of mobile banking among the respondents. As recommended by Shih and Fang (2004) decomposing the structure of belief into a multi-dimensional structure may improve the understanding of the relationship between the variables. In addition, research on the use and usage of mobile service has stated that traditional models adopted should be expanded when used for mobile service (Pederson, 2005).

Having considered the factors described in the previous paragraphs, this study was carried out in three phases. The first phase briefed on the relationship between Actual Use and Intention To Use of mobile banking. The second phase of the research framework reviews the relationship between the Main Beliefs, Attitudes, Perceived Behavioral Control, Subjective Norms, Perceived Risk, Perceived Trust and Intention To Use of mobile banking. Finally, the third phase reviews the relationship between the antecedent factors and Main Beliefs.

3.2 Theoretical Framework

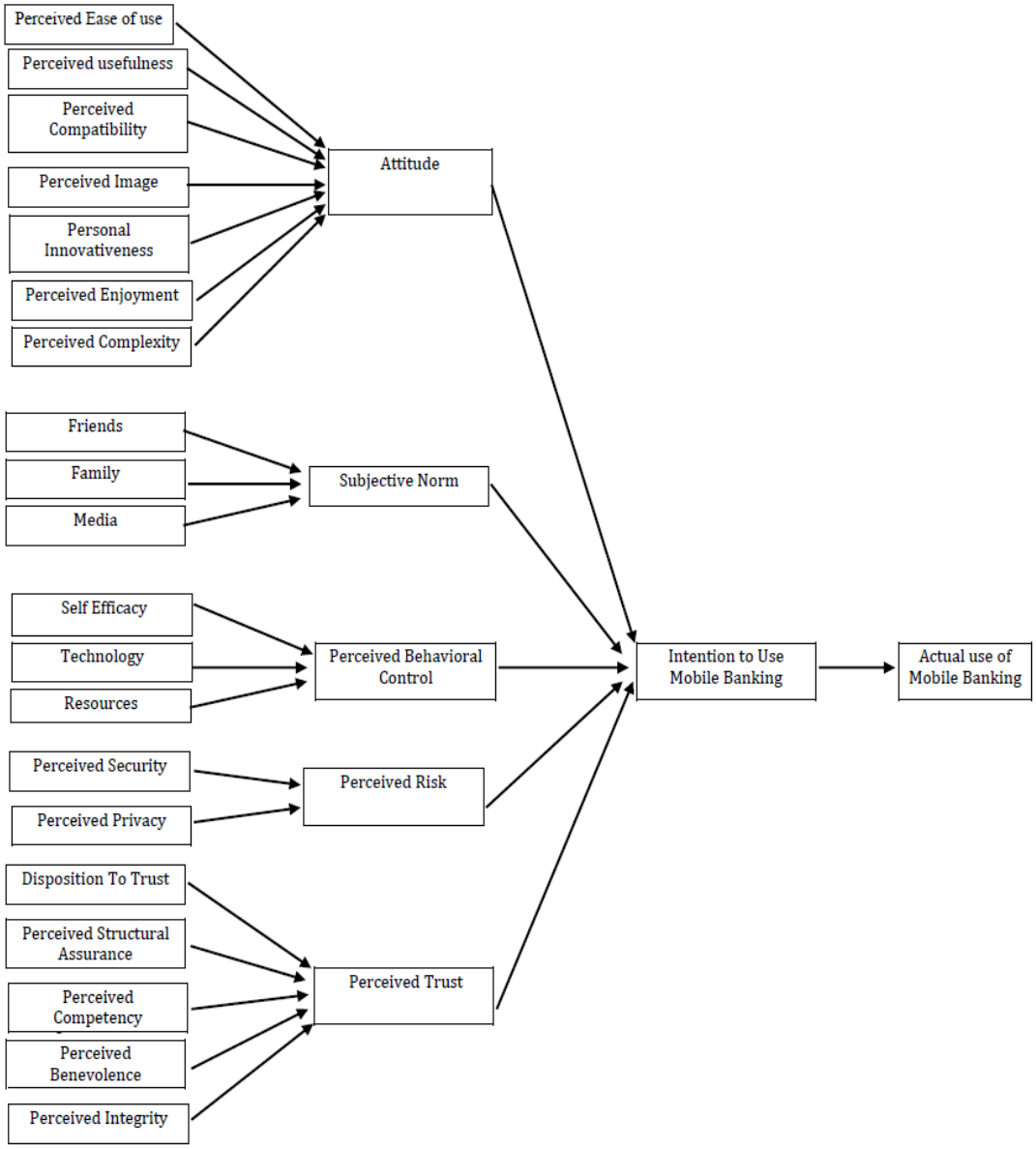

Figure 3.1

Theoretical Framework

The DTPB model had advantages over the other models because it comprises specific features that are likely to affect the use of information technology. In particular, the model has been found to have excellent predictive power when compared with the traditional TPB and TAM. Taylor and Todd (1995) compared the models with TPB and stated that, "*in comparing the two versions of TPB, we believe that there is added*

value due to decomposition, in terms of increasing the power of information and better understanding, more precise, understanding of the antecedents of behavior" (Taylor and Todd, 1995). Therefore, this study decides that DTPB is more preferable for further execution . On the other hand, when compared with TAM, it was deduced that if the goal is simply on the forecast of usage, then TAM may be better. "*However, the DTPB provides a more complete tolerent of the usage behavior and intention and can provide a more effective guide to researchers and IT Managers who wish to review the implementation of the system*" (Ndubisi & Sinti, 2006). Besides, DTPB contains constructs from the innovation field. It is also noted that Perceived Behavior Control and Subjective Norm are more detailed if decomposed into more specific dimension. It gives a comprehensive way to understand how Perceived Behavioral Control, individual Subjective Norm and Attitude control can influence the intention to use electronic learning.

On the other hand, Attitude is defined as the positive or negative individual feeling (the effects of evaluative) about performing certain target behavior (Fishbein& Ajzen, 1975a). It relates to the behavioral intention because people form the intention towards behavior when they have positive feelings. In that regard, the relationship between behavior and attitude is the fundamental to TRA, TAM and other related models (Bagozzi, 1981).

Meanwhile, Subjective Norm is defined as "*the perception of those who most of the people preferred and who matter most for he thought he should or should not perform the relevant behavior*" (Fishbein & Ajzen, 1975c). It has been found to be more significant previously, or at the beginning stages of the implementation of innovation,

when users faced limitations on direct experience to developed positive attitude (Hartwick, Henri, & West, 1994; Taylor & Todd, 1995).

Based on the previous studies (Taylor & Todd 1995; Tan & Teo 2000) this study managed to identify three reference group of Subjective Norm, which are friends, family members, and media. Liker and Sindi (1997) when studying the factors that affect accountants' intention in using an expert system found that Subjective Norm is an important element of the intention. Also, Karahanna et al. (1999) discovered that Subjective Norm affected positive potential adopters intention to adopt Microsoft Windows 3.1 technology.

Besides, Taylor and Todd (1995) also clerifies on the Perceived Behavioral Control, in which they refer it to the obstacles to the use of technology. The measurement of the Perceived Behavioral Control in this study include (1) easy access to the technology, infrastructure, and resources (Lau & Yen, 2001); (2) self-efficacy, which refers to an individual's self-confidence in the ability to conduct the behavior (Hill, , Smith, , & Mann, 1986); (3) computer anxiety, an individuals or even worry, when they was confront with the circumstance of using the computer (Simonson, Maurer, Montag-Torardi, & Whitaker, 1995); (4) computer training- for personal computing, which has a positive effects on Perceived Usefulness and acceptance of the technology (Igbaria et al., 1997); (5) Prior experience,which has been indentified as an important element of behavior (Bagozzi, 1981); (5) past knowledge (Eagly & Chaiken, 1993)

Gupta and Xu (2010) suggest that whenever risk involves, it will slow down the adoption of technology due to security concern. Many researchers and direct

marketing practitioners have been interested in the Perceived Risk because it is more effective in explaining the behavior of users (Mitchell & Mitchell, 1999). As mentioned by Bauer et al. (2005), Perceived Risk highly influences the enthusiasm of users to adopt mobile marketing innovation since utilizing mobile marketing service also involves provision of private information, security, privacy, and others. The risk of user visibility is important when deciding whether to acquire new technologies or services (Laforet & Li, 2005b). In online transactions, the Perceived Risk is usually defined as the perception about the risk implicit in using the open internet infrastructure to exchange personal information, and it is often operationalized as build multi-dimensional (Chen, 2013). In addition, this study also includes Perceived Trust as a new construct to examine the customer's perception on the acceptance of mobile banking services. Trust is one of the common issues being highlighted whenever it involves in information and security issue.

As this study is carried out to identify the Actual Use Behavior of mobile banking services, Perceived Trust is used as one of the important element. Schoorman et al. (2007) argue that ability, integrity, and benevolence will contribute to the trust in a group or organization. Due to virtuality and lack of control, mobile banking involves substantial uncertainties and risks. Therefore the user must build the trust concept in intention to use and adopt the mobile banking (Tao Zhou, 2011).

Finally, consumer acceptance in this study is measured based on Intention To Use and Actual Usage Behavior. It has been proposed that the actual behaviour of individuals is determined by the intention or behavior (Ajzen, 1991a; Davis, 1989a; Fishbein& Ajzen, 1975a).

3.3 Statement of Hypotheses Development

Based on the theoretical framework, the hypotheses prelisted in Table 3.1 have been formulated. Previous empirical findings on the relationship especially among the main beliefs variables are presented to support the proposed hypotheses.

3.3.1 Relationship between Intention to Use and Actual Use

In this study behavioral Intention To Use refers to customer perception upon the system and their intention to use and accept the features of the system including new product information, promotional offers, purchasing the product or services, and anything related to the mobile banking product and transaction.

Previous studies in predicted the use of Behavioral Intention to Use and Actual Use is well recognized (e.g. Davis, 1989b; Pedersen, 2005). The study by Davis, (1989) had reveal the Behavioral Intention to Use is a significant indicator to Actual Use. Another study by Sek et. al. (2010), revealed the same result. Therefore, the previous studies had proved the effect and positive relationship between Behavioral Intention to Use and Actual Use. This leads to the first hypothesis.

Hypothesis 1: Intention To Use mobile banking significantly affects Actual Use of mobile banking

3.3.2 Relationship between Attitude and Intention to Use

In this study, attitude refers to the customer decision either to accept or decline mobile banking service. When one believes something leads to beneficial good results, he or she will have good attitudes towards doing it. In contrast, is something leads to negative results, he or she will not have good attitudes towards doing it. Generally, an

individual who trusts of doing certain behavior will point to certain results and will return a good attitude towards doing the behavior.

The effect of Attitude and Behavioral Intention has been validated by numerous studies. A study by Davis, (1989) revealed that attitude had strong influence on Behavioral Intention to Use. In a study by Khalil and Pearson (2008), in their study of internet banking acceptance had suggested that positive attitude should take place before the technology can be accepted. Another study conducted by Lu et al. (2009) revealed the Attitude significantly influenced the Intention to Use the instant messaging services. Therefore, leads to the second hypothesis:

Hypothesis 2: Attitude significantly affects Intention To Use mobile banking

3.3.3 Relationship between Subjective Norm and Intention to Use

Subjective norm can be defined as the degree of the individual belief on the use of innovation. The antecedents can be their family, friends, colleagues, authority figures or media. The perception of the mentioned antecedents can influence such behavior to be normal and attractive. The stronger experienced with the pressure, the bigger the intention of behavior and indirectly, the expectation of the behavior will be realized (Aboelmaged & Gebba, 2013). According to Ramayah et al. (2003), "*subjective norms are normative belief functions. In other means, an individual who believes that most of the referents which he is persuade to adhere to think, he or she should be doing social behavior will assume the pressure to do so*".

The relationship of Subjective Norm and Intention to Use in the previous study had also reveal significant result. Karahanna et al. (1999) in their study on potential

adopters and users of Microsoft's Windows 3.1 found that Subjective Norm significantly influence on Intention to Use. Other studies in mobile service context have also revealed that Subjective Norm positively affects the Intention to Use (e.g. Bauer et al., 2005; Pedersen, 2005). This leads to the third hypotheses:

Hypothesis 3: Subjective Norm, significantly affects Intention To Use mobile banking

3.3.4 Relationship between Perceived Behavioral Control and Intention to Use

Perceived behavioral control referring to the respondent's perception regarding accessing and opportunity needed towards using the mobile banking. The significance of actual behavioral control is clear, opportunities and resources that are available to a person must be a little set the potential achievement of the behavior. Psychological significance larger than the actual control, anyway, the understanding of behavioural control and collision to the intentions and actions (Ajzen, 1991a).

There is few studies found the significant relationship between Perceived Behavioral Control and Intention to Use. In a study by Cheung, Chang and Lai (2000) found positive significant relationship between Perceived Behavioral Control and Intention to Use. Another study by Pedersen (2005) have also found the same result in the study of mobile context. Therefore, the fourth hypothesis is proposed:

Hypothesis 4: Perceived Behavioral Control significantly affects Intention To Use mobile banking

3.3.5 Relationship between Perceived Risk and Intention to Use

Perceived Risk generally refers to a perception of the risks inherent in the use of open internet infrastructure for the exchange of personal information, and it often operates as a multi dimensional construct (C. Chen, 2013). Previous studies have incorporated risk is seen as the main antecedent behavior intention towards the purchase of e-commerce (Featherman & Pavlou, 2002). According to Jarvenpaa, Tractinsky, & Vitale (1999) trust belief is found to assist in clarified on how consumers can conquered perceived risk and engaged in online transactions.

Kim et al., (2008) in a study of online ticket purchasing had also found Perceived Risk have a significant relationship with Intention to Use. Kleijnen et al., (2009) reveal Perceived Risk is the most significant factor in adoption of mobile games. There are few more studies in Perceived Risk that reveal a significant relationship on Intention to Use (e.g. Chen, 2008; Luo et al., 2010; Wu & Wang, 2005). This leads to the fifth hypothesis:

Hypothesis 5: Perceived Risk significantly affects Intention To Use mobile banking

3.3.6 Relationship between Perceived Trust and Intention to Use

Trust is a necessity of social behavior, especially on important decisions. Based on the trust literature, risk and trust are two important cause of intention behavior of people to carry out activities that involve risk (Gefen, 2000). Mobile banking currently in the infancy stages of adoption, users who are not clear on the technical capabilities of their banks to afford the mobile banking services and on the reliability and security of the line and communication wireless channels in providing their conscious transaction data, among other things.

Therefore, the stronger the trust a consumer has to the bank, the lower the risk he expects to accept the mobile banking (Luo et al., 2010). Kim, Shin, & Lee (2009), defined the problem from the perspective of an additional attention, formation of early faith of mobile banking user. Their studies justified that, initial trust was an important cause of intentions on mobile banking. This leads to the sixth hypothesis.

Hypothesis 6: Trust significantly affects Intention to Use mobile banking

Table 3.1

Summary of Statement of Direct Relationship Hypotheses Development

Hypothesis No	Hypothesis Statement
H1	Intention To Use mobile banking significantly affects Actual Use of mobile banking
H2	Attitude significantly affects Intention To Use mobile banking
H3	Subjective Norm, significantly affects Intention To Use mobile banking
H4	Perceived Behavioral Control significantly affects Intention To Use mobile banking
H5	Perceived Risk significantly affects Intention To Use mobile banking
H6	Trust significantly affects Intention to Use mobile banking
H7	Perceived Ease of Use significantly affects Attitude towards using the mobile banking
H8	Perceived Usefulness significantly affects Attitude towards using the mobile banking
H9	Perceived Compatibility significantly affects Attitude towards using the mobile banking
H10	Perceived Image significantly affects Attitude towards using the mobile banking
H11	Personal Innovativeness significantly affects Attitude towards using the mobile banking
H12	Perceived Enjoyment significantly affects Attitude towards using the mobile banking
H13	Perceived Complexity significantly affects Attitude towards using the mobile banking
H14	Friends significantly affects Subjective Norm towards using the mobile banking
H15	Family significantly affects Subjective Norm towards using the mobile banking
H16	Media significantly affects Subjective Norm towards using the mobile banking
H17	Self-Efficacy significantly affects Perceived Behavioral Control
H18	Technology significantly affects Perceived Behavioral Control
H19	Resources significantly affects Perceived Behavioral Control
H20	Perceived Security significantly affects Perceived Risk towards using the mobile banking
H21	Perceived Privacy significantly affects Perceived Risk towards using the mobile banking
H22	Disposition to Trust significantly affects Perceived Trust towards using the mobile banking
H23	Perceived Structural Assurance significantly affects Perceived Trust towards using the mobile banking
H24	Perceived Competency significantly affects Perceived Trust towards using the mobile banking
H25	Perceived Benevolence significantly affects Perceived Trust towards using the mobile banking
H26	Perceived Integrity significantly affects Perceived Trust towards using the mobile banking

3.4 Summary of the Chapter

This chapter describes a widespread research model including the hypotheses in this study, which have been empirically tested. The chapter also explains the relationship among variables in detail with supports from the underpinning theory. The theoretical framework has been formulated based on the DTPB by Taylor and Todd (1995), and the research problem, as well as after a depth review on past studies. Next, Chapter 4 discusses the methodology that has been gone through in answering the research questions and solving the described problem.

CHAPTER 4
METHODOLOGY

4.1 Introduction

This chapter discusses the research methodology that this study has gone through in achieving the research objectives stated in Chapter 1. This chapter is divided into six parts, which is research design, sample and sampling procedures, data analysis, data collection instrument, and a summary.

4.2 Research Design and method

Zikmund (2013) defines research design as a master plan that sets out the procedures and methods to collect and analyse necessary information. In addition, he identified three (3) types of business research documented from the literature: 1) Exploratory, 2) Causal/Hypothesis testing and 3) Descriptive.

Research design is a framework to lead this study in selecting the preferred data collection method for testing the hypotheses. For a quantitative research, Wiersma (2009) discusses some of the characteristics that ensure a good research design and they include the degree of freedom from confounding, freedom from bias, control in unneeded variables, use of statistical precision for testing hypotheses, and managing the variances to uphold decency of research designs.

This study focuses on causal-effectresearch (hypothesis testing) and descriptive since the objective of this study is to examine the factors that influence the intention to use and actual use of behavior. Descriptive research was carried out in this study to identify the characteristics of a population, such as the diversity of respondents (student). It is conducted when there is some understanding of the problem nature, which is used to provide a more specific description of the problem. Therefore the research design for this study includes a self-reported questionnaire survey.

Hopkins (2008) in his study mentioned that,"*in quantitative research, your intention is to identify the relationship between an item (non variable) and another item (which rely or decision variable) in the population*". Quantitative research design includes descriptive (subjects are normally measured once) or experiment (subjects are measured before and after treatment) techniques. In this study, descriptive study has been set for the association among variables as an attempt to establish connection. For such purpose, it normally requires a sample within the range of hundreds or thousands., Meanwhile, an experiment particularly crossover, requires only tens subjects. The estimated relationship is less likely to be biased if there is a high participation rate in a randomly selected sample of the population.

4.3 Operationalization of Variables

The actual use of mobile banking in this study was measured by using self-reported measures adapted from Davis (1989b). It measures based on every time when the customer accesses to mobile banking system with average login time of weekly basis, time spent, and the frequency of log-in time reported by the respondent. These self-reported measures that measure in terms of commonness of use and time spent using a

target system is a typical usage metric employed in MIS research (Ginzberg, 1981). The great advantage of self-report is that "*it gives you the direct respondent's own views*" (Wiley, 2003). In addition, Legris, Ingham, and Collerette (2003) mentioned that self-reported measures are the best relative indicator of usage behavior. As this study concerns on the customer usage of mobile banking, therefore it is desirable to measure the frequency of behavior and the duration or time spent behavior within the time period (Fishbein& Ajzen, 1980).

Behavioral Intention to Use mobile banking refers to the individual area on a subjective probability element involving a relation between himself with some other actions. A Behavioral Intention, therefore, refers to a person's subjective probability results after certain behavior is performed (Fishbein& Ajzen, 1975b). This study uses unidimension construct that contains five item, It uses the six-point Likert scale adapted from Khalil & Pearson (2008). The respondents were asked to reveal their intentions to use mobile banking service in the future.

The antecedent factors for Intention To Use are Subjective Norm, Attitude , Perceived Behavioral Control, Perceived Risk and Perceived Trust. All variables have been conceptualized as the main beliefs to predict students' intention to use mobile banking service. The attitude reflects the individual assessment either positive or negative about doing certain behavior (Ajzen, 1991b). Subjective Norm as defined by Ajzen and Fishbein (1980) enables someone to be persistent with his or her understanding and think he or she should or should not conduct a particular behavior. That person is stimulating to comply with referents even though he was not in favor of doing the behavior. The referents could be peers (e.g., friends or classmates) or superiors (e.g., parents or teachers) (Taylor & Todd, 1995). In this study, Subjective Norm is

measured using a five-item constructwith six-point of Likert scale. It consist of three antecedent factors which are friends, family, and media.

Then, Perceived Behavioral Control refers to the individual perception on how easy or difficult to conduct certain behaviors. Behavioral control has been proven to have an effect on dependent variables such as intentions and behavior in various domains (Ajzen, 1991b). It is measured using a four-item construct with six-point Likert scale adapted from Shih and Fang (2004).

Next, Perceived Risk refers to the customer's subjective belief on suffering a loss in pursuit of a desired outcome. It is a multi-dimensional construct in which the total risk is subdivided into physical, performance, financial, social loss, psychological, and time (Greatorex & Mitchell, 1994). It is measured using a seven-item construct with a six-point of Likert scale adapted from Chen (2008).

Trust is defined as "*the expectations that individuals or companies which ones interact other won't take improper gains arising from reliance is with them*" (Gefen, Karahanna, & Straub, 2003b). It is measured using a five-item construct with six-point Likert scales adapted from Luo et al. (2010).

The discussions in the previous paragraphs clarifies the antecedent factors of Intention to Use. Further, this paragraph and the subsequents discuss the antecedent factors of Attitude, which consist of Perceived Ease of Use, Perceived Usefulness, Perceived Compatibility, Perceived Image, Personal Innovativeness, Perceived Enjoyment, and Perceived Complexity. Particularly, Perceived Ease of Use is a person's assessment on the extent to which interaction with a specific technology or information system is free of mental effort. For a system, it refers to the degree to which an individual believes by using an exact technology will be free of effort (Davis et al., 1989a). It is

measure using a five-item construct with a six-point of Likert scale adapted from Khalil and Pearson (2008).

Perceived Usefulness refers to a level of individuals who trust that using new technologies will improve the performance of their duties. There are a number of research that provide the evidence of its significant towards intention to use (Davis, 1989a). It is measured using a five-item construct with a six-point Likert scale adapted from Pedersen (2005). Then, Rogers (1995) justified the Compatibility is viewed as "*the extent to which innovation is seen in line with existing values, experience and needs of potential adopters*". It is measured using a four-item construct with a six-point Likert scale adapted from Teo and Pok (2003).

The other antecedent of Attitude is Perceived Image, which is defined by Dasgupta, Paul, and Fuloria (2011) as customers' stereotyping products or services in their mind because of some specific signal with the product. The associations can result as a service or product in the home country image, a product belonging to product categories or just maybe their opinion about the product. The better image in the mind of the customer, the more they likely to use it. It is measure using a five-item construct with a six-point Likert scale adapted from Teo and Pok (2003).

Personal Innovativeness refers to the willingness of individuals to experience any new information systems. Leung and Wei (2000) reported that positive user innovativeness in relation to the results of the use of various technologies. It is measured using a four-item construct with a six-point Likert scale adapted from Agarwal and Prasad (1998).

Next, Davis, Bagozzi, and Warshaw (1992) define Perceived Enjoyment as the degree to which a specific system or activity that is considered enjoy and fun in it's own

right, apart from any result from the usage of the system's performance while using it. Increase direct action with the target system, the role of public computer playfulness as an element of the Perceived Ease of Use of the target system is expected to be reduced, and a specific system is expected to govern the Perceived Enjoyment. It is measured using a four-item construct with a six-point Likert scale adapted from Hong et al. (2008).

The final antecedent of Attitude in this study is Complexity. Cheung, Chang, and Lai (2013) define complexity as the range to which innovation can be a little hard to understand and use. It is validated using a five-point Likert scale.

Having discussed about the antecedent factors of Attitude, this paragraphs clarifies the antecedent factors of Subjective Norm, which consist of family, friends, and media. Friends refers to the individual contacts of classmates, roommates, housemates, and others who can influence individual's decision on whether to use the technology (Mohammad Ismail & Razli, 2011). It is measured using a four-item construct with a six-point Likert scale adapted from Khalil and Pearson (2008). Meanwhile, family influence refers to individual's kin or family members that might influence the decision of individual's to adopt and use the technology. It is measured using a four-item construct with a seven-point Likert scale adapted from Khalil and Pearson (2008). Media is another antecedent factor of Subjective Norm that might influence the decision of the individuals, which appear in the forms of newspaper, magazine, television, and commercials. It is measured using a four-item construct with a seven-point Likert scale adapted from Bhattacherjee (2000) and Hong, Thong, Moon, and Tam (2008).

Further, this paragraph and the subsequent discuss the antecedent factors of Perceived Behavioral Control. It consists of Technology,Resources, and Self-Efficacy.

Self-Efficacy in this study is operationalized as the individuals' perception or judgment on their degree of confidence towards using the technology. It reflects the individual's self-confidence (i.e. self-efficacy) on their ability to perform behaviour (Bandura, 1986; Khalil & Pearson, 2008). Self-Efficacy influences the choice of behavioral settings. Usually, people fear and tend to avoid situations that they believe require more than skills to overcome, even though they engage in activities and behave assuredly when they punish themselves to be able to handle situations that other wise be intimidating (Bandura, 1977). Self-efficacy is measured using a five-item constructs with a six-point Likert scale adapted from Khalil and Pearson (2008).

Another antecedent factor of Perceived Behavioral Control is Technology, which is defined as the individual beliefs towards the technology everytime they use it. The availability of the network and infrastructures of the technology are considered. It is measured using a four-item construct with a six-point Likert scale adapted from Pedersen (2005).

Meanwhile, Resources refers to the belief of the individual's on availability, difficulty, and sufficiency to get the resources (i.e. money, time, information, skill, etc). It is measured using a five-item construct with a six-point Likert scale adapted from Khalil and Pearson (2008).

The antecedents of Perceived Risk in this study are Perceived Privacy and Perceived Security. Perceived Privacy refers to the individual's belief when using technology (Yang & Zhang, 2009). It is measured using a five-item construct with a six-point Likert scale adapted from Chen (2008).

Lastly, the antecedent factors of Perceived Trust are discussed in this paragraph, which consist of Disposition to Trust, Institutional Trust and Interpersonal Trust. Disposition to Trust is important for establishing trust at the early stage and become less important to the strong relationship of trust or pre-existing beliefs (Gefen, Karahanna, & Straub, 2003a). It is determined using a four-items construct with a six-point Likert scale adapted from Gefen et al. (2003a). Institutional Trust such as promises, guarantees, and contractual protections should also assist to reduce the Perceived Risk in the unfamiliar, open airwave environment. It is measured using a four-items construct with a six-point Likert scale adapted from McKnight, Choudhury, and Kacmar (2002). Finally, Interpersonal Trust (consist of Competency, Benevolence and Integrity) or trust beliefs in a bank that will give an important basis for the customer to assess whether mobile banking can be well-performed and of any utility to him or her (Luo et al., 2010). It is measureed using a four-items construct with a six-point Likert scale adapted from Gefen et al. (2003b).

4.4 Unit of Analysis

The unit of analysis refers to the type of unit this study applies when measuring the variables, used to explain the unit themselves. It refers to what is analyzed in the study. This study aims to determine the level factors that influence the Behavioral Intention to Use and Actual Use mobile banking. In complementing such purpose, university students who use cellular phones has been decided as the unit of analysis in this study. It was decided so for a reason to get an accurate data by getting a large sample of mobile banking customer. The data were collected through survey method by distributing the questionnaire to the target respondents.

4.5 Population and sample

The population of this study are students of four local public universities in Klang Valley, Malaysia (Universiti Kebangsaan Malaysia, Universiti Putra Malaysia, Universiti Malaya and Universiti Islam Antarabangsa Malaysia) who are doing either PhD, Master, Bachelor, or Diploma. Such population, which is detailed in Table 4.1 is chosen as the subject for this study because of several reasons. Firstly, they are young and the future generation of banking customer and are considered as an active group in computer-mediated transaction. Young people are more acceptable in intention to use the m-commerce services as compared to other internet users because this service is normally low-cost entertainment product (e.g. ringtones, songs) that fits their lifestyle (Bigne, Ruiz, & Sanz, 2005).

Secondly, normally young generation has their own group. This group is called the specific IT savvy group whereby they do not face any difficulty in using mobile marketing service (Mohammad Ismail & Razli, 2011). The influence of friends is usually more effective in terms of trust for them as their reference if they want to know new things or something newly introduced to them. For young users, they usually prefer to follow the opinion of their friends in the mobile marketing environment rather than their families. The influence of their friends is much stronger than their families. Therefore, the perceived pressure from those that users think important, and have a close relationship with, act as an important role in influencing their decision to use the technology in the marketing of mobile phones (Mohammad Ismail & Razli, 2011). It is inline with the recommendation by Tan and Teo (2000) that the internet users are generally young with the majority of them are aged between 20 to 29 years. The four universities were located in Klang Valley Malaysia, and the

reason for the selection is because the statistic report by the Malaysian Communication and Multimedia Commission reveal the highest penetration rate for cellular telephone and broadband were recorded in Klang Valley Malaysia.

Table 4.1
Population Size

Institution	**PhD**	**Master**	**Bachelors Degree**	**Diploma**	**Total**
UKM	2883	6504	15959	52	25,398
UPM	2878	7560	17027	976	28441
UM	2708	7210	15506	-	25424
UIAM	967	2638	16452	65	20122
TOTAL					99385

Source: Ministry of Higher Education (MOHE), 2010

4.5.1 Sample Size

Determining sample size is a an important issue in any research. According to Ding, Velicer, and Harlow (1995), a total of 100 to 150 subjects are considered to be the minimum sample size acceptable when using Structural Equation Modeling (SEM). Boomsma (1985) investigated the existence of non-convergence and improper solutions with a sample size of 25 to 400 and found an improper solutions of non-convergent and declining when the sample size increases. That leads to a conclusion that when the sample size is less than 100, is the solution may not be perfect. Accordingly, Hair, Anderson, Tatham, and Black (1998) propose a sample of at least 200 observation as the suitable and minimum sample.

Meanwhile, Schumacker and Lomax (2004) found that many studies employed between 250 and 500 subjects in their research. Additionally, they also suggest that the sample size can be measured by using the rules of thumb (i.e. 10 subjects per variable) or to employ 20 subjects for each variable. Therefore, this study makes use of the rule of thumb. Hence, 20 subjects have been employed for every variable (there are 26 variables altogether). This makes up a minimum sample size of 520 is required. However, Krejcie and Morgan (1970) propose a different view, in which for a given population, the factor table in Table 4.3 could be used. Based on that, this study decides to employ a minimum sample size of 380. Eventually, the samples as broken down in Table 4.2 have been decided.

Table 4.2
Sample Size

Institution	(%) of Total Population	Total
UKM	26%	104
UPM	29%	116
UM	25%	100
UIAM	20%	80
TOTAL	100%	400

Table 4.3
Determining Sample Size from a Given Population

N	*S*	*N*	*S*	*N*	*S*
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

Note.—*N* is population size.
S is sample size.

4.5.2 Sampling Techniques

This study used multistage probability sampling technique for the purpose of determining the respondents. First, it divides the population into smaller groups called

strata. Based on stratified random sampling, the strata were formed based on certain characteristics of the members or shared attributes. These strata are then grouped to form a random sample. The stratified random sampling was used to segregate the samples according to the course registered by the students, according to their level of study (PhD, Master, Bachelor and Diploma).

4.6 Data Collection Method

Data collection refers to a term used to explain a process of preparing and collecting data (Sekaran, 2011). In this study, Preliminary data collection involves a review of the literatures. Then, based on the information gathered from the preliminary data collection, a set of questionnaire was designed to measure the research variables. It established a number of instruments for collecting qualitative data . This questionnaire merges variety number of previously certified instruments and measures that were developed specifically for the purpose of the study.

Accordingly, this study used the questionnaire as the instrument for collecting data. It was distributed to the targeted students through the student affairs department of each university (as detailed in Table 4.2).

4.7 Variable Measurement

The measurement of variables used in this study were adapted from previous studies. The items were modified to suit with the current common context. This process resulted in multiple-item measures for each construct as detailed in Table 4.4, with six-point Likert scale ranging from 1 = strongly disagree to 6 = strongly agree.

Table 4.4
Variable Measurement

Items	Reference
Actual use 1. On average, how many times per week you use mobile banking? 2. How many hours do you use mobile banking each week? 3. How frequent do you use the mobile banking?	Khalil and Pearson (2008)
Behavioral Intention 1. I intend to use mobile banking in future 2. I will use mobile banking in the future 3. Given the chance, I predict I will use mobile banking in the future 4. It is likely that I will use mobile banking in future 5. I expect to use mobile banking in future	Khalil and Pearson (2008) Taylor and Todd (1995a)
Attitude 1. Using mobile banking is a good idea 2. I like the idea of using mobile banking 3. Using mobile banking is a pleasant idea 4. Using mobile banking is an appealing idea 5. Using mobile banking is an exciting idea	Khalil and Pearson (2008) Taylor and Todd (1995a)

Table 4.4 (Continued)

Items	Reference
Subjective Norm 1. People who influence my behavior think that 2. People who are important to me think that I should use mobile banking 3. People whose opinions I value think I should use mobile banking 4. People who are close to me think that I should use mobile banking 5. People who influence my decisions think that I should use mobile banking	Khalil and Pearson (2008) Taylor and Todd (1995a)
Perceived Behavioral Control 1. I would be able to operate mobile banking 2. I have the resources to use mobile banking 3. I have the knowledge to use mobile banking 4. I have the ability to use mobile banking	Shih and Fang (2004)
Perceived Risk 1. In general, I believe that it would be riskier to use mobile banking 2. Compared to traditional methods, I believe that using mobile banking is riskier 3. I believe that there will be high potential for loss associated with using mobile banking 4. I believe that there will be too much uncertainty associated with using mobile banking 5. I believe that using mobile banking will involve many unexpected problems 6. I do not believe that the companies enabling me to use mobile banking will protect my interests 7. I would not feel safe if I use mobile banking	Chen (2008)
Trust 1. I trust mobile banking 2. I can always rely on mobile banking for my banking activities 3. Mobile banking is trustworthy 4. When I need to conduct banking activities, I would feel comfortable depending on mobile banking for the services 5. I feel that I could trust mobile banking to conduct my banking activities	Khalil and Pearson (2008)

Table 4.4 (Continued)

Items	Reference
Perceived Ease of Use	
1. I think it is easy to learn how to use mobile banking 2. I believe that it is easy to get mobile banking services to do what I want it to do 3. I think it is easy to remember how to use mobile banking 4. I think mobile banking are easy to use 5. I think it is easy to become skillful at using mobile banking	Davis (1989)
Perceived Usefulness	
1. I think using mobile banking make me save time 2. I think using mobile banking make me a better consumer 3. I think using mobile banking improve my efficiency as a consumer 4. I think mobile banking are useful to me as a consumer. 5. I think mobile banking increase my effectiveness as a consumer	Davis (1989) Pedersen (2005)
Compatibility	
1. I think that mobile banking fits well with my lifestyle 2. I think that mobile banking fits well with the way I live my life 3. I think that mobile banking is services completely compatible with my current situation 4. I think that mobile banking fits well with all aspects of my banking needs	Moore and Benbasat (1991)
Perceived Image	
1. I think using mobile banking will improve my image 2. I think people who use mobile banking are IT savvy 3. I think people who use mobile banking are trendy 4. I think only young people use mobile banking 5. I think people who use mobile banking are more prestigious	Moore and Benbasat (1991) Teo and Pok (2003)

Table 4.4 (Continued)

Items	Reference
Personal Innovativeness 1. If I heard about a new information technology, I would look for ways to try out with it 2. Among my friends, I am usually the first to explore new information technologies 3. In general. I am skeptical to try out new information technologies 4. I like to try out with new information technologies	Agarwal and Prasad (1998)
Perceived Enjoyment 1. I think using mobile banking is enjoyable 2. I think using mobile banking is pleasureable 3. I will have fun if I use mobile banking 4. I think using mobile banking is to be interesting	Davis et al. (1992) Hong et al. (2008)
Complexity 1. Working with the internet is complicated, it is difficult to understand what is going on 2. Using the Internet involves too much time doing mechanical operations 3. It takes too long to learn how to use the internet to make it worth the effort 4. In general, the internet is very complex to use	Cheung et al. (2000)
Friends 1. My friends think that I should use mobile banking 2. I will use mobile banking because my friends use it 3. I will have to use mobile banking if my friends have already used it 4. I have to use mobile banking because my friends think I should use it	Khalil and Pearson (2008) Taylor and Todd (1995a)

Table 4.4 (Continued)

Items	Reference
Family	
1. My family thinks that I should use mobile banking	
2. I will use mobile banking because my family uses it	Khalil and Pearson (2008)
3. I will have to use mobile banking if my family has already used it	Taylor and Todd (1995a)
4. I have to use mobile banking because my family thinks I should use it	
Media	
1. Media and advertising consistently recommended the using of mobile banking of mobile banking	
2. Newspapers, magazines, mobile operators‟ promotion and advertising suggest that using mobile banking services is to be a good idea	Bhattacherjee (2000)
3. Media is full of reports, articles and advertisements suggesting mobile banking to be worth using	Hong et al. (2008)
4. Mass media reports influenced me to try out mobile banking	
Self Efficacy	
1. I am confident of using mobile banking even if there is no one around to show me how to use it	Khalil and Pearson (2008)
2. I am confident of using mobile banking even if I have never used it before	
3. I am confident of using mobile banking if I have only the instructions manual for reference	
4. I am confident of using mobile banking if I have someone else using it before trying it myself	
5. I am confident of using mobile banking if someone has helped me get started	

Table 4.4 (Continued)

Items	Reference
Technology	
1. I have access to the applications and network services required to use mobile banking 2. The mobile banking that I will use are well integrated and provided in a stable service infrastructure 3. There are no compatibility problems with my mobile phone in terms of applications to mobile banking I use 4. I have technological resources required to use mobile banking	Pedersen (2005) Taylor and Todd (1995a)
Resources	
1. Mobile banking is accessible to me when I need it 2. I have access to a mobile phone with internet connection to use mobile banking 3. The resources (i.e. time, money, skill, information ,etc) needed to use mobile banking are available to me 4. I could easily get access to the resources (i.e. time, money, skill, information, etc) that are needed to use mobile banking 5. I have sufficient resources (i.e. time, money,skill ,information, etc) to use mobile marketing banking	Khalil and Pearson (2008)
Perceived Security	
1. I do not believe that the data exchanged in using mobile banking services will be restricted to genuine users only 2. I do not believe that the methods of mobile banking have security controls to maintain data confidentiality 3. I do not believe that the methods of mobile banking services will have controls to prevent non- requested transaction 4. I do not believe that the methods of mobile banking will have controls to ensure the accuracy of data 5. I do not believe that mobile banking methods will incorporate sufficient security 6. I do not believe that the methods of mobile banking will have security controls to prevent fraud	Chen (2008)

Table 4.4 (Continued)

Items	Reference
Perceived Privacy 1. I am concerned about the amount of personal information I will be required to provide when using mobile banking 2. I do not believe that the personal information used for certain transactions (e.g. mobile banking, mobile payment, etc) of mobile banking will be protected 3. I do not believe that the personal information used for certain transactions will be accurate 4. I do not believe that the personal information using for mobile banking will only be used for the purposes I authorize 5. I believe that using mobile banking services will put my privacy at risk	Chen (2008)
Disposition to Trust 1. I generally trust other people 2. I generally trust other people unless they give me reason not to 3. I tend to trust a person even though I have little knowledge of him/her 4. It is easy for me to trust a person	Khalil and Pearson (2008)
Structural Assurance 1. The Internet has enough safeguards to make me feel comfortable using mobile banking 2. I feel assured that legal structures adequately protect me from problems when using mobile banking 3. I feel assured that technological structures adequately protect me from problems when using mobile banking 4. I feel confident that technological advances (such as encryption) on the Internet make it safe for me to use mobile banking. It is easy for me to trust a person	Khalil and Pearson (2008)

Table 4.4 (Continued)

Items	Reference
Interpersonal Trust (Competency) 1. I think banks that provide mobile banking are competent at serving their customers 2. I think banks that provide mobile banking services are capable at meeting customer needs 3. I generally trust other people unless they give me reason not to 4. I think banks that provide mobile banking have sufficient expertise to provide the services	Khalil and Pearson (2008)
Interpersonal Trust (Benevolence) 1. I think if a customer required help, banks that provide mobile banking services would do their best to help 2. I think banks that provide mobile banking services are interested in customers' well-being, not just their own well-being 3. I think banks that provide Mobile banking services are ready and willing to assist and help me	Khalil and Pearson (2008)
Interpersonal Trust (Integrity) 1. I think banks that provide mobile banking are honest with their customers 2. I think banks that provide mobile banking keep promises they make 3. I think banks that provide mobile banking keep their commitments 4. I think banks that provide mobile banking act ethically in dealing with customers. 5. I think banks that provide mobile banking fulfill their agreements	Khalil and Pearson (2008)

4.8 Method of Data Analysis

This study involves experienced and knowledgeable people for validating the content in the questionnaire, which was constructed based on a deep review of the literatures. Meanwhile, factor analysis was used to guarantee the criterion validity. Several methods in analyzing the data were used. First, data screening and cleaning were done to check for any abnormalities. After the end of the first stage, then the data were analyzed using descriptive statistics. This is to summarize the data and to carefully analyze and understand them. In general, the reliability, validity, and suitable measurement were used in this study to reduce measurement error.

4.8.1 Descriptive Analysis

Descriptive statistics involves the transformation of raw data into a form that provides information to describe a set of factors in the situation (Sekaran, 2003). Data were checked before analyzed, in which particular attention was given to assess multivariate normality because of the sensitivity of data with SEM (Hair et al., 1998). Besides, this study also use the descriptive statistics to check the data set of a mistake, to describe the characteristics of the sample, and to check if the variables violate the assumptions underlying the statistical techniques used specifically to address the research questions.

4.8.2 Exploratory Factor Analysis (EFA)

Exploratory Factor Analysis (EFA) is an interdependent technique whose the primary purpose is to define the underlying structure among the variables. The statistical method was used to discover the basic structure of a large set of variables It identifies the basis of the relationship between the variables. Thus, this study conducted EFA to find out how many factors, there really are or which variables belong to which constructs.

4.8.3 Confirmatory Factor Analysis (CFA)

Confirmatory Factor Analysis (CFA) is used to test the measurement theories (Hair, Black, Babin, & Anderson, 2006). Researchers need to determine the number of items and factors (indicators) that represent these factors in theory before doing statistical analysis. In general, CFA is a method used to test how the number of additional factors and the appropriate indication of measured.

Some issues have been noted prior to implementing SEM (i.e. the fit indexes) and are discussed in the next section.

4.8.4 Structural Equation Model (SEM)

SEM is a multivariate technique that simultaneously examines the aspects and at the same time tests the process that causes a series of structural relationship between latent construct and using them to present the hypotheses in diagrammatical illustrations. SEM can function with continuous or discrete data and latent variables and observed variables. It also suits this study best because this study involves many variables.

4.8.4.1 Absolute goodness-of-fit measure

Absolute fit measurement determines the extent to which the proposed model predicts (fits) the observed covariance matrix. A number of appropriate absolute measures are commonly used, including chi-square statistics, goodness-of-fit statistics, and root mean square error approximation.

4.9 Summary of the Chapter

A good research starts an identification of research objectives. A correct research problem and correct research objectives, must be supported with a correct research methodology. In order to answer the research objectives and to solve the research problem, this chapter discusses and details the research design and method, which is based on the quantitative approach through the use of an adapted questionnaire. Also, this chapter discusses about the population, sample size, sampling techniques, data collection method, and variable measurement. Nevertheless, this chapter deals with the statistical techniques which are used in this study. In order to answer the research objectives, SEM has been decided as the best statistical analysis. Next, Chapter 5 discusses the research findings and recommends for future enhancement.

CHAPTER 5
ANALYSIS AND FINDINGS

5.1 Introduction

This chapter discusses the data analysis. The respondens' demographic characteristics are gathered in part A of the questionnaire. In order to apply for the multivariate assumptions, the data screening process was conducted and the result is discussed. The exploratory and confirmatory factor analysis are also discuss in this chapter. The validity and reliability of each construct are also discussed. More importantly, the results of hypotheses testing are discussed in detail towards the end of this chapter.

5.2 Response Rate

Total questionnaire distributed to the respondent is 800. The respondent is the full time student at four local universities in Klang Valley Malaysia. A total of 653 were returned. Out of 653 returned questionnaires, 351 response found to be non-useable. In category, 82 questionnaires were incomplete, another 162 were excluded due to non-users of mobile banking. This study would like to focus on the users of mobile banking. Outliers questionnaires of 58 have been dropped. Thus, 302 complete survey responses were used as data for this study and therefore the response rate is 46.24%. Hair, Black, Babin, & Anderson (2010) suggested that a good sample size for statistical analysis at least 10 times more than variables.

5.3 Sample Demographics

Having analyzed the 302 valid questionnaires, the demographic profile of the respondents are detailed in Table 5.1. It is seen that 26% of them are male, while another 74% are.This is not a surprise because it is in line with the report by the Ministry of Higher Education Malaysia (MOHE, 2012) that 61% of students in local universities in 2012 were female (while 39% were male). Malay is the largest ethnic (83%), followed with Chinese (9%), India (4%), and others (3%). It was found that majority of them aged between 18 and 20 (43%), and between 21 and 25 (40%), while 5% aged between 26 and 30, 9% between 31 and 40, and 2% above 40 years old.

On the other hand, 77% of them hold a Bachelor degree, followed with 11% hold a Master degree, 9% hold a Diploma, and 3% hold a PhD. When analyzing the services used, it is obvious that prepaid-top up is the most common one (76%), followed with accounts inquiry (57%), between-account transfer (38%), inter-bank fund transfer (23%), bill payment (22%) and others (1%).

Table 5.1
Demographic Profile (N = 302)

Variable	Category	Frequency	Percentage (%)
Gender	Male	78	25.8
	Female	224	74.2
Ethnic	Malay	252	83.4
	Chinese	27	8.9
	India	13	4.3
	Others	10	3.3
Age	18-20	131	43.4
	21-25	122	40.4
	26-30	16	5.3
	31-40	28	9.3
	Above 40	5	1.7
Program	Diploma	27	8.9
	Bachelor Degree	231	76.5
	Master Degree	34	11.3
	PhD	10	3.3
Type of services used	Account inquiry	173	57.3
	Between account transfer	114	37.7
	Inter-bank fund transfer	70	23.2
	Prepaid-Top up	229	75.8
	Bill payments	67	22.2
	Others	3	1.0

5.4 Mobile Banking Awareness

Table 5.2
Mobile Banking Awareness

Variable	Category	Frequency	Percent
Know what mobile banking was	Yes	271	89.7
	No	31	10.3
Alert that mobile banking is available in Malaysia	Yes	280	92.7
	No	22	7.3

Further, Table 5.2 explains that almost 90% of the respondents know what mobile banking was. On top of that, almost 93% of the respondents are alert on the availability of mobile banking services.

5.5 Data screening and Multivariate Assumptions

Data screening refers to the process of determining errors in the data and process them before performing data analysis. This process involved checking of the raw data, to identify outliers and deal with missing data. Having done that, 82 incomplete questionnaires were identified and removed for further analysis. Particularly, 58 questionnaires were identified as univariate outliers, based on *z* scores and the multivariate outliers . The next step after completing the screening of data, the normality tests was conducted, using skewness and kurtosis test (results are detailed in Table 5.3). Then, linearity test, multicollinearity and homoscedasticity followed.

Table 5.3
Results of the Skewness and Kurtosis for All Study Variables

Variable	**Skewness**		**Kurtosis**	
	Statistic	**Std. Error**	**Statistic**	**Std. Error**
Perceived Usefulness (A)	-0.919	0.140	2.032	0.280
Perceived Ease of Use (B)	-0.545	0.140	0.900	0.280
Compatibility (C)	-0.602	0.140	0.533	0.280
Perceived Image (D)	-0.272	0.140	-0.092	0.280
Perceived Innovativeness (E)	-0.282	0.140	0.369	0.280
Perceived Enjoyment (F)	-0.172	0.140	-0.256	0.280
Perceived Complexity (G)	-0.361	0.140	-0.438	0.280
Self Efficacy (H)	-0.507	0.140	0.978	0.280
Technology (I)	-0.535	0.140	0.862	0.280
Resources (J)	-2.68	0.140	0.452	0.280
Friends (K)	-1.69	0.140	-0.292	0.280
Family (L)	-0.198	0.140	-0.571	0.280
Media (M)	-0.649	0.140	0.865	0.280
Perceived Security (N)	-0.317	0.140	0.138	0.280
Perceived Privacy (O)	-0.329	0.140	0.276	0.280
Disposition to Trust (P)	-0.283	0.140	-0.368	0.280
Structural Assurance (Q)	-0.331	0.140	-0.214	0.280
Interpersonal Trust (Competency) (R)	-0.299	0.140	0.749	0.280
Interpersonal Trust (Benevolence) (S)	-0.473	0.140	0.787	0.280
Interpersonal Trust (Integrity) (T)	-0.546	0.140	1.173	0.280
Attitude (U)	-0.548	0.140	0.564	0.280
Subjective Norm (V)	-0.538	0.140	0.205	0.280
Perceived Behavioral Control (W)	-0.543	0.140	0.517	0.280
Perceived Risk (X)	-0.334	0.140	0.387	0.280
Trust (Y)	-0.517	0.140	0.173	0.280
Behavioral Intention (Z)	-0.704	0.140	0.280	0.280

Based on the above table on normality test, the skewness and kurtosis statistic signify that the assumption of normality is achieved for all variables. Table 5.3 shown the value of skewness and kurtosis for all variables are less than ± 2.58 (Coakes, Steed, & Price, 2008) or ±2 for Skewness and ±3 for Kurtosis (Kline, 2005).

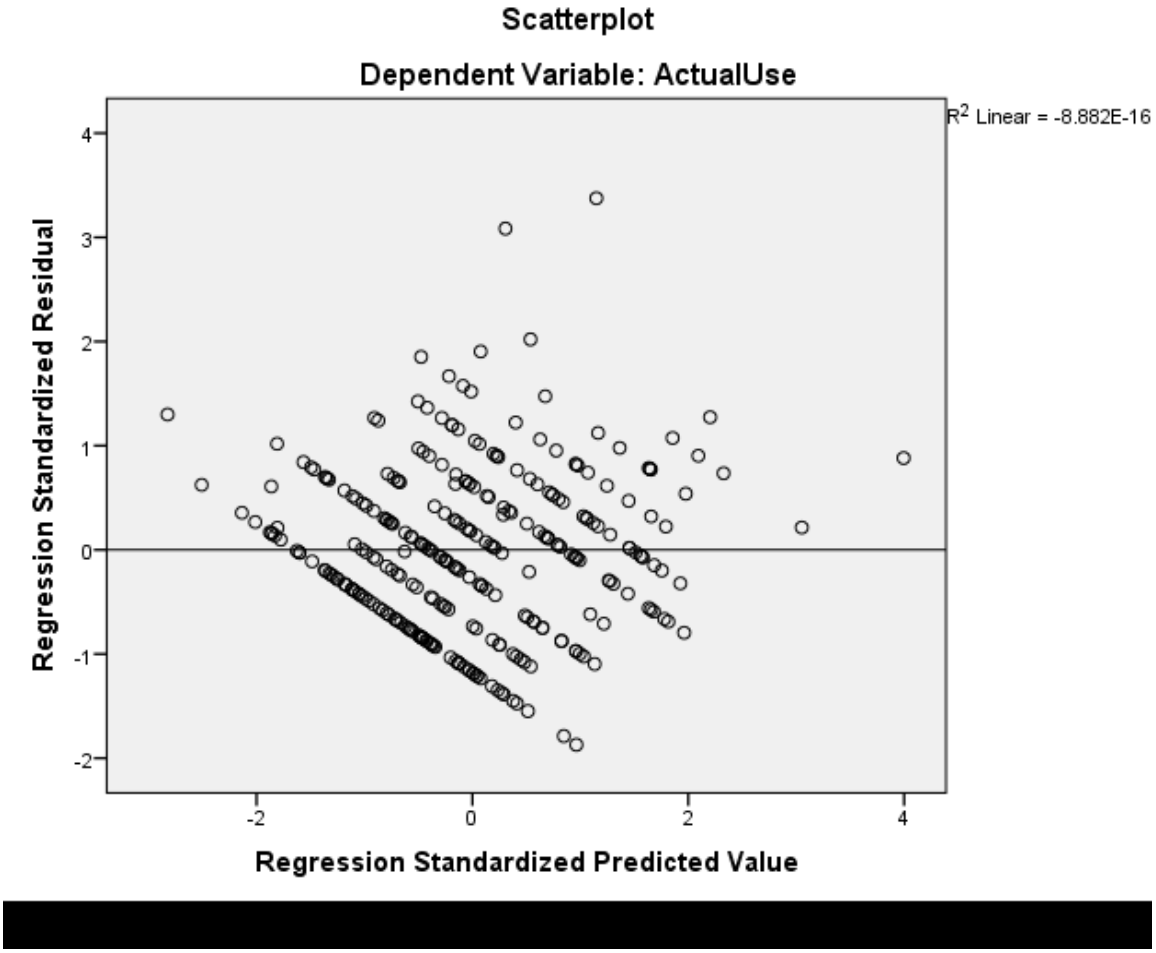

Figure 5.1
Scatterplot for Actual Use

On the other hand, the fit line in Figure 5.1 is very flat, which means a good sign of homoscedisticity. Accordingly, this study concludes that the error variance is constant with variance value in the predicted variable, which is the actual use in this study.

Table 5.4
Levene's Test, Homoscedisticity Assumption

Metric Variables	Non Metric variable Gender	Significant Level
	Levene's Statistic (F value)	(P<0.001)
Perceived Usefulness	1.484	0.82
Perceived Ease of Use	1.273	0.188
Compatibility	0.707	0.811
Perceived Image	1.269	0.191
Perceived Innovativeness	1.113	0.335
Perceived Enjoyment	1.207	0.257
Perceived Complexity	1.645	0.046
Self Efficacy	1.534	0.059
Technology	1.775	0.025
Resources	1.044	0.411
Friends	1.699	0.033
Family	0.568	0.933
Media	0.661	0.863
Perceived Security	0.979	0.493
Perceived Privacy	1.469	0.087
Disposition to Trust	0.752	0.776
Structural Assurance	1.117	0.331
Interpersonal Trust (Competency)	2.487	0.001
Interpersonal Trust (Benevolence)	2.019	0.014
Interpersonal Trust (Integrity)	0.987	0.480
Attitude	1.431	0.098
Subjective Norm	1.020	0.439
Perceived Behavioral Control	1.574	0.062
Perceived Risk	1.044	0.407
Trust	1.065	0.384
Behavioral Intention	1.065	0.384

On top of that, the homoscedistcity assumption in Table 5.4 details the gender against the significant level ($p<0.001$). The results show high values for all variables and therefore the assumption of homoscedisticity is met.

Multicollinearity was examined using Pearson Product Moment test. The Variance Inflation Factor (VIF), tolerance values, and the condition index for all exogenous variables were examined, in which the results are exhibited in Table 5.5. The tolerance value should be close to 1.00 to signify a little or no multicollinearity (Hair et al., 2010). The VIF cut-off value of 10.00 as suggested by Hair et al. (2010) is acceptable. This analysis is important to regulate the assurance of the variables. Hair et al. (2010) mention that the existence of multicollinearity is high when the

correlation exceeds 0.90. In this study, the highest correlation is 0.69 between Attitude and Behavioral Intention. Meanwhile, the lowest correlation is 0.10 between Behavioral Intention and Perceived Complexity. On top of that, it is seen that the durability of all correlations is below 0.90. Therefore, this signifies that there is no severe multicollinearity (Hair et al., 2010).

Table 5.6 also exhibits the values for the VIF and tolerance. Particularly, those values also reveal no multicollinearity effect among all exogenous variables on endogenous variables. It is obviously noticed because the value of tolerance exceeds the common accepted value, which is 0.10 (this value meets the acceptable VIF of 10) as underlined by (Hair et al., 2010).

Table 5.5

Pearson Correlations Matrix for Study Variables

	ACT	A	B	C	D	E	F	G	H	I	J	K	M	L	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
ACT	1.000																										
PU (A)	.225**	1.000																									
PEOU (B)	.195**	.660**	1.000																								
COM (C)	.291**	.608**	.622**	1.000																							
PI (D)	.167**	.263**	.287**	.439**	1.000																						
PIN (E)	.166**	.258**	.353**	.472**	.372**	1.000																					
PE (F)	.198**	.500**	.467**	.581**	.483**	.526**	1.000																				
PC (G)	-.017	-.169**	-.109	-.117*	.188**	.046	.001	1.000																			
SE (H)	.198**	.242**	.306**	.411**	.294**	.353**	.410**	.102	1.000																		
TEC (I)	.222**	.315**	.337**	.485**	.256**	.447**	.436**	-.029	.579**	1.000																	
RES (J)	.229**	.418**	.450**	.537**	.238**	.394**	.458**	-.091	.392**	.584**	1.000																
FRN (K)	.017	.102	.183**	.246**	.430**	.330**	.390**	.131*	.291**	.289**	.251**	1.000															
MED (M)	.139*	.278**	.320**	.304**	.249**	.431**	.416**	.001	.204**	.258**	.434**	.341**	1.000														
FAM (L)	.124*	.055	.116*	.238**	.338**	.352**	.364**	.264**	.310**	.306**	.305**	.600**	.370**	1.000													
PS (N)	.020	.025	.071	.020	.225**	.210**	.050	.316**	.028	-.006	.000	.122*	.136*	.096	1.000												
PP (O)	-.072	-.050	-.060	-.067	.172**	.084	.019	.183**	.065	.038	-.038	.072	.003	.073	.401**	1.000											
DTT (P)	.097	.253**	.276**	.306**	.293**	.329**	.389**	.076	.242**	.282**	.290**	.378**	.290**	.308**	.048	-.033	1.000										
SA (Q)	.155**	.213**	.290**	.342**	.300**	.330**	.346**	.169**	.361**	.307**	.400**	.342**	.302**	.382**	.010	-.145*	.522**	1.000									
ITC (R)	.067	.285**	.349**	.320**	.179**	.408**	.381**	.067	.379**	.337**	.411**	.237**	.381**	.219**	.022	-.020	.391**	.521**	1.000								
ITB (S)	.118*	.306*	.373**	.255**	.128*	.218**	.248**	.026	.222**	.265**	.393**	.132*	.274**	.174**	.004	-.053	.326**	.438**	.533**	1.000							
ITI (T)	.193**	.392**	.453**	.391**	.305**	.300**	.390**	.042	.324**	.296**	.388**	.234**	.244**	.252**	-.020	-.109	.350**	.569**	.454**	.628**	1.000						
ATT (U)	.259**	.392**	.387**	.422**	.334**	.301**	.566**	-.017	.459**	.440**	.473**	.367**	.353**	.381**	-.098	-.030	.378**	.440**	.401**	.372**	.505**	1.000					
SN (V)	.270**	.179**	.268**	.344**	.358**	.323**	.410**	.186**	.303**	.312**	.384**	.486**	.362**	.561**	-.010	-.049	.380**	.495**	.278**	.319**	.483**	.602**	1.000				
PBC (W)	.305**	.379**	.427**	.520**	.195**	.397**	.446**	-.133*	.335**	.439**	.578**	.255**	.396**	.253**	.033	-.039	.353**	.329**	.384**	.321**	.393**	.569**	.448**	1.000			
PR (X)	-.073	.068	.048	-.004	.080	.032	.049	.149**	.038	-.031	.014	.062	.077	-.002	.270**	.499**	-.052	-.209**	-.007	.003	-.021	-.048	-.040	.012	1.000		
TR (Y)	.322**	.325**	.354**	.402**	.320**	.317**	.459**	.013	.391**	.437**	.435**	.328**	.274**	.377**	-.047	-.162	.414**	.637**	.346**	.355**	.573**	.630**	.617**	.471**	-.203**	1.000	
BI (Z)	.271**	.390**	.385**	.433**	.284**	.249**	.485**	-.100	.402**	.465**	.420**	.335**	.346**	.341**	-.103	-.070	.273**	.372**	.347**	.298**	.449**	.687**	.531**	.563**	-.133*	.648**	1.000

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

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

Table 5.6

Results of Multicollinearity Test for Actual use of Mobile Banking

Variables	Collinearity Statistics		Condition	Variance Proportions																							
	Tolerence	VIF	index	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
PU (A)	.426	2.347	11.498	.00	.00	.00	.00	.00	.00	.05	.00	.00	.00	.00	.00	.00	.04	.02	.01	.01	.00	00	.00	.00	.00	.00	.02	.01	.00
PEOU (B)	.439	2.276	13.582	.01	.01	.01	.00	.00	.00	.08	.00	.00	.00	.04	.09	.00	.00	.00	.01	.01	.00	.00	.00	.00	.01	.01	.00	.00	.00
COM (C)	.354	2.824	16.550	.00	.00	.00	.01	.01	.01	.10	.00	.00	.00	.06	.06	.01	.00	.00	.04	.07	.01	.02	.01	.00	.00	.00	.00	.01	.00
PI (D)	.562	1.779	18.655	.00	.00	.00	.01	.02	.00	.07	.01	.00	.00	.02	.01	.01	.02	.00	.33	.01	.00	.00	.00	.01	.02	.00	.00	.02	.02
PIN (E)	.503	1.987	20.960	.00	.00	.02	.17	.01	.02	.04	.02	.00	.00	.00	.04	.07	.01	.01	.00	.00	.01	.03	.00	.00	.01	.01	.03	.01	.00
PE (F)	.411	2.430	21.613	.00	.00	.00	.03	.08	.00	.03	.04	.02	.02	.03	.05	.03	.00	.02	.08	.01	.02	.00	.00	.01	.02	.00	.03	.01	.01
PC (G)	.680	1.472	22.580	.00	.00	.00	.01	.01	.00	.01	.11	.04	.00	.01	.00	.08	.19	.02	.14	.01	.00	.00	.00	.00	.02	.00	.02	.01	.00
SE (H)	.546	1.832	23.843	.01	.01	.01	.05	.00	.01	.04	.02	.02	.00	.01	.00	.01	.25	.02	.04	.00	.01	.03	.02	.00	.00	.03	.01	.05	.01
TEC (I)	.439	2.276	24.506	.00	.00	.00	.01	.00	.02	.27	.02	.00	.00	.13	.00	.03	.03	.02	.16	.09	.01	.02	.02	.01	.02	.03	.00	.00	.00
RES (J)	.430	2.328	27.288	.01	.01	.04	.01	.00	.01	.03	.02	.00	.01	.11	.39	.18	.01	.00	.03	.00	.04	.01	.01	.02	.00	.00	.00	.00	.03
FRN (K)	.513	1.948	27.816	.02	.03	.01	.06	.12	.02	.07	.00	.00	.01	.29	.01	.01	.09	.11	.00	.01	.00	.00	.00	.00	.02	.01	.04	.01	.00
FAM (L)	.475	2.105	29.467	.02	.00	.00	.01	.19	.01	.01	.01	.00	.00	.11	.18	.12	.01	.01	.02	.01	.00	.00	.01	.00	.16	.06	.02	.00	.04
MED (M)	.598	1.673	30.070	.00	.00	.02	.02	.08	.03	.00	.00	.00	.09	.00	.04	.08	.05	.00	.01	.21	.03	.08	.03	.01	.01	.01	.09	.00	.03
PS (N)	.667	1.500	31.367	.02	.02	.00	.37	.05	.07	.00	.00	.03	.06	03	.00	.00	.00	.00	.01	.04	.00	.08	.00	.00	.00	.03	.10	.07	.00
PP (O)	.610	1.639	33.056	.00	.00	.02	.00	.01	.01	.00	.00	.12	.00	.00	.03	.13	.00	.02	.04	.11	.09	.02	.01	.02	.02	.24	.00	.12	.01
DTT (P)	.609	1.643	33.380	.00	.00	.00	.00	.02	.00	.06	.49	.05	.02	.05	.00	.03	.10	.10	.01	.00	.00	.00	.01	.01	.11	.00	.03	.04	.04
SA (Q)	.360	2.775	35.485	.01	.05	.04	.00	.04	.31	.00	.01	.00	.13	.00	.00	.02	.05	.07	.01	.00	.00	.02	.01	.03	.06	.00	.08	.02	.07
ITC (R)	.491	2.035	37.135	.01	.00	.00	.08	.02	.10	.02	.00	.00	.03	.00	.06	.01	.03	.12	.00	.02	.00	.00	.04	.04	.30	.16	.17	.10	.03
ITB (S)	.483	2.071	40.789	.00	.00	.01	.03	.03	.00	.03	.02	.01	.00	.03	.01	.05	.04	.12	.00	.05	.53	.01	.12	.06	.10	.06	.12	.05	.02
ITI (T)	.389	2.572	42.653	.01	.08	.05	.03	.01	.10	.00	.02	.13	.06	.01	.01	.00	.03	.02	.00	.12	.05	.01	.04	.10	.02	.01	.06	.24	.28
ATT (U)	.342	2.920	44.189	.03	.00	.06	.02	.10	.14	.01	.07	.05	.01	.02	.01	.03	.03	.19	.00	.07	.00	.08	.00	.37	.00	.07	.09	.16	.02
SN (V)	.382	2.616	46.752	.00	.04	.21	.00	.00	.02	.00	.02	.05	.25	.00	.00	.02	.00	.01	.03	.02	.02	.30	.26	.18	.02	.00	.02	.04	.08
PBC (W)	.437	2.290	48.230	.05	.01	.02	.01	.14	.01	.02	.04	.31	.23	.00	.01	.03	.00	.00	.02	.00	.09	.17	.13	.00	.02	.12	.04	.00	.30
PR (X)	.638	1.568	49.049	.00	.26	.40	.07	.00	.08	.01	.00	.04	.05	.02	.01	.03	.01	.03	.02	.12	.04	.08	.24	.08	.03	.12	.01	.01	.00
TR (Y)	.319	3.133	50.111	.23	.41	.01	.00	.04	.00	.02	.06	.09	.01	.00	.00	.02	.00	.06	.00	.00	.03	.02	.03	.03	.01	.01	.02	.00	.00
BI (Z)	.361	2.768	55.330	.57	.05	.06	.00	.02	.04	.04	.01	.01	.00	.01	.00	.00	.00	.05	.00	.00	.00	.01	.00	.02	.01	.02	.00	.00	.00

5.6 Exploratory Factor Analysis (EFA)

EFA was used to reveal the basic structure of the variables that are relatively large. It is a technique in factor analysis, whose overarching goal is to identify the basis of the relationships between the measured variable. The justification of using the EFA is by testing the matrix data, which should have adequate correlation prior to the use of EFA (Hair et al., 2010).

5.6.1 Factor Analysis for Antecedents of Attitude

Table 5.7 shows the results of EFA, together with the value of Kaiser-Mayer-Olkin (KMO) (0.91). It is good enough, because it is greater than the threshole 0.5 underlined by Hair et al.(2010). On top of that, the Bartlett's test also reveals a significant value (p = 0.00) because it satisfies the threshole $p< 0.05$. Hence, it is good enough to interprate an approppriatness and adequate correlation among the variables (Hair et al., 2010). Further, the communality values for all items are greater than 0.50 and factor loading of all items are significant at 0.35 for 250 sample size and above satisfy the conditions underlined by Hair et al. (2010). Particularly, the loadings are between 0.61 to 0.89, in which details of this are provided in Appendix C.

Table 5.7
Factor Analysis of Antecedents of Attitude

Items	Factor Loadings	Eigenvalues	% of Variance	Cronbach's Alpha
FACTOR 1:				
B3 I think it is easy to remember how to use mobile banking	0.83	11.64	13.38	0.93
B4 I think mobile banking is easy to use	0.82			
B5 I think it is easy to become skillful at using mobile banking	0.78			
B1 I think it is easy to learn how to use mobile banking	0.79			
B2 I believe that it is easy to get mobile banking services to do what I want it to do	0.76			
FACTOR 2 :				
A2 I think with mobile banking it is convenient or easy for me to do any bank transaction	0.81	4.11	12.59	0.91
A1 I think using mobile banking can save my time	0.80			
A4 I think mobile banking is useful to me as a customer	0.78			
A5 I think using mobile banking is effective and good to be used	0.75			
A3 I think by using mobile banking I can manage my account efficiently	0.66			
FACTOR 3				
F3 I will have fun if I use mobile banking	0.83	2.40	10.85	0.93
F2 I think using mobile banking is pleasurable	0.81			
F4 I think using mobile banking is to be interesting	0.78			
F1 I think using mobile banking is enjoyable	0.76			
FACTOR 4				
D5 I think people who use mobile banking are more prestigious	0.83	1.91	10.81	0.87
D3 I think people who use mobile banking are trendy	0.80			
D4 I think only young people use mobile banking	0.77			
D2 I think people who use mobile banking are IT savvy	0.76			
D1 I think using mobile banking will improve my image	0.61			
FACTOR 5				
G2 Using the Internet involves too much time doing mechanical operations	0.89	1.51	10.12	0.90
G3 It takes too long to learn how to use the internet to make it worth	0.88			
G1 Working with the internet is complicated it is difficult to understand what is going on	0.85			
G4 In general the internet is very complex to use	0.84			
FACTOR 6				
C2 I think that mobile banking fits well with all aspects of my banking activities	0.77	1.51	9.87	0.94
C3 I think mobile banking is serviced completely compatible with my current situation	0.77			
C4 I think that mobile banking fits well with all aspects of my requirement as a student	0.77			
C1 I think that mobile banking will improve my image	0.73			

Table 5.7 (Continued)

Items	Factor Loadings	Eigenvalues	% of Variance	Cronbach's Alpha
FACTOR 7				
E4 I like to try out with new information technology	0.80	1.24	9.62	0.85
E1 If I heard about a new information technology, I would look for ways to try out with it	0.80			
E2 Among my friends, I am usually the first to explore new information technologies	0.77			
E3 In general, I am skeptical to try out new information technologies	0.76			
Total variance explained	77.24%			
Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO)	0.91			
Bartlett's Test of Sphericity : Approx Chi-Square	7656.441			
Df	465			
Sig	0.000			

5.8.2 Factor Analysis for Antecedents of Subjective Norm

Results of factor analysis for antecedents of Subjective Norm are showcased in Table 5.8. It is noticed that the KMO for all items is 0.87 with Bartlettt's test is significant ($p = 0.000$). It is hence deduced meeting the conditions. In detail, factor 1 is related to the media influence towards the usage of mobile banking, factor 2 is related to friends influence on the mobile banking usage, and factor 3 is related to family influence on mobile banking usage.

The table omits K1 and L3 items on reasons explained in this paragraph. Item K1 was found to have a communality value (0.45) below the threshole (0.5) (Hair et al, 2010). Therefore, the item has been dropped. Meanwhile, item L3 was found to have a cross loading into more than one factor. It is a general practice to remove this element that may reduce the correlations between inconsistent factors and thus improve the reliability of the scale (Hair et al., 2010). When both items were deleted, the total variance for the remaining factors is 84.55% (the full report is provided in Appendix C). With that, the eigen values for all items is greater than 1. On top of that,

reliability analysis has also been done and the results reveal that all the 3 factors have reliability coefficients greater that 0.70 (full results are available in Appendic D), which meet the minimum accepted reliability underlined by Nunnally & Bernstein (1994).

Table 5.8
Factor Analysis for Antecedents of Subjective Norm

Items	Factor Loadings	Eigenvalues	% of Variance	Cronbach's Alpha
FACTOR 1:				
M2 Newspaper, magazines, mobile operators, promotion and advertising suggest that using mobile banking services is to be a good idea	0.90	5.02	32.53	0.92
M3 Media is full of reports, articles and advertisements suggesting the mobile banking to be worth using	0.90			
M1 Media and advertising consistently recommend the using of mobile banking	0.86			
M4 Mass media reports influenced me to try out mobile banking	0.86			
FACTOR 2 :				
K2 I will use mobile banking because my friends use it	0.91	2.28	26.64	0.88
K3 I will have to use mobile banking if my friends have already used it	0.89			
K4 I have to use mobile banking because my friends think I should use it	0.88			
FACTOR 3				
L2 I will use mobile banking because my family uses it	0.90	1.16	25.38	0.93
L1 My family thinks that I should use mobile banking	0.85			
L4 I have to use mobile banking because my family thinks I should use it	0.85			
Total variance explained	84.55%			
Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO)	0.83			
Bartlett's Test of Sphericity : Approx				
Chi-Square	2545.078			
Df	45			
Sig	0.000			

5.8.3 Factor Analysis for Antecedents of Perceived Behavioral Control

Results of factor analysis of the antecedents of Perceived Behavioral Control are detailed in Table 5.9. It consists of two factors. Factor 1 is on the resources needed by the respondents to access the mobile banking service, which includetime, money,

skills, information, and internet connection. Meanwhile, factor 2 is the technology related to the system, access to the applications, and also the service infrastructure. Referring to the table, the KMO is significant with 0.90, as well as the Bartlett's ($p = 0.000$). These indicate the significance of the correlation matrix and therefore, applicable for factor analysis. The table hides items H5, I1, I2, I3, and I4 because they do not meet the critera. Particularly, items H5 and I3 were found to have low communality values. After they have been dropped, and varimax rotation was run, the items I1, I2, I4 were found to have cross loadings to more than one factor. That indicates that the items have to be dropped too (Appendix C evidences the full results). Eventually, having dropped those items, the remaining contribute to coefficients above 0.70 (full results are available in Appendix D).

Table 5.9
Factor Analysis for Antecedents of Perceived Behavioral Control

Items	**Factor Loadings**	**Eigenvalues**	**% of Variance**	**Cronbach's Alpha**
FACTOR 1:				
J4 I could easily get access to the resources (i.e time, money, skill, information etc) that are needed to use mobile banking	0.86	4.55	39.64	0.90
J3 The resources (ie. time. Money, skill, information etc) needed to use mobile banking are available to me	0.85			
J5 I have sufficient resources (i.e. time, money, skill, information etc) to use mobile banking	0.84			
J1 Mobile banking is accessible to me when I need it	0.80			
J2 I have access to a mobile phone with internet connection to use mobile banking	0.79			

Table 5.9 (Continued)

Items	Factor Loadings	Eigenvalues	% of Variance	Cronbach's Alpha
FACTOR 2 :				
H3 I am confidence of using mobile banking if I have only the instructions manual for reference	0.88			
H2 I am confident of using mobile banking even if I have never used it before	0.84			
H1 I am confident of using mobile banking even if there is no one around to show me how to use it	0.81			
H4 I am confident of using mobile banking if I have someone else using it before trying it myself	0.76			
Total variance explained	71.41%			
Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO)	0.86			
Bartlett's Test of Sphericity : Approx				
Chi-Square	1578.05			
Df	36			
Sig	0.000			

5.8.4 Factor Analysis for Antecedents of Perceived Risk

Table 5.10 exhibits the results of factor analysis for antecedents of Perceived Risk. There are two factors. Factor 1 is on security while using the mobile banking. It consist of 6 items on the beliefs of the users every time they access the system. Meanwhile factor 2 consists of 5 items questioning on the privacy concerned by the respondent when log-in to the mobile banking system. The issue of personal information which is related to the risk involved. The table Showcases that the KMO for all items is 0.92, with significant Bartlett's test ($p = 0.000$). These evidence a significant correlation matrix and appropriateness for factor analysis. However items O1 and N6 are not listed because they do not fit enough. Particularly, the communality value for O1 was less than 0.50. When it has been dropped, N6 has been found to have cross loading into more than one factor, which needs to be dropped too (as seen in Appendix C). Having dropped them, the reliability coefficient (0.95) exceeds the threshold (0.70), with eigenvalues greater than 1.

Table 5.10
Factor Analysis for Antecedents of Perceived Risk

Items	Factor Loadings	Eigenvalues	% of Variance	Cronbach's Alpha
FACTOR 1:				
N3 I do not believe that the methods of mobile banking services will have controls to prevent non-requested transaction	0.92	4.82	51.00	0.95
N2 I do not believe that the methods of mobile banking have security controls to maintain data confidentiality	0.91			
N4 I do not believe that the methods of mobile banking will have controls to ensure the accuracy of data	0.90			
N1 I do not believe that the data exchange in using mobile banking	0.87			
N5 I do not believe that mobile banking methods will incorporate sufficient security	0.86			
FACTOR 2 :				
O3 I do not believe that the personal information used for certain transactions will be accurate	0.91	1.82	32.14	0.86
O4 I do not believe that the personal information using for mobile banking will only be used for the purpose I authorize	0.90			
O2 I do not believe that the personal information used for certain transactions (e.g. mobile banking, mobile payment, etc) of mobile banking will be protected	0.87			
Total variance explained	83.10%			
Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO)	0.88			
Bartlett's Test of Sphericity : Approx Chi-Square	2108.60			
Df	28			
Sig	0.000			

5.8.5 Factor Analysis for Antecedents of Perceived Trust

Results of factor analysis for antecedents of Perceived Trust are detailed in Table 5.11. It consists of four factors, which measure the respondent's perception of trust when dealing with the banks. Factor 1 consists of the respondent's needs of the bank's commitments, factor 2 elaborates on to the respondents requirements on the service and the banks ability to serve their customers on the usage of mobile banking, factor 3 on the respondents trust to other parties, and factor 4 is about the trust by the respondents if any error occurred during the transaction process. In the table, the

KMO for overall items are 0.91, while the p value the Bartletts Test 0.000). The varimax rotation, however, shows cross loadings for items S1, S2 and S3 into more than one factor. Thus, the item were deleted for further analysis. Having deleted them, the reliability coefficient was found greater that 0.70. Details of the tests are available in Appendices C and D.

Table 5.11
Factor Analysis for Antecedents of Trust

Items	Factor Loadings	Eigenvalues	% of Variance	Cronbach's Alpha
FACTOR 1:				
T2 I think banks that provide mobile banking keep promises they make	0.87	11.64	13.38	0.94
T4 I think banks that provide mobile banking act ethically in dealing with customers	0.87			
T5 I think banks that provide mobile banking fulfill their agreements	0.83			
T1 I think banks that provide mobile banking are honest with their customers	0.83			
T3 I think banks that provide mobile banking keep their commitments	0.83			
FACTOR 2:				
R2 I think banks that provide mobile banking services are capable at meeting customer needs	0.87	4.11	12.59	0.92
R3 I think banks that provide mobile banking services have the ability to handle the services	0.86			
R1 I think banks that provide mobile banking are competent at serving their customers	0.84			
R4 I think banks that provide mobile banking have sufficient expertise to provide the services	0.83			
FACTOR 3				
P1 I generally trust other people	0.87	2.40	10.85	0.92
P3 I tend to trust a person even though I have little knowledge of him/her	0.86			
P2 I generally trust other people unless they give me reason not to	0.84			
P4 It easy for me to trust a person	0.83			

Table 5.11 (Continued)

Items	Factor Loadings	Eigenvalues	% of Variance	Cronbach's Alpha
FACTOR 4				
Q3 I feel assured that technological structures adequately protect me from problems when using mobile banking	0.84	1.91	10.81	0.95
Q4 I feel confident that technological advances (such as encryption) on the internet make it safe for me to use mobile banking	0.84			
Q2 I feel assured that legal structures adequately protect me from problems when using mobile banking	0.83			
Q1 The internet has enough safeguards to make me feel comfortable using mobile banking	0.80			
Total variance explained	82.58%			
Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO)	0.91			
Bartlett's Test of Sphericity: Approx Chi-Square	4871.825			
Df	136			
Sig	0.000			

5.8.6 Factor Analysis of Attitude

Table 5.12 exhibits the results of factor analysis of Attitude. There are 5 items, which ask on the perceptions of respondents when using the mobile banking. Based on the table, the KMO value is 0.90 and the p value for the Bartlett's Test is 0.000. It is also seen that the factor loading of all items are between 0.93 and 0.96, with eigenvalue exceeding 1 (4.35%). Additionally, the p value for reliability test is 0.96, very high showing highly significant. Further, the full output is available in Appendix C.

Table 5.12
Factor Analysis for Attitude

Items	Factor Loadings	Cronbach's Alpha
U3 Using mobile banking is a pleasant idea	0.96	0.96
U2 I like the idea of using mobile banking	0.94	
U4 Using mobile banking is an appealing idea	0.94	
U5 Using mobile banking is an exciting idea	0.93	
U1 Using mobile banking is a good idea	0.91	
Eigenvalues	4.35%	
Total variance explained	87.00%	
Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO)	0.90	
Bartlett's Test of Sphericity: Approx Chi-Square	1801.39010	
Df	0.000	
Sig		

5.8.7 Factor Analysis of Subjective Norm

There are 5 items involved in Subjective Norm. The items are more towards the respondents feedback with influence by the people they think important and close to them. Having run the factor analysis, the KMO value is recorded 0.89, with the Bartlett's Test highly significant ($p = 0.000$). The MSA value is within the acceptable range between 0.86 and 0.93 indicating that the assumption of factor analysis is met. While the summarized results exhibited in Table 5.14 (The full results are available in Appendix C), it is noticed that the factor loadings for all items are between 0.89 to 0.94. Further, reliability analysis results in a cronbach alpha value of 0.95 (full results of the reliability test are available in Appendix D).

Table 5.13
Factor Analysis for Subjective Norm

Items	Factor Loadings	Cronbach's Alpha
V1 People who influence my behavior think that I should use mobile banking	0.94	0.95
V2 People who are important to me think that I should use mobile banking	0.93	
V3 People whose opinions I value think I should use mobile banking	0.92	
V4 People who are close to me think that I should use mobile banking	0.91	
V5 People who influence my decisions think that I should use mobile banking	0.89	
Eigenvalue	4.23	
Total variance explained	84.54%	
Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO)	0.89	
Bartlett's Test of Sphericity: Approx		
Chi-Square	1609.58	
Df	10	
Sig	0.000	

5.8.8 Factor Analysis of Perceived Behavioral Control

Perceived Behavioral Control consists of 4 items, measuring on the respondent's ability, knowledge, and resources to use mobile banking service. The results of factor analysis are summarized in Table 5.14 (full results are available in Appendix C), which showcases that the KMO value is 0.90 and the p value for Bartlett's Test is 0.000. Additionally, the MSA values fall in the acceptable range of between 0.79 and 0.94. The factor loadings for all items are between 0.90 and 0.94. Further, results of reliability analysis show a significant coefficient (p = 0.94) .

Table 5.14
Factor Analysis for Perceived Behavioral Control

Items	Factor Loadings	Cronbach's Alpha
W2 I have the resources to use mobile banking	0.94	0.94
W3 I have the knowledge to use mobile banking	0.93	
W4 I have the ability to use mobile banking	0.91	
W1 I would be able to operate mobile banking	0.90	
Eigenvalue	3.39	
Total variance explained	84.68%	
Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO)	0.85	
Bartlett's Test of Sphericity: Approx		
Chi-Square	1095.476	
Df	6	
Sig	0.000	

5.8.9 Factor Analysis of Perceived Risk

Perceived Risk comprises of 7 items, measuring respondent's perception on their belief on possible risks that might occur every time they access the system. Having run factor analysis test, the results are summarized in Table 5.15 (the full report is available in Appendix C). It is noticed that the KMO is 0.92, while the value for the Bartletts Test is 0.000, indicating significant correlation matrix. Besides, the MSA values range from 0.90 to 0.93, and the factor loading range between 0.81 and 0.91. Further, the reliability test reveals p value equals 0.94.

Table 5.15
Factor Analysis of Perceived Risk

Items	Factor Loadings	Cronbach's Alpha
X3 I believe that there will be high potential for loss associated with using mobile banking	0.91	0.94
X5 I believe that using mobile banking will involve many unexpected problems	0.90	
X4 I believe that there will be too much uncertainty associated with using mobile banking	0.89	
X1 In general I believe that it would be riskier to use mobile banking	0.87	
X2 Compared to traditional methods, I believe that using mobile banking is riskier	0.86	
X6 I do not believe that the companies enabling me to use mobile banking will protect my interests	0.83	
X7 I would not feel safe if I use mobile banking	0.81	
Eigenvalues	5.26	
Total variance explained	75.11%	
Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO)	0.92	
Bartlett's Test of Sphericity: Approx		
Chi-Square	1883.7352	
Df	1	
Sig	0.000	

5.8.10 Factor Analysis of Trust

Perceived Trust contains five items,which measure the respondents' trust and confidence level when they perform their mobile banking transaction. When factor analysis was run, the results as summarized in Table 5.16 (full report is in Appendix C) were obtained. It is noticed that the KMO is 0.91. the Bartlett's test equals 0.000. On top of that, the MSA value is within the acceptable range, between 0.90 and 0.93 indicating that the assumption of factor analysis is met. In fact, the factors loadings are between 0.90 and 0.93. When reliability test was run, it resulted a high alpha value (0.96), satisfying the threshole.

Table 5.16
Factor Analysis for Trust

Items	Factor Loadings	Cronbach's Alpha
Y3 Mobile banking is trustworthy	0.93	0.96
Y2 I can always rely on mobile banking for my banking activities	0.93	
Y5 I feel that I could trust mobile banking to conduct my banking activities	0.93	
Y4 When I need to conduct banking activities, I would feel comfortable depending on mobile banking for the services	0.91	
Y1 I trust mobile banking	0.90	
Eigenvalue	4.25	
Total variance explained	85.00%	
Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO)	0.91	
Bartlett's Test of Sphericity: Approx Chi-Square	1595.0941	
Df	0	
Sig	0.000	

5.8.11 Factor Analysis of Behavioral Intention

Table 5.17 details the summarized result (full result is available in Appendix C) for factor analysis test of Behavioral Intention, which comprises of 5 items that measure on respondents' Behavioral Intention on future interests to use mobile banking. In the table, it is seen that the KMO is 0.90 and the Bartletts Test is 0.000. This indicates the significance of the correlation matrix and thus appropriating for factor analysis. Additionally, the MSA values fall in the acceptable range between 0.87 and 0.92 and factor loadings are between 0.93 to 0.96. Further, results of reliability test with p value equals 0.97 indicates that it is highly significant. .

Table 5.17
Factor Analysis for Behavioral Intention

Items	Factor Loadings	Cronbach's Alpha
Z2 I will use mobile banking in the future	0.96	0.97
Z3 Given the chance, I predict I will use mobile banking in the future	0.95	
Z1 I intend to use mobile banking in future	0.94	
Z4 It is likely that I will use mobile banking in future	0.94	
Z5 I expect to use mobile banking in future	0.93	
Eigenvalues	4.43%	
Total variance explained	88.75	
Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO)	0.90	
Bartlett's Test of Sphericity: Approx		
Chi-Square	2007.0631	
Df	0	
Sig	0.000	

5.8.12 Factor Analysis of Actual Use

Table 5.18 exhibits the summarized results (full report is provided in Appendix C) of factor analysis test for Actual Use. It comprises 3 items, which measure the respondents' frequency of usage in term of weekly, time, and hours. However, the communality value of item hours was less than 0.50. Therefore, the item has been removed for further analysis. Having removed that, referring to the table, it is noticed that the KMO value is 0.58 exceeding the recommended value of 0.50 (Hair et al., 2010). Besides, the Bartletts Test is also significant ($p = 0.000$). On top of that, the factor loadings range between 0.70 and 0.86 and the MSA values range between 0.56 and 0.59. These indicate significant results. Further, the reliability (Cronbach's Alpha) value is 0.94, conveying a highly significant coefficient.

Table 5.18
Factor Analysis of Actual Use

Items	Factor Loadings	Cronbach's Alpha
TIME On average, how many time per week you use mobile banking?	0.87	0.65
FREQUENT How frequent do you use mobile banking services each week?	0.87	
Eigenvalues	1.51%	
Total variance explained	75.70	
Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO)	0.50	
Bartlett's Test of Sphericity: Approx Chi-Square	91.90	
Df	1	
Sig	0.000	

5.8 Reliability Analysis

The reliability of the constructs are determined through the Cronbach's alpha value. It was determined after the items were finalized (the steps of deletion are described in the previous section). In accordance, Table 5.19 lists the number of items for each variable before and after deletion. More importantly, the table exhibits the Cronbach's alpha values, which range between 0.65 and 0.97.

Table 5.19
Reliability Coefficients for All Variables

Variables	Number of items	Number of deleted items	Reliability
Perceived Usefulness	5	-	0.91
Perceived Ease of Use	5	-	0.93
Compatibility	4	-	0.94
Perceived Image	5	-	0.87
Personal Innovativeness	4	-	0.85
Perceived Enjoyment	4	-	0.93
Perceived Complexity	4	-	0.90
Friends	3	1	0.88
Family	3	1	0.93
Media	4	-	0.92
Self Efficacy	4	1	0.86
Technology	-	4	0.86
Resources	5		0.90
Perceived Security	5	1	0.95
Perceived Privacy	4	1	0.86
Disposition to Trust	4	-	0.91
Structural Assurance	4	-	0.95
Perceived Competency	4	-	0.92
Perceived Benevolence	-	3	0.88
Perceived Integrity	5	-	0.94
Attitude	5	-	0.96
Subjective Norm	5	-	0.95
Perceived Behavioral Control	4	-	0.94
Perceived Risk	7	-	0.94
Trust	5	-	0.96
Behavioral Intention	5	-	0.97
Actual Use	2	1	0.65
Total	109	13	

Although generally the Cronbach's alpha value should exceed a threshold of 0.70, Santos (1999) tolerates to accept values lower than 0.70

5.9 Restatement of Hypotheses

Referring to the results of factor analysis, the hyphotheses stated earlier have to be adjusted. Accordingly, the reformulated hypotheses are listed in Table 5.20.

Table 5.20

Summary of Restatement of Hypotheses

Hypothesis No	Hypothesis Statement
H1	Intention to Use mobile banking significantly affect the Actual Use of mobile banking
H2	Attitude significantly affects the Intention to Use mobile banking
H3	Subjective Norm, significantly affects the Intention to Use mobile banking
H4	Perceived Behavioral Control significantly affects the Intention to Use mobile banking
H5	Perceived Risk significantly affects the Intention to Use mobile banking
H6	Trust significantly affects the Intention to Use mobile banking
H7	Perceived Ease of Use significantly affects the Attitude towards using the mobile banking
H8	Perceived Usefulness significantly affects the Attitude towards using the mobile banking
H9	Perceived Compatibility significantly affects the Attitude towards using the mobile banking
H10	Perceived Image significantly affects the Attitude towards using the mobile banking
H11	Personal Innovativeness significantly affects the Attitude towards using the mobile banking
H12	Perceived Enjoyment significantly effects the Attitude towards using the mobile banking
H13	Perceived Complexity significantly affects the Attitude towards using the mobile banking
H14	Friends significantly affects the Subjective Norm towards using the mobile banking
H15	Family significantly affects the Subjective Norm towards using the mobile banking
H16	Media significantly affects the Subjective Norm towards using the mobile banking
H17	Self Efficacy significantly affect the Perceived Behavioral Control
H19	Resources significantly affects the Perceived Behavioral Control
H20	Perceived Security significantly affects the Perceived Risk towards using the mobile banking
H21	Perceived Privacy significantly affects the Perceived Risk towards using the mobile banking
H22	Disposition to Trust significantly affects Trust towards using the mobile banking
H23	Perceived Structural Assurance significantly affects Trust towards using the mobile banking
H24	Perceived Competency significantly affects Trust towards using the mobile banking
H26	Perceived Integrity significantly affects Trust towards using the mobile banking

5.10 Descriptive Analysis of Study Variables

5.10.1 Major Variables

Table 5.21 lists the final variables with some descriptive statistics. The study consists of Actual Use as an endogenous variable and 18 exogenous variables. Items are measured using a six-point Likert scale ranging from 1 = strongly disagree to 6 = strongly agree. To conclude the clarification, the criteria are based on the mean scores. The six-point Likert scale measurement is classified into low, moderate, and high. In accordance, mean scores below 3 are considered low and scores of 5 and greater are considered high while others in between are considered moderate.

Table 5.21
Descriptive Statistics for Variables of the Study (N=302)

Variables	No. of items	Minimum	Maximum	Mean	Standard Deviation
Actual Use	3	1.00	5.00	1.88	0.79
Behavioral Intention	5	1.00	6.00	4.38	1.05
Attitude	5	1.00	6.00	4.48	1.02
Subjective Norm	5	1.00	6.00	3.83	1.05
Perceived Behavioral Control	4	1.00	6.00	4.28	1.00
Perceived Risk	7	1.00	6.00	4.29	0.92
Trust	5	1.00	6.00	3.82	1.12
Perceived Ease of Use	5	1.00	6.00	4.63	0.85
Perceived Usefulness	5	1.00	6.00	4.85	0.86
Compatibility	4	1.00	6.00	4.37	0.97
Perceived Image	5	1.00	6.00	3.86	0.99
Personal Innovativeness	4	1.00	6.00	3.94	0.96
Perceived Enjoyment	4	1.00	6.00	4.28	1.00
Perceived Complexity	4	1.00	6.00	3.42	1.08
Friends	4	1.00	6.00	3.46	1.22
Family	4	1.00	6.00	3.56	1.22
Media	4	1.00	6.00	4.14	1.01
Self Efficacy	5	1.00	6.00	3.89	1.00
Resources	5	1.00	6.00	4.24	0.90
Perceived Security	6	1.00	6.00	3.80	1.05
Perceived Privacy	5	1.00	6.00	4.17	0.97
Disposition to Trust	4	1.00	6.00	3.52	1.14
Perceived Structural Assurance	4	1.00	6.00	3.67	1.15
Perceived Competency	4	1.00	6.00	4.23	0.88
Perceived Integrity	5	1.00	6.00	4.14	0.88

Referring to Table 5.21 shows that almost all variables are moderately perceived by respondents. Only Actual Use obtains low perception by the respondents (Mean = 1.88, Standard Deviation = 0.79). Meanwhile, Perceived Usefulness and Perceived Ease of Use obtain a high score. Therefore, based on the responses, it can be concluded that attention and belief to be free from adversity when using the mobile banking.

5.10.2 Level of Actual Use by Respondents

The first research question is "what is the level actual usage of mobile banking?" The details in Table 5.22 provide the answer for that, through the mean value. The standard deviation of 0.79 conveys a low level usage of mobile banking by the respondents.

Further, Table 5.22 shows the independent *t*-test to determine the differences in intention to know the level of Actual Use Behavior by the students subjected to gender. The results reveal that there is no major difference between the two genders. .

Table 5.22
Actual Usage Behavior by Gender

Independent Variable	Mean	Standard Deviation	*F*-value	*p*-value
Male	2.00	0.79	0.157	0.692
Female	1.84	0.78		

On top of that, the level of actual used is also tested subjected to ethnicity, age, and program enrolled in each university. The Age is divided into five classes, which is between 18 and 20, 21 and 25, 26 and 23, 31 and 40, and 40 and above. Meanwhile,

Ethnicity is divided into four groups, which is Malay, Chinese, India, and Others and Program Enroll by the students, is divided into Diploma, Bachelor Degree, Master, and PhD.

The analysis of variance (ANOVA) was used to analyze the variables in terms of those three demographic characteristics. The results as seen in Table 5.23 evidence significant difference in terms of age (F=6.22 , p=0.00), but not varying in terms of ethnic (F=1.34 , p=0.26). In contrast, it is significantly different in terms of the program that the students enroll (F=5.88, p=0.00). Generally, the result reveals approximately low in term of actual use of mobile banking by the students in Malaysia. The respondents from Bachelor Degree program are the highest users as compared to other programs.

Table 5.23
Actual Usage Behavior by Age, Ethnicity and Study Program

Independent variable	**Categories**	**Means**	***F*-value**	***p*-value**
Age	18-20	1.74	6.22	0.00*
	21-25	1.84		
	26-30	2.38		
	31-40	2.39		
	Above 40	1.87		
Ethnic	Malay	1.91	1.34	0.26
	Chinese	1.75		
	Indian	1.74		
	Others	1.48		
Program	Diploma	1.65	5.88	0.00*
	Bachelor Degree	1.82		
	Master Degree	2.36		
	PhD	2.07		

Note : *$p < .05$

5.11 Confirmatory Factor Analysis (CFA)

CFA is a multivariate statistical process used to test how strong the measured variables serve the number of constructs. This process was carried out using SEM and Analysis of Moment Structures (AMOS). Basically, the items and antecedents of Subjective Norm, Attitude , Perceived Risk, Perceived Behavioral Control and Perceived Trust were analyzed in term of the specification and validity of the model.

5.11.1 First-Order Model the Antecedents of Attitude

The model of antecedents of Attitude was derived from the EFA and then described into the measurement model (first order model) consisting of Perceived Usefulness (A), Perceived Ease of Use (B), Compatibilty (C), Perceived Image (D), Perceived Innovativeness (E), Perceived Enjoyment (F), and Perceived Complexity (G). Two types of validity have been employed in this study, that is Convergent Validity and Discriminant Validity. The Convergent Validity could be verified by computing the Average Variance Extracted (AVE) for every construct. The composite reliability must be greater than 0.70 and the AVE must be greater than 0.50 (Hair et al., 2010).

Figure 5.2 shows the re-specified model due to the low factor loading of item D4. Therefore the item was dropped and eliminated from the analysis. Thereafter, the results for antecedents of Attitude form a good fit, in which CMIN/df ratio = 2.26, tucker lewis index (TLI) = 0.925, Root Mean Square Error of Approximation (RMSEA) = 0.065 and Comporative Fit Index (CFI) = 0.934. The GFI value is marginally accepted, although a little less than the recommended value of 0.90. It is decided so with the supports of previous case, such as by Chang, Li, Hung, and

Hwang (2005), Hu et al. (2012), and Segars (2010), in which they also obtained GFI value of less than 0.90. Therefore, this study concludes that the data are appropriate for the measurement model.

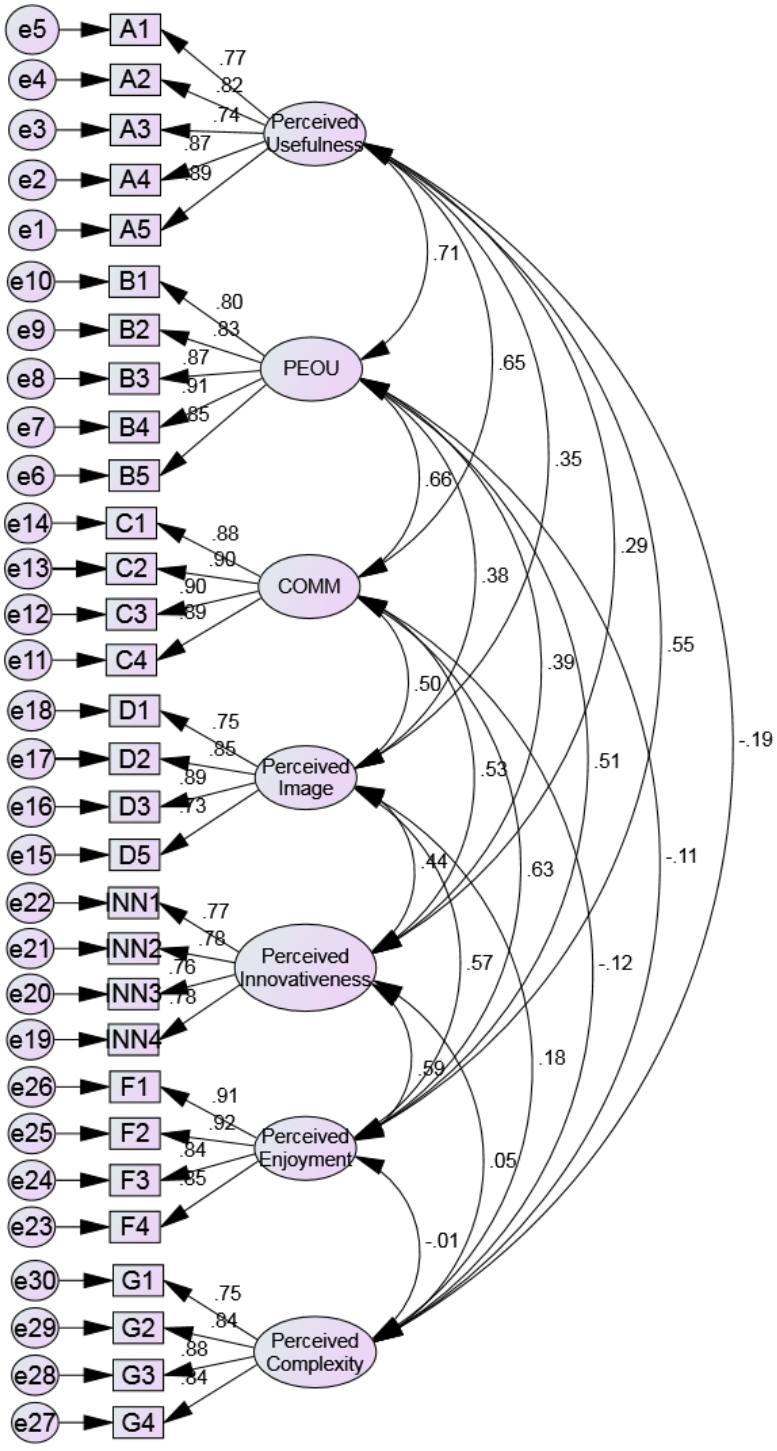

Figure 5.2
Respecified Model for Antecedents of Attitude

On the other hand, Table 5.24 shows the results of internal reliability and Convergent Validity (average variance extracted and composite reliability). The internal reliability was determined through Cronbach's alpha as recommended by Nunnally and Bernstein (1994). It is seen that the obtained values are between 0.85 to 0.94 (satisfy the threshold), Meanwhile, the Convergent Validity was measured through factor loading (AVE and composite reliability outcome) (Hair et al., 2010). It has been underlined that the Convergent Validity is considered achieved if the AVE is greater than 0.50 and the Composite Reliability is 0.70 or greater (Fornell & Larcker, 1981).

Having run the test, the results are detailed in Table 5.24. It could be noticed that all items meet the requirement level of 0.70. since the values range between 0.74 and 0.91. The AVE ranges between 0.60 and 0.79. Therefore the Convergent Validity for all antecedents of Attitude is met. On top of that, the Discriminant Validity in Table 5.25 shows the AVE (diagonal value) is higher than the squared correlation (off-diagonal value).

Table 5.24
Convergent Validity for First-Order Model Antecedents of Attitude

Construct	Items	Internal Reliability Cronbach's Alpha	Factor Loading	Average Variance Extracted	Composite Reliability
Perceived Usefulness	A1	0.90	0.77	0.67	0.91
	A2		0.82		
	A3		0.74		
	A4		0.87		
	A5		0.89		
Perceived Ease of Use	B1	0.93	0.80	0.73	0.93
	B2		0.83		
	B3		0.87		
	B4		0.91		
	B5		0.85		
Compatibility	C1	0.94	0.88	0.79	0.94
	C2		0.90		
	C3		0.90		
	C4		0.89		

Table 5.24 (Continued)

Construct	Items	Internal Reliability Cronbach's Alpha	Factor Loading	Average Variance Extracted	Composite Reliability
Perceived Image	D1	0.87	0.75	0.65	0.88
	D2		0.85		
	D3		0.89		
	D5		0.73		
Perceived Innovativeness	E1	0.85	0.77	0.60	0.85
	E2		0.78		
	E3		0.76		
	E4		0.78		
Perceived Enjoyment	F1	0.93	0.91	0.78	0.93
	F2		0.92		
	F3		0.84		
	F4		0.85		
Perceived Complexity	G1	0.90	0.75	0.69	0.90
	G2		0.84		
	G3		0.88		
	G4		0.84		

Table 5.25
Discriminant Validity of Construct

Construct	1	2	3	4	5	6	7
PerceivedEnjoyment (1)	**0.880**						
PerceivedUsefulness (2)	0.546	**0.821**					
PerceivedEase of use (3)	0.506	0.714	**0.854**				
Compatibility (4)	0.627	0.649	0.658	**0.891**			
PerceivedImage (5)	0.568	0.349	0.378	0.500	**0.807**		
PerceivedInnovativeness (6)	0.590	0.289	0.393	0.527	0.442	**0.771**	
PerceivedComplexity (7)	-0.008	-0.189	-0.115	-0.116	0.179	0.049	**0.829**

5.11.2 Second-Order Model of Attitude

The re-specified model for the antecedents of Attitude contains the remaining items to be designated in the second-order model of Attitude visualized in Figure 5.3. As a complement to the model, Table 5.26 conveys that the data fit the measurement model well (CMIN/DF = 2.125, p value = 0.00, GFI = 0.827, CFI = 0.936, TLI = 0.928, and RMSEA = 0.061).

The table contains the Convergent Validity for the second order model for the antecedents of Attitude and shows that the data meet the requirement. It is seen that the factor loadings range between 0.74 and 0.92, Composite Reliability between 0.85 and 0.96, and AVE ranges between 0.60 and 0.79. In overall, it is obvious that they satisfy the conditions. On top of that, the Discriminant Validity in Table 5.27 shows the AVE (diagonal value) is higher than the squared correlation (off-diagonal value).

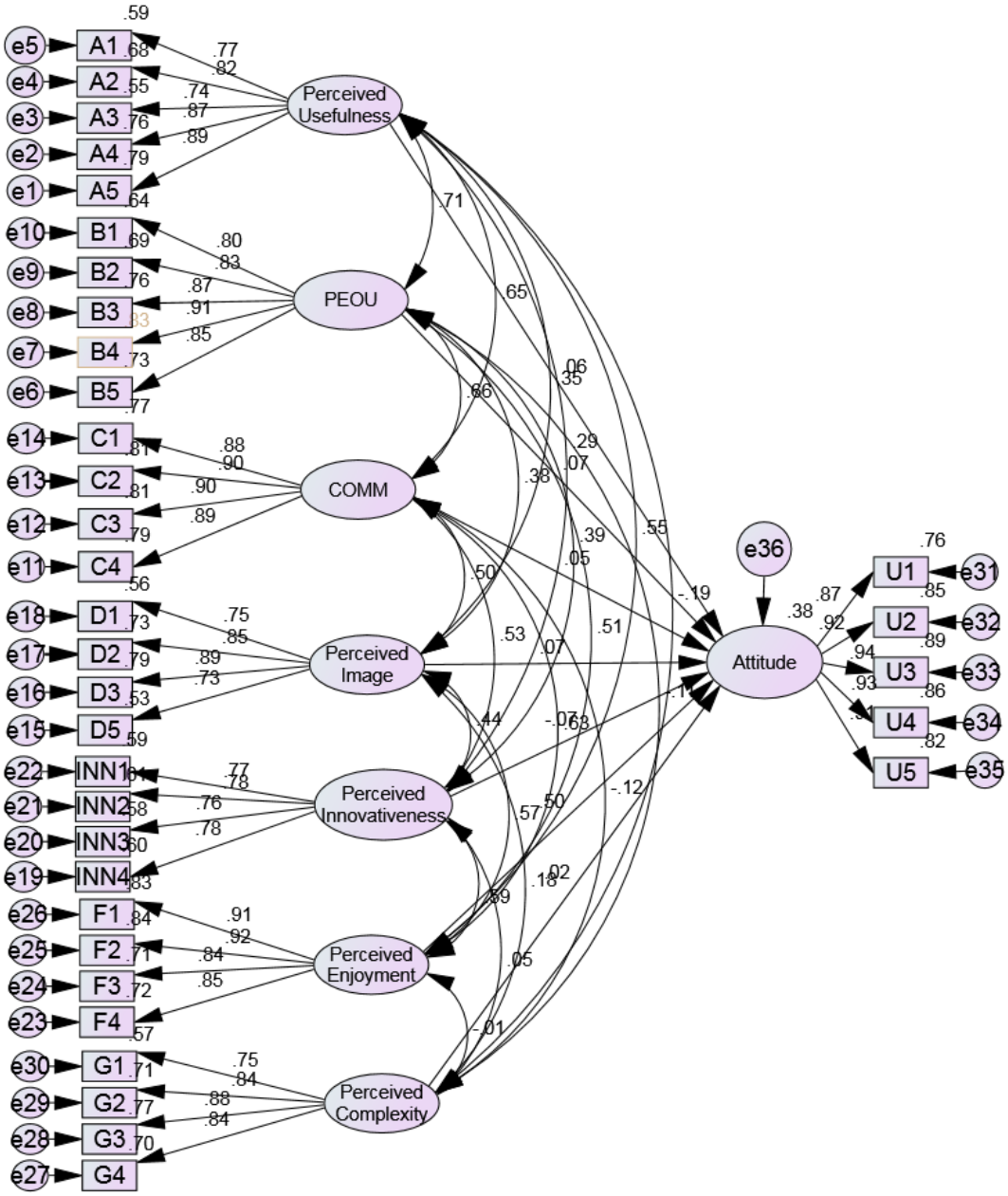

Figure 5.3
Second Order Model of Attitude

Table 5.26 *Convergent Validity for Second-Order Model Antecedents of Attitude*

Construct	Items	Internal Reliability Cronbach's Alpha	Factor Loading	Average Variance Extracted	Composite Reliability
Perceived Usefulness	A1	0.90	0.77	0.67	0.91
	A2		0.82		
	A3		0.74		
	A4		0.87		
	A5		0.89		
Perceived Ease of Use	B1	0.93	0.80	0.73	0.93
	B2		0.83		
	B3		0.87		
	B4		0.91		
	B5		0.85		
Compatibility	C1	0.94	0.88	0.79	0.94
	C2		0.90		
	C3		0.90		
	C4		0.89		
Perceived Image	D1	0.87	0.75	0.65	0.88
	D2		0.85		
	D3		0.89		
	D5		0.73		
Perceived Innovativeness	E1	0.85	0.77	0.60	0.85
	E2		0.78		
	E3		0.76		
	E4		0.78		
Perceived Enjoyment	F1	0.93	0.91	0.78	0.93
	F2		0.92		
	F3		0.84		
	F4		0.85		
Perceived Complexity	G1	0.90	0.75	0.69	0.90
	G2		0.84		
	G3		0.88		
	G4		0.84		
Attitude	U1	0.96	0.87	0.84	0.96
	U2		0.92		
	U3		0.94		
	U4		0.93		
	U5		0.91		

Table 5.27
Discriminant Validity Construct

Construct	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
PerceivedEnjoyment (1)	**0.881**							
PerceivedUsefulness (2)	0.546	**0.821**						
Perceived Ease of Use (3)	0.506	0.714	**0.854**					
Compatibility (4)	0.627	0.649	0.658	**0.891**				
PerceivedImage (5)	0.568	0.349	0.378	0.500	**0.806**			
PerceivedInnovativeness (6)	0.590	0.289	0.393	0.527	0.443	**0.771**		
PerceivedComplexity (7)	-0.009	-0.189	-0.115	-0.116	0.179	0.050	**0.829**	
Attitude (8)	0.598	0.414	0.397	0.446	0.401	0.332	-0.002	**0.915**

5.11.3 First Order Model the Antecedents of Subjective Norm

The Figure 5.4 exhibits the re-specified model for the antecedents of Subjective Norm. The model consists of Friends (K), Family (L), and Media (N). There are three items for friends, three items for family, and four items for media. K1 and L3 have been deleted from the original model due to the high value of modification indices.

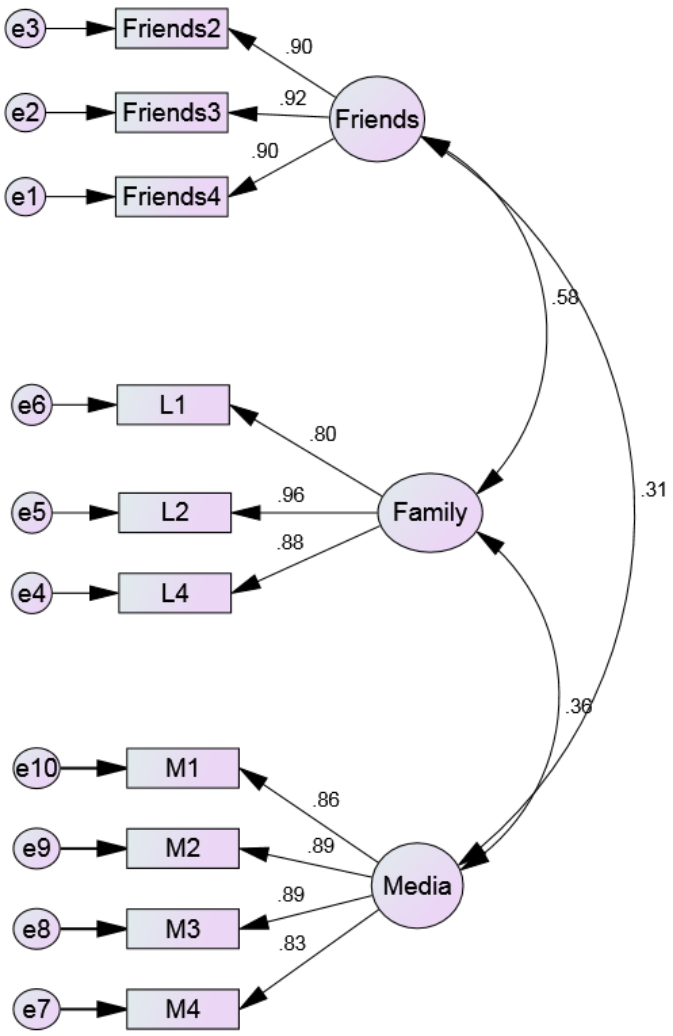

Figure 5.4
The Re-specified Model for Antecedents of Subjective Norm

The overall results of the data convey a good fit of the measurement model (CMIN/df (ratio) = 3.617, p value = 0.00, GFI = 0.932, CFI = 0.967, TLI = 0.954, and RMSEA = 0.093). The Convergent Validity for a first order model for the antecedents of Subjective Norm in Table 5.28 reveal satisfactory result. It is seen that the factor loading of all items range between 0.83 and 0.96, greater than 0.50. Besides, Composite Reliability range between 0.92 and 0.93, greater than 0.60 and AVE range between 0.75 and 0.83, greater than 0.50. On top of that, the Discriminant Validity as seen in Table 5.29 shows that the AVE value is greater than the square correlation's value.

Table 5.28 *Convergent Validity for First-Order Model Antecedents of Subjective Norm*

Construct	**Items**	**Internal Reliability Cronbach's Alpha**	**Factor Loading**	**Average Variance Extracted**	**Composite Reliability**
Friends (K)	Friends2	0.88	0.90	0.83	0.93
	Friends3		0.92		
	Friends4		0.90		
Family (L)	L1	0.93	0.80	0.78	0.91
	L2		0.96		
	L3		0.88		
Media (M)	M1	0.92	0.86	0.75	0.92
	M2		0.89		
	M3		0.89		
	M4		0.83		

Table 5.29
Discriminant Validity of Constructs

Constructs	**1**	**2**	**3**
Family (1)	**0.882**		
Friends (2)	0.581	**0.908**	
Media (3)	0.359	0.308	**0.867**

5.11.4 Second-Order Model of Subjective Norm

The second order model of Subjective Norm (Figure 5.5) determines the GFI, Convergent and Discriminant Validity. Basically, the model fits well (CMIN/df(ratio) = 3.152, CFI = 0.958, GFI = 0.902, TLI = 0.948, and RMSEA = 0.085). The RMSEA of between 0.08 to 0.10 provides a mediocre fit and below 0.08 shows a good fit (MacCallum, Browne, & Sugawara, 1996).

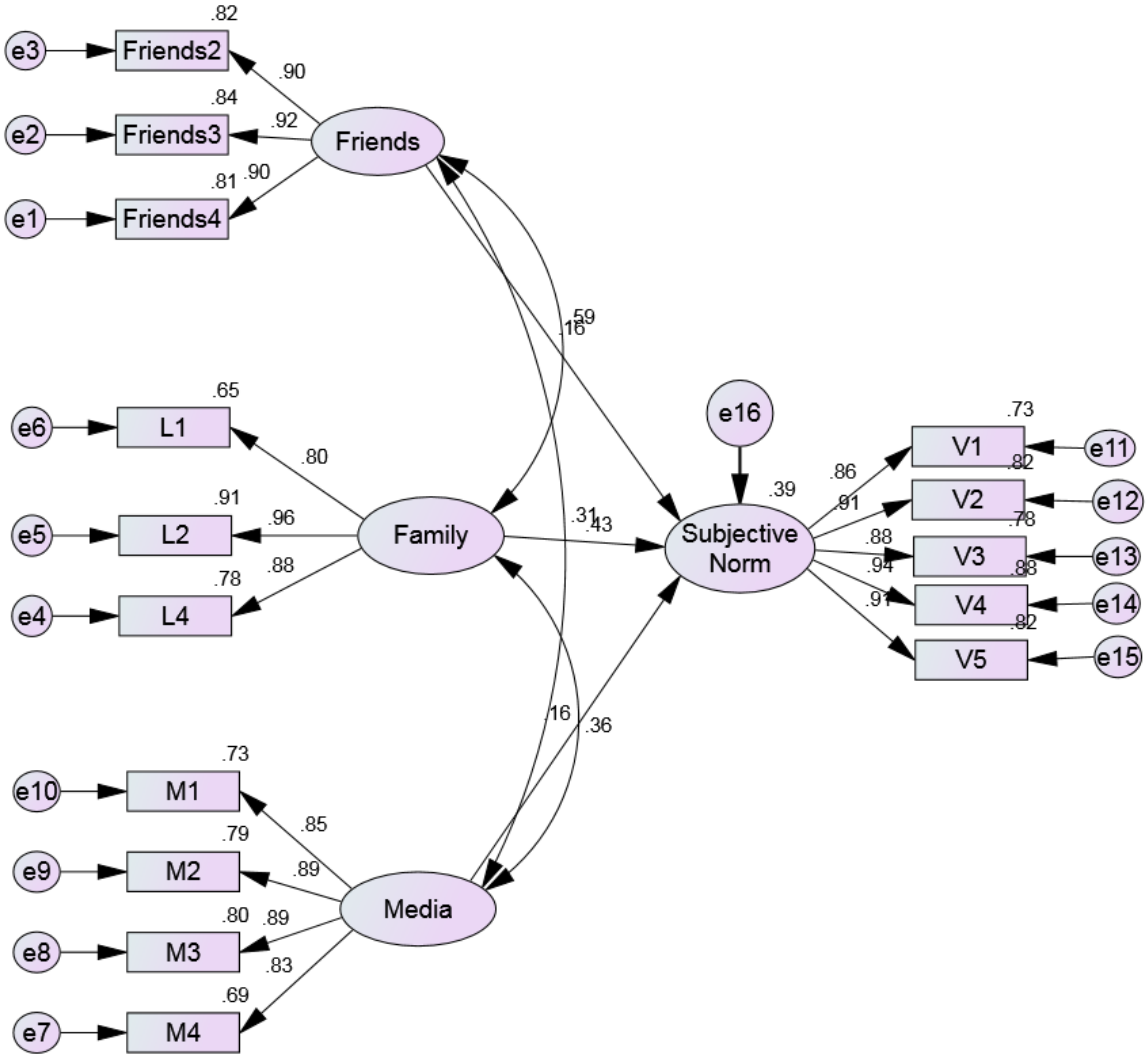

Figure 5.5
Second Order Model on Antecedents of Subjective Norm

The Cronbach's alpha was used to determine the unidimensionality of internal reliability. The values as seen in Table 5.30 range from 0.88 to 0.95, exceeding the threshold value of 0.70. The Convergent Validity was checked by aligning the AVE, factor loading, and Composite Reliability. It is seen that the factor loading values range from 0.83 to 0.96, which exceed the recommended value of 0.70. Similarly the Composite Reliability values exceed the recommended value of 0.70 (ranging between 0.91 and 0.95). On the other hand, Table 5.31 shows the Discriminant Validity, in which the AVE value is greater than the square correlation's value.

Table 5.30
Convergent Validity for Second-Order Model Antecedents of Subjective Norm

Construct	**Items**	**Internal Reliability Cronbach's Alpha**	**Factor Loading**	**Average Variance Extracted**	**Composite Reliability**
Friends (K)	Friends2	0.88	0.90	0.83	0.93
	Friends3		0.92		
	Friends4		0.90		
Family	L1	0.93	0.80	0.78	0.91
	L2		0.96		
	L3		0.88		
Media	M1	0.92	0.86	0.75	0.92
	M2		0.89		
	M3		0.89		
	M4		0.83		
Subjective Norm	V1	0.95	0.86	0.81	0.95
	V2		0.91		
	V3		0.88		
	V4		0.94		
	V5		0.91		

Table 5.31
Discriminant Validity of Constructs

Construct	**1**	**2**	**3**	**4**
Media (1)	**0.867**			
Friends (2)	0.309	**0.908**		
Family (3)	0.363	0.586	**0.882**	
S/Norm (4)	0.367	0.468	0.588	**0.898**

5.11.5 First-Order Model for Antecedents of Perceived Behavioral Control

The model for antecedents of Perceived Behavioral Control has beend derive from EFA and then described into the measurement model (first order model) (Figure 5.6). It consist of Eelf-Efficacy (H) and Resources (J). The Convergent Validity was verified through the AVE for every construct. The results in Table 5.32 show that the Composite Reliability for the two items are 0.86 and 0.64, exceeding the recommended value, and the AVE are greater than 0.50 (ranging from 0.62 and 0.64). Besides, the factor loadings for the two items are 0.73 and 0.88, also exceeding the recommended value of 0.50 (Churchill, 1979).

Further, for the purpose of analyzing the Discriminant Validity, the square correlations between constructs was compared against AVE of individual items. The results in Table 5.33 show that the AVE is greater than square correlation value. Thus, the constructs are definite from one another and confirm Discriminant Validity.

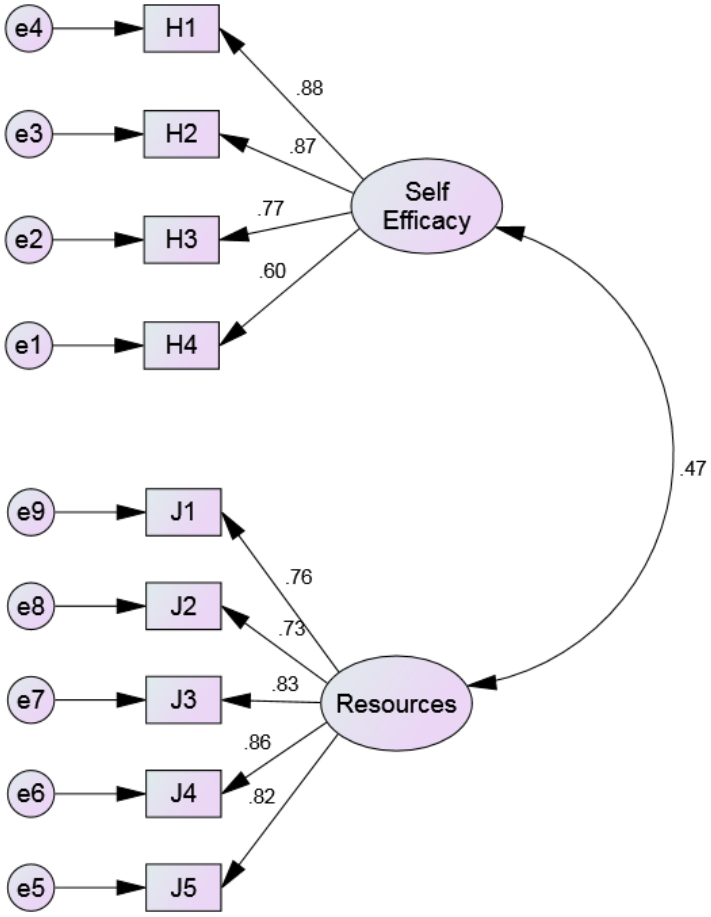

Figure 5.6
First Order Model on Antecedents of Perceived Behavioral Control

Table 5.32
Convergent Validity for First-Order Model Antecedents of Perceived Behavioral Control

Construct	Items	Internal Reliability Cronbach's Alpha	Factor Loading	Average Variance Extracted	Composite Reliability
Self Efficacy	H1	0.86	0.88	0.62	0.86
	H2		0.87		
	H3		0.77		
	H4		0.60		
Resources	J1	0.90	0.76	0.64	0.64
	J2		0.73		
	J3		0.83		
	J4		0.86		
	J5		0.82		

Table 5.33
Discriminant Validity of Construct

Construct	1	2
Resources (1)	**0.8**	
Self Efficacy (2)	0.468	**0.785**

5.11.6 Second-Order Model of Perceived Behavioral Control

The second order model of Perceived Behavioral Control determines the GFI, Convergent and Discriminant Validity. Figure 5.6 shows that the CMIN/df(ratio) is 2.367, CFI = 0.970, GFI = 0.931, TLI = 0.962, and RMSEA = 0.067. The results convey that the determined measurement model fits the data well.

The internal reliability Cronbach's alpha value was used to test the unidimensionality. The values as detailed in Table 5.34 range from 0.86 to 0.94. The Convergent Validity was checked by aligning the AVE, factor loading, and Composite Reliability. It is seen that the factor loading ranges from 0.60 to 0.93, the Composite Reliability ranges between 0.64 to 0.94, and the AVE ranges between 0.62 to 0.80. Based on the results, it is understandable that all indicators satisfy the conditions. In fact, the

Discriminant Validity in Table 5.35 shows that the AVE (diagonal value) is higher than the squared correlation (off-diagonal value).

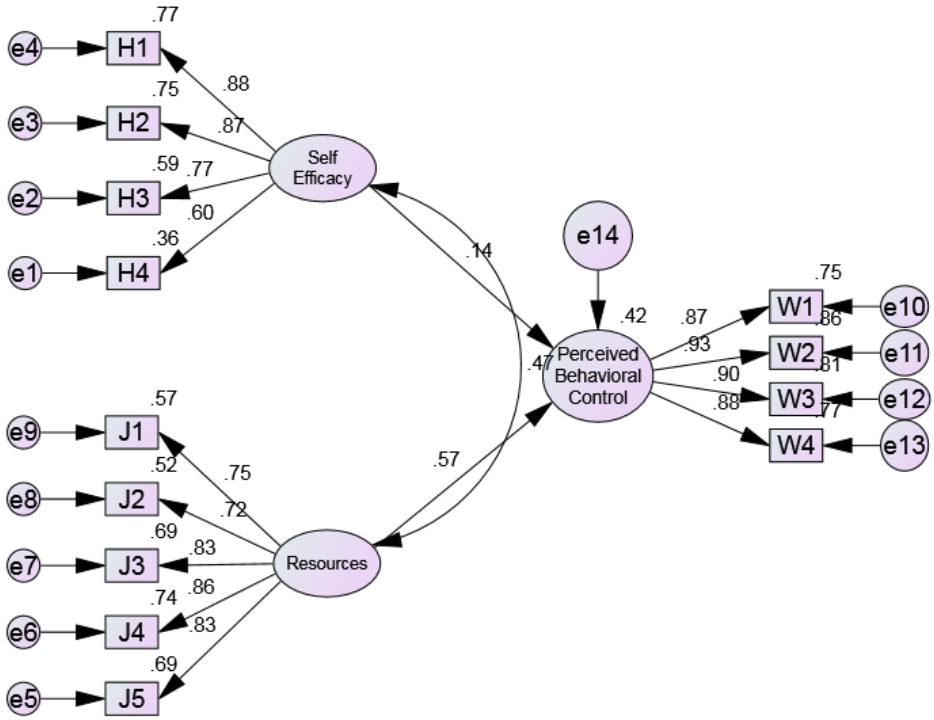

Figure 5.7
Second Order Model on Antecedents of Perceived Behavioral Control

Table 5.34
Convergent Validity for Second-Order Model Antecedents of Perceived Behavioral Control

Construct	Items	Internal Reliability Cronbach's Alpha	Factor Loading	Average Variance Extracted	Composite Reliability
Self Efficacy	H1	0.86	0.88	0.62	0.86
	H2		0.87		
	H3		0.77		
	H4		0.60		
Resources	J1	0.90	0.76	0.64	0.64
	J2		0.73		
	J3		0.83		
	J4		0.86		
	J5		0.82		
Perceived Behavioral Control	W1	0.94	0.87	0.80	0.94
	W2		0.93		
	W3		0.90		
	W4		0.88		

Table 5.35
Discriminant Validity of Construct

Construct	1	2	3
Resources (1)	**0.8**		
Self Efficacy (2)	0.468	**0.785**	
Perceived Behavioral Control (3)	0.636	0.408	**0.893**

5.11.7 First-Order Model for Antecedents of Perceived Risk

The first order model for the antecedents of Perceived Risk contains two items, Perceived Security (N) and Perceived Privacy (O). The Convergent and Discriminant Validity were tested. Consequently, Table 5.36 shows that the data is good and fit the measurement model (CMIN/df (ratio) = 2.045, p= 0.00, GFI = 0.962, CFI = 0.988, TLI = 0.984, and RMSEA = 0.059). The factor loadings range between 0.71 and 0.92, the Composite Reliability ranges from 0.90 to 0.95, and the AVE are greater than 0.50 (between 0.69 and 0.79). Similarly, the internal reliability Cronbach's alpha

values range between 0.86 and 0.95. These results are obviously satisfying their respective conditions. Further, Table 5.37 shows the Discriminant Validity and the results reveal that the AVE are greater than the square correlation value.

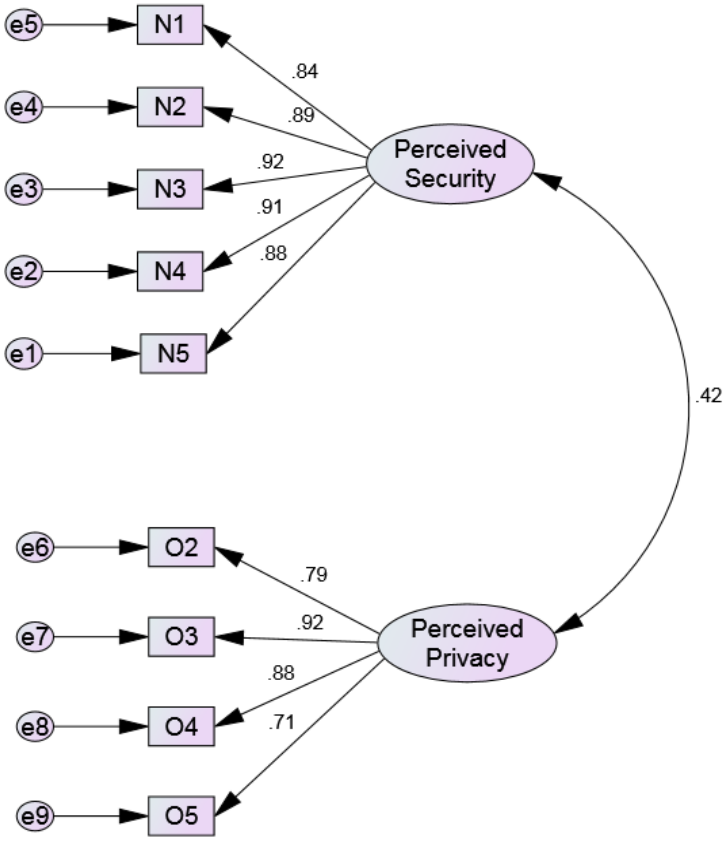

Figure 5.8
First-Order Model for Antecedents of Perceived Risk

Table 5.36
Convergent Validity for First-Order Model Antecedents of Perceived Risk

Construct	Items	Internal Reliability Cronbach's Alpha	Factor Loading	Average Variance Extracted	Composite Reliability
Perceived Security	N1	0.95	0.84	0.79	0.95
	N2		0.89		
	N3		0.92		
	N4		0.91		
	N5		0.88		
Perceived Privacy	O2	0.86	0.79	0.69	0.90
	O3		0.92		
	O4		0.88		
	O5		0.71		

Table 5.37
Discriminant Validity of Construct

Construct	1	2
Perceived Privacy (1)	**0.831**	
Perceived Security (2)	0.420	**0.843**

5.11.8 Second-Order Model of Perceived Risk

Figure 5.8 shows the second order model for antecedents of Perceived Risk. It is seen that the CMIN/df(ratio) is 2.823, CFI = 0.957, TLI = 0.949, and RMSEA = 0.078. Although the GFI value is lower than the recommend value of 0.90, Chang et al. (2005), Segars (2010), Hu et al. (2012) recommend to marginally accept it . Therefore, this study concludes that the data are appropriate for the measurement model.

In Table 5.38, the internal reliability Cronbach's alpha values are seen ranging from 0.86 to 0.95. The Convergent Validity was checked by aligning the AVE, factor

loading, and Composite Reliability. The factor loading values range from 0.71 to 0.92, The Composite Reliability values range between 0.90 and 0.95,and the AVE range between 0.69 and 0.79. The results reveal that all indicators satisfy their respective conditions. Further, Table 5.39 shows the Discriminant Validity and the results reveal that the AVE are greater than the square correlation value.

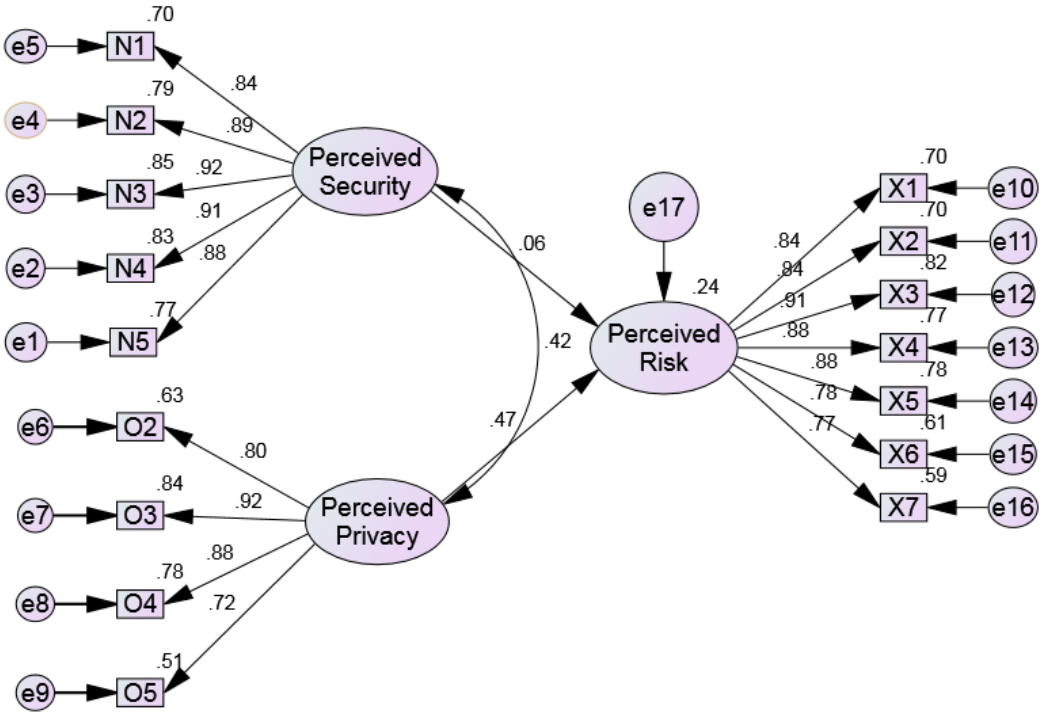

Figure 5.9
Second-Order Model of Perceived Risk

Table 5.38
Convergent Validity for Second-Order Model Antecedents of Perceived Risk

Construct	Items	Internal Reliability Cronbach's Alpha	Factor Loading	Average Variance Extracted	Composite Reliability
Perceived Security	N1	0.95	0.84	0.79	0.95
	N2		0.89		
	N3		0.92		
	N4		0.91		
	N5		0.88		
Perceived Privacy	O2	0.86	0.79	0.69	0.90
	O3		0.92		
	O4		0.88		
	O5		0.71		
Perceived Risk	X1	0.94	0.84	0.71	0.95
	X2		0.84		
	X3		0.91		
	X4		0.88		
	X5		0.88		
	X6		0.78		
			0.77		

Table 5.39
Discriminant Validity of Construct

Construct	1	2	3
Perceived Privacy	**0.831**		
Perceived Risk	0.491	**0.843**	
Perceived Security	0.420	0.254	**0.888**

5.11.9 First-Order Model of Perceived Trust

There are four items in the first order model for the antecedents of Perceived Trust after finalizing the results of EFA specified into measurement model visualized in Figure 5.10. The model consists of Disposition to Trust (P), Structural Assurance (Q), Perceived Competency (R), and Perceived Integrity (T). In Table 5.41, data is found good and fit the measurement model because all criteria are met (CMIN/df (ratio) = 2.711, p = 0.00, GFI = 0.899, CFI = 0.960, TLI = 0.952, and RMSEA = 0.075). The factor loadings range between 0.79 and 0.94,. Additionally, Composite Reliability

values range from 0.90 to 0.95, and the AVE range between 0.69 and 0.79 . This shows that all criteria meet their respective conditions. Meanwhile, he Discriminant Validity as shown in Table 5.41 reveals that the AVE (diagonal value) are higher than the squared correlation (off-diagonal value).

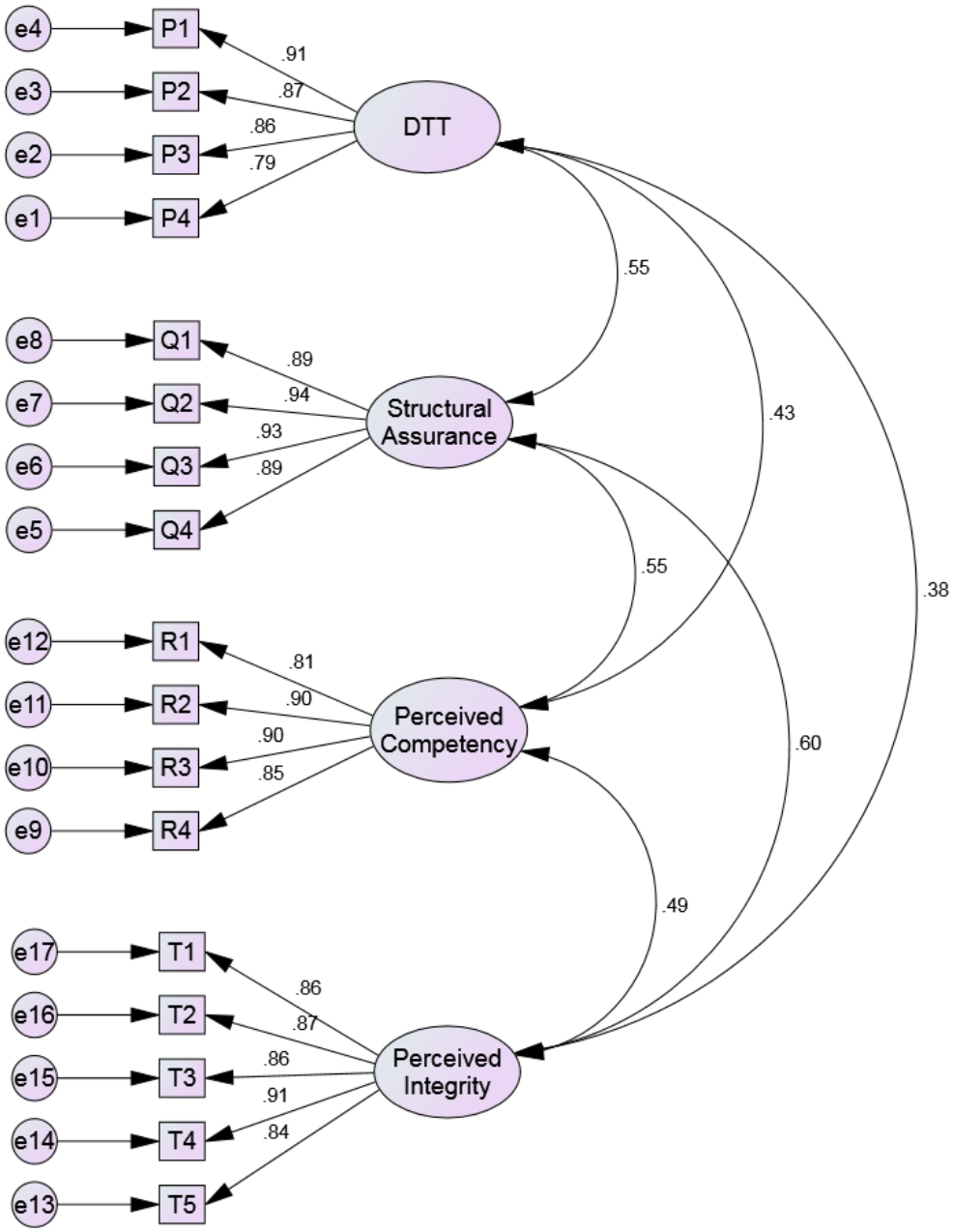

Figure 5.10
First Order Model of Antecedents of Trust

Table 5.40
Convergent Validity for First-Order Model Antecedents of Perceived Risk

Construct	Items	Internal Reliability Cronbach's Alpha	Factor Loading	Average Variance Extracted	Composite Reliability
DTT	P1	0.92	0.91	0.73	0.92
	P2		0.87		
	P3		0.86		
	P4		0.79		
Structural Assurance	Q1	0.95	0.89	0.84	0.95
	Q2		0.94		
	Q3		0.93		
	Q4		0.89		
Perceived Competency	R1	0.92	0.81	0.75	0.92
	R2		0.90		
	R3		0.90		
	R4		0.85		
Perceived Integrity	R1	0.94	0.86	0.76	0.94
	R2		0.87		
	R3		0.86		
	R4		0.86		
			0.91		
			0.84		

Notes : DTT = disposition to trust

Table 5.41
Discriminant Validity of Construct

Construct	1	2	3	4
Perceived Competency (1)	**0.867**			
DTT (2)	0.429	**0.856**		
Structural Assurance (3)	0.552	0.554	**0.915**	
Perceived Integrity (4)	0.490	0.378	0.599	**0.869**

5.11.10 Second-Order Model of Perceived Trust

The second order model for the antecedents of Perceived Behavioral Control determines the GFI, Convergent and Discriminant Validity. Figure 5.11 shows the model with criteria and their values (CMIN/df(ratio) = 2.188, CFI = 0.959, GFI = 0.889, TLI = 0.959, and RMSEA = 0.063). The results convey that the determine measurement model fits the data well.

The internal reliability Cronbach's alpha value was used to test the unidimensionality. The value range from 0.92 to 0.95, For the Convergence Validity, the factor loading values range from 0.79 to 0.93, the Composite Reliability values range between 0.92 and 0.96, the AVE range between 0.73 and0.84. Obviously, all criteria meet the conditions. Nevertheless, the Discriminant Validity as seen in Table 5.43 also meet the criteria since the AVE (diagonal value) are greater than the squared correlation (off-diagonal value).

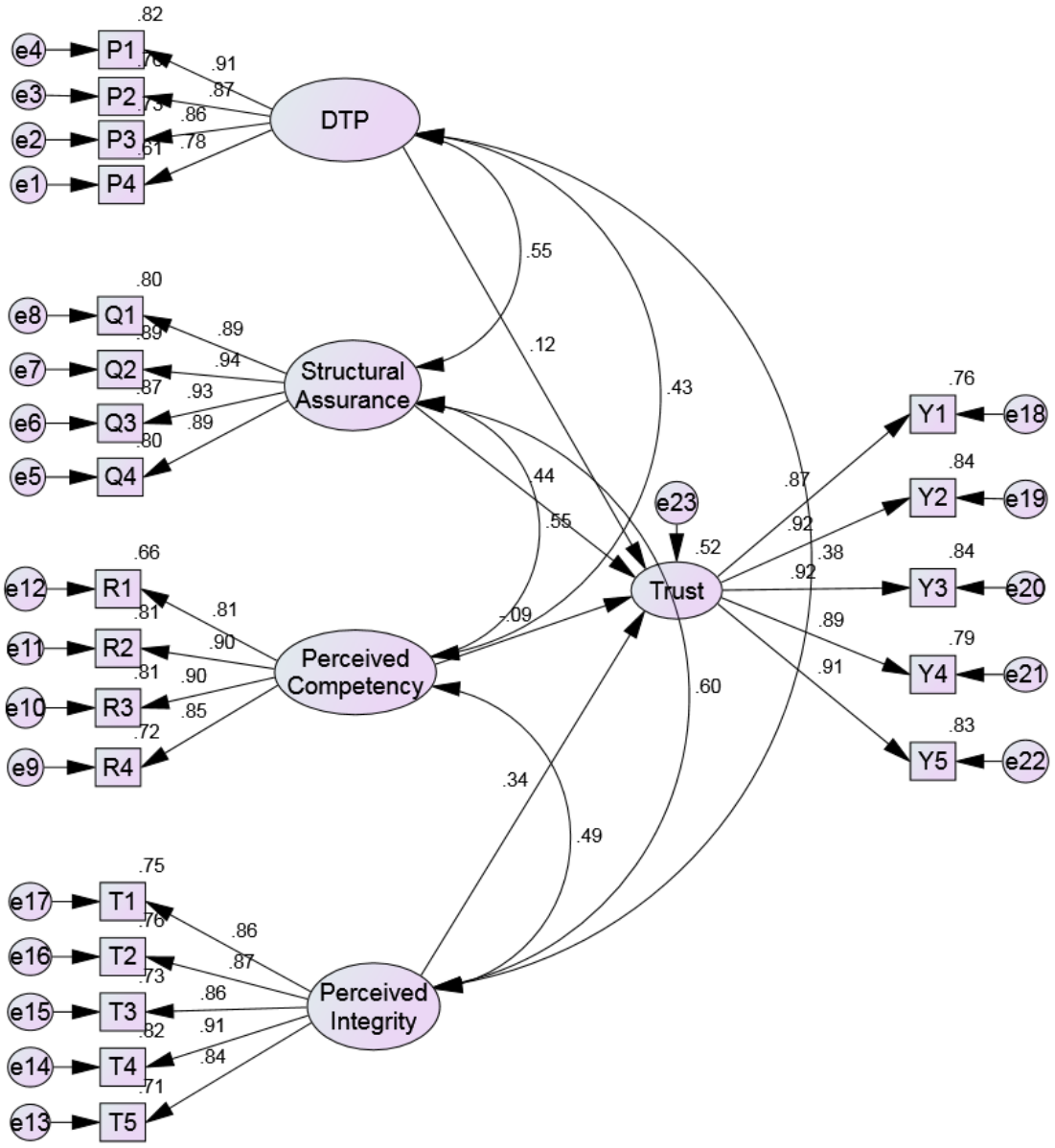

Figure 5.11
First Order Model on Perceived Trust

Table 5.42
Convergent Validity for Second-Order Model for Perceived Trust

Construct	Items	Internal Reliability Cronbach's Alpha	Factor Loading	Average Variance Extracted	Composite Reliability
DTT	P1	0.92	0.91	0.73	0.92
	P2		0.87		
	P3		0.86		
	P4		0.79		
Structural Assurance	Q1	0.95	0.89	0.84	0.95
	Q2		0.94		
	Q3		0.93		
	Q4		0.89		
Perceived Competency	R1	0.92	0.81	0.75	0.92
	R2		0.90		
	R3		0.90		
	R4		0.85		
Perceived Integrity	R1	0.94	0.86	0.76	0.94
	R2		0.87		
	R3		0.86		
	R4		0.86		
			0.91		
			0.84		
Trust	Y1	0.94	0.87	0.81	0.96
	Y2		0.92		
	Y3		0.92		
	Y4		0.89		
	Y5		0.91		

Table 5.43
Discriminant Validity of Construct

Construct	1	2	3	4	5
Perceived Integrity (1)	**0.870**				
DTT (2)	0.377	**0.856**			
Structural Assurance (3)	0.599	0.554	**0.915**		
Perceived Competency (4)	0.489	0.429	0.552	**0.867**	
Trust (5)	0.602	0.454	0.660	0.369	**0.902**

5.11.11 Measurement Model for Endogenous Variable

The model for endogenous variable consist of Behavioral Intention and Actual Use. The Composite Reliability for the two items are 0.68 and 0.97, exceeding the recommended value of 0.70. Besides, the AVE range from 0.52 to 0.85, also greater than 0.50. Similarly, the factor loadings are also greater than the threshold, with values 0.66 and 0.95.

Further, Figure 5.12 shows the model with good criteria (CMIN/df(ratio) = 1.383, CFI = 0.998, GFI = 0.986, TLI = 0.996, and RMSEA = 0.036). The internal reliability Cronbach's Alpha values range between 0.65 and 0.97. Although the is one alpha value less than 0.7, Santos (1999) recommends that it could be considered acceptable. For Discriminant Validity and for the items of Behavioral Intention, it is seen that the AVE value (0.85) is greater than maximum shared variance (MSV) value (0.11), and also the value of average shared variance (ASV) (0.11). Meanwhile, for items in Actual Use, the AVE (0.52) is also greater than the MSV (0.11) and the ASV (0.11). These results are exhibited in Table 5.44.

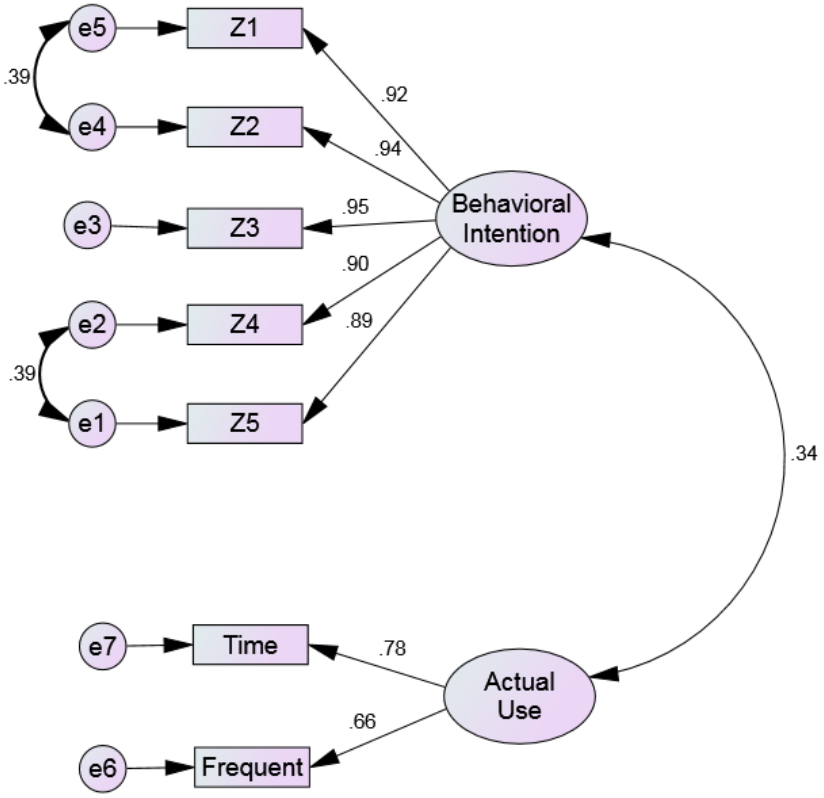

Figure 5.12
First Order Model on Behavioral Intention and Actual Use

Table 5.44
Convergent Validity for Behavioral Intention and Actual Use

Construct	Items	Internal Reliability Cronbach's Alpha	Factor Loading	Average Variance Extracted	Composite Reliability
Behavioral Intention	Z1	0.97	0.92	0.85	0.97
	Z2		0.94		
	Z3		0.95		
	Z4		0.90		
	Z5		0.89		
Actual Use	Time	0.65	0.78	0.52	0.68
	Frequent		0.66		

5.12 Structural Model Analysis

After the measurement models have been built,with the best fit model, the validity of convergent and discriminant satisfactorily, then the model was applied to the structure of the model. The structural model is constructed to answer the hypotheses in this study. The categorization of the constructs in this study consists of the endogenous variables, which are Behavioral Intention and Actual Usage Behavior and exogenous variable Attitude and its antecedents, which are Perceived Usefulness, Perceived Ease of Use, Compatibility, Perceived Image, Perceived Innovativeness, Perceived Enjoyment, and Perceived Complexity. For Perceived Behavioral Control, its antecedents are Resources and Self-Efficacy, while the antecedents of Subjective Norm are Friends, Family, and Media. The antecedents of Perceived Risk include Perceived Security and Perceived Privacy and the antecedents of Perceived Trust are Disposition to Trust, Structural Assurance, Perceived Competency, and Perceived Integrity.

Having run the test, the results show unsatisfactory outcome (Chi-square = 7166.046, p = 0.00, CMIN/df(ratio) = 1.900, CFI = 0.865, TLI = 0.860, and RMSEA = 0.055). Therefore the structural model was re-specified.

The re-specified model has been performed by deleting and dropping the items that have low factor loading and the items that have high value of modification index. Based on the results, the antecedent items that have low factor loading are Perceived Competency, Disposition to Trust, Structural Assurance, Perceived Complexity, Perceived Innovativeness, Perceived Image, Media, Perceived Enjoyment, Friends, and Perceived Security. Meanwhile, items that have high value of modification index are A2, B2, C2, F4, H4, J2, M2, M4, N2, P4, Q4, T5, W1, X1, X5, X6, Z5, Z1, Z3. Having deleted the appropriate items, the re-specified model is exhibited in Figure 5.13, while the full structured model is provided in Appendix F. When compared with MI values for all other parameter covariance error, these values are high and requires the re-specification. With this model, all criteria are found satisfying their respective conditions (Chi-square = 2630.846, p = 0.00, CMIN/df(ratio) = 1.942, CFI = 0.905, TLI = 0.900, and RMSEA = 0.056). This indicates a good fit. Furthermore, the other fit statistics indicate a more acceptable fit for the respecified model.

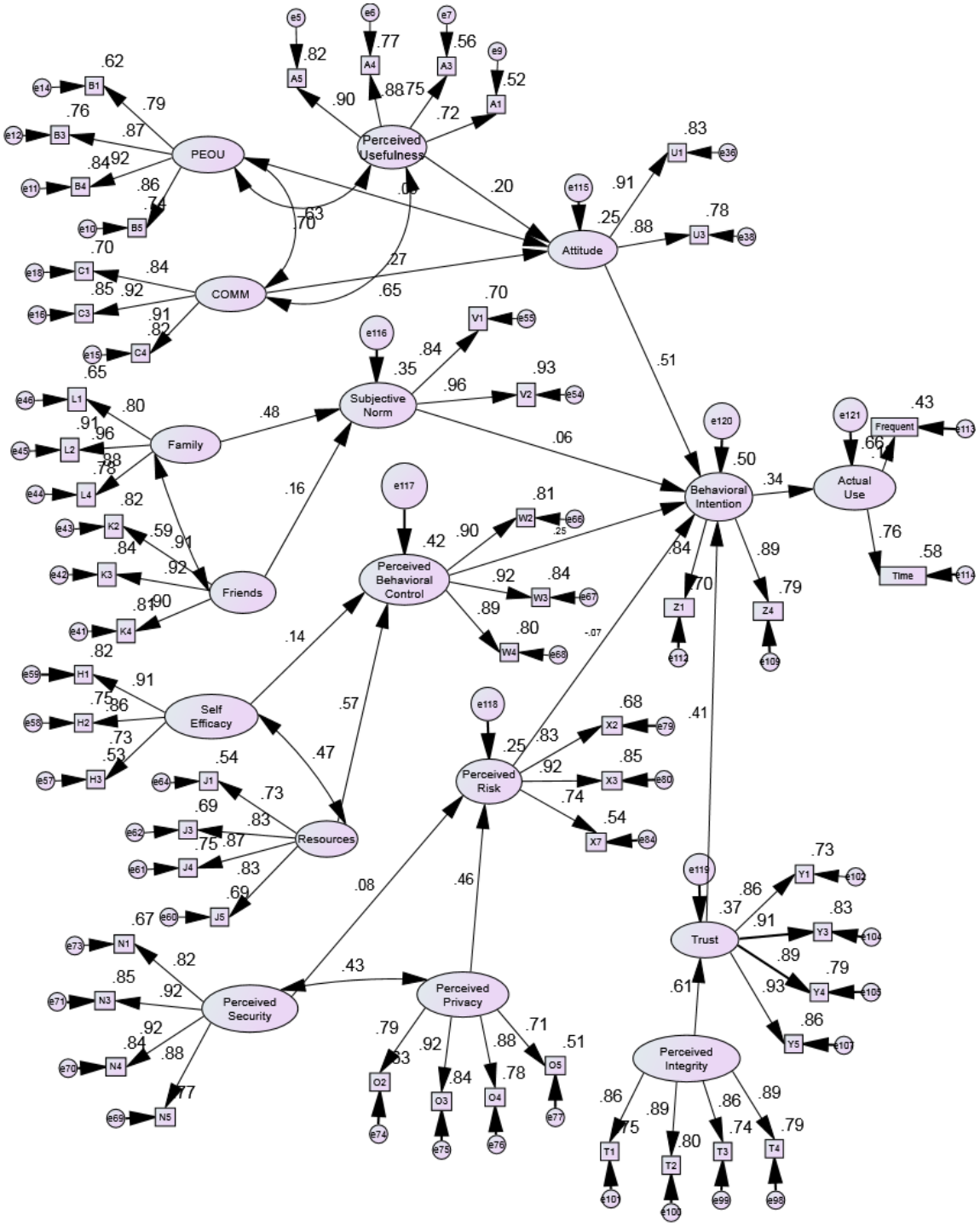

Figure 5.13
The Re-specified Model of Structural Model Analysis

5.13 Hypotheses Testing

After the results of structural model and goodness of fit model have been achieved, the next step is to test the hypotheses. The results of hypotheses testing enable this study to answer the second, third, and fourth research questions. The results also explain the relationship between variables and antecedents, which are Attitude , Perceived Behavioral Control, Subjective Norm, Perceived Risk, Perceived Trust and Intention To Use and Actual Use Behavior of mobile banking.

5.13.1 The Relationship between Intention to Use and Actual Use

Table 5.45 shows the result of hypothesis testing between Intention To Use and Actual Use. It is seen that Standardized Coefficient (β) = 0.341, Critical Ratio (CR) = 3.675, $p < 0.000$. Thus, H1 is supported.

5.13.2 The Relationship between Attitude, Subjective Norm, Perceived Behavioral Control, Perceived Risk, Perceived Trust and Intention to Use

The test of hypothesis for the relationship between Attitude and Intention To Use reveals that the relationship is supported., Obviously, β = 0.508, CR = 9.090, $p < 0.000$. Therefore, H2 is supported. Meanwhile for Subjective Norm, H3 is not supported because the results (β = 0.058, CR = 1.159, p = 0.246). reveal that Subjective Norm has no significant relationship with Intention To Use. Meanwhile, for Perceived Behavioral Control, the H4 is supported. Obviously the results (β = 0.251, CR = 4.934, $p < 0.000$) reveal a significant relationship. For the relationship between Perceived Risk and Intention To Use, H5 is not supported because the results

(β = -0.072, CR = -1.414, p < 0.157) reveal no significant relationship. Meanwhile, H6 is supported and conveys that there is a significant relationship between Perceived Trust and Intention To Use (β = 0.412, CR = 7.801, p < 0.000.

Table 5.45
Hypothesis Testing for Acceptance of Mobile Banking

Hypothesis	**Relationship between exogenous and endogenous variables**	**Standardized coefficient (β)**	**Critical Ratio (CR)**	***P* Value**	**Results**
H1	Actual Use <--- Behavioral Intention	0.341	3.675	0.000***	Supported
H2	Behavioral Intention <-- -Attitude	0.508	9.090	0.000***	Supported
H3	Behavioral Intention <--- Subjective_Norm	0.058	1.159	0.246	Not Supported
H4	Behavioral Intention<--- Perceived Behavioral Control	0.251	4.934	0.000***	Supported
H5	Behavioral Intention <--- Perceived Risk	-0.072	-1.414	0.157	Not Supported
H6	Behavioral Intention <--- Perceived Trust	0.412	7.801	0.000***	Supported

Note: *p<0.1, **p<0.05, ***p<0.001

Further, the squared multiple correlations in Table 5.46 reveal that 50% of Behavioral Intention can be justified by Attitude, Perceived Behavioral Control, Subjective Norm, Perceived Risk and Perceived Trust. Meanwhile. 11.6% of the actual construct, can be explained by Attitude , Perceived Behavioral Control, Subjective Norm, Perceived Risk, Perceived Trust and Behavioral Intention.

Table 5.46
Squared Multiple Correlations

Construct	Squared Multiple Correlations Value
Behavioral Intention	0.500
Actual Use	0.116

5.13.3 The Relationship between Antecedents of Attitude and Attitude

With reference to Table 5.47, the result of the relationship between the Antecedents of Attitude and Attitude reveal that Perceived Ease of Use has no significant relationship with Attitude ($\beta = 0.090$, CR = 1.009, $p = 0.313$). Therefore H7 is not supported. In contrast, Perceived Usefulness and Attitude has a positive relationship ($\beta = 0.200$, CR = 2.158, $p = 0.031$). Similarly, Compatibility and Attitude has a significant positive relationship ($\beta = 0.271$, CR = 3.265, $p = 0.001$). Accordingly, both H8 and H9 are supported.

Table 5.47
The result of Hypothesis Testing for Antecedents of Attitude and Attitude

Hypothesis	Relationship between exogenous and endogenous variables	Standardized coefficient (β)	Critical Ratio (CR)	*P* Value	Results
H7	ATT <--- PEOU	0.090	1.009	0.313	Not Supported
H8	ATT < --- Perceived Usefulness	0.200	2.158	0.031	Supported
H9	ATT <--- COMM	0.271	3.265	0.001	Supported

Note: PEOU = Perceived Ease of Use and COMM = Compatibility
*p<0.1, **p<0.05, ***p<0.001

5.13.4 The Relationship between Antecedents of Subjective Norm and Subjective Norm

The relationship between the Antecedents of Subjective Norm and Subjective Norm is positive and significant (β = 0.164, CR = 2.492, p = 0.013). It is also similar for family (β = 0.482, CR = 6.683, p = 0.000). Therefore, both H10 and H11 are supported as indicated in Table 5.48.

Table 5.48
The result of Hypothesis Testing for Antecedents of Subjective Norm and Subjective Norm

Hypothesis	**Relationship between exogenous and endogenous variables**	**Standardized coefficient (β)**	**Critical Ratio (CR)**	***P* Value**	**Results**
H10	Subjective Norm < --- Friends	0.164	2.492	0.013	Supported
H11	Subjective Norm < -- Family	0.482	6.683	0.000***	Supported

Note :*p<0.1, **p<0.05, ***p<0.001

5.13.5 Relationship between Antecedents of Perceived Behavioral Control and Perceived Behavioral Control

The relationship between the Antecedents of Perceived Behavioral Control and Perceived Behavioral Control is significant and positive. Self-Efficacy measures the level of confidence to use mobile banking services. The results reveal a significant positive relationship between Self-Efficacy and Perceived Behavioral Control ($\beta = 0.137$, $p < 0.001$). Thus, H12 is supported. Another antecedent item is Resources that measures the infrastructure to access the internet besides time and money. The results ($\beta = 0.574$, $p < 0.001$) determine that H13 is supported as outlined in Table 5.49.

Table 5.49
The result of Hypothesis Testing for Antecedents of Perceived Behavioral Control and Perceived Behavioral Control

Hypothesis	**Relationship between exogenous and endogenous variables**	**Standardized coefficient (β)**	**Critical Ratio (CR)**	***P* Value**	**Results**
H12	Perceived Behavioral Control < --- Self Efficacy	0.137	2.318	0.020	Supported
H13	Perceived Behavioral Control < -- Resources	0.574	8.906	0.000***	Supported

Note : *p<0.1, **p<0.05, ***p<0.001

5.13.6 Relationship between Antecedents of Perceived Risk and Perceived Risk

Referring to Table 5.50, H14 and H15 involve the new constructs introduced in this study. It is found that Perceived Security negatively influencing Perceived Risk (β = 0.076, CR = 1.215, p = 0.224). Only Perceived Privacy has significant positive relationship with Perceived Risk, (β = 0.464, CR = 6.941, p = 0.000). This indicates that H14 is not supported, while H15 is supported.

Table 5.50
The result of Hypothesis Testing for Antecedents of Perceived Risk and Perceived Risk

Hypothesis	Relationship between exogenous and endogenous variables	Standardized coefficient (β)	Critical Ratio (CR)	*P* Value	Results
H14	Perceived Risk <--- Perceived Security	0.076	1.215	0.224	Not Supported
H15	Perceived Risk <--- Perceived Privacy	0.464	6.941	0.000***	Supported

Note : *p<0.1, **p<0.05, ***p<0.001

5.13.7 Relationship between Antecedents of Trust and Perceived Trust

The relationship between the Antecedents of Trust and Perceived Trust shows only one items remain in the construct. It is also newly constructed in this study. The results reveal a significant positive relationship with Perceived Trust (β = 0.606, CR = 10.643; p = 0.000). Therefore, H16 is supported as indicated in Table 5.51.

Table 5.51
The result of Hypothesis Testing for Antecedents of Perceived Trust and Perceived Trust

Hypothesis	Relationship between exogenous and endogenous variables	Standardized coefficient (β)	Critical Ratio (CR)	*P* Value	Results
H16	Trust < -- Perceived Integrity	0.606	10.643	0.000***	Supported

Note: DTP = Disposition to Trust, *p<0.1, **p<0.05, ***p<0.001

5.14 Summary of Findings

From the beginning of the analysis, the early and late responses have no significant difference because the questionnaire was distributed and collected personally. The geographical distribution among them is adequately distributed with the main concentration on the four universities in Klang Valley Malaysia. After testing the reliability and the assumption for multivariate analysis were accomplished, descriptive tests were performed. The results reveal a low level of actual usage by university students, but at moderate level in intention to use the mobile banking. The level of actual use by referring to standard deviation reveals low actual use among the students in Malaysia. Additionally, the structural analysis with the use of SEM was designed to analyze the relationships between exogenous variables and endogenous variable. Having tested the hypotheses the summary exhibited in Table 5.52. Further, next chapter elaborates the results in relation with the context and implications to the theory.

Table 5.52
Summary of Hypotheses Testing

Hypothesis	Statement	Results
Hypothesis 1	Intention to Use mobile banking significantly affects the Actual Use of mobile banking	Supported
Hypothesis 2	Attitude significantly affects the Intention to Use mobile banking	Supported
Hypothesis 3	Subjective Norm significantly affects the Intention to Use mobile banking	Not Supported
Hypothesis 4	Perceived Behavioral Control significantly affects the Intention to Use mobile banking	Supported
Hypothesis 5	Perceived Risk negatively affects the Intention to Use mobile banking	Not Supported
Hypothesis 6	Perceived Trust significantly affects the Intention to Use mobile banking	Supported
Hypothesis 7	Perceived Ease of Use significantly affects the Attitude towards using the mobile banking	Not Supported
Hypothesis 8	Perceived Usefulness significantly affects the Attitude towards using the mobile banking	Supported
Hypothesis 9	Compatibility significantly affects the Attitude towards using the mobile banking	Supported
Hypothesis 10	Friends' influence the using of mobile banking significantly affects Subjective Norm	Supported
Hypothesis 11	Family influence the using of mobile banking significantly affects Subjective Norm	Supported
Hypothesis 12	Self-Efficacy significantly affects the Perceived Behavioral Control	Supported
Hypothesis 13	Resources significantly affects the Perceived Behavioral Control	Supported
Hypothesis 14	Perceived Security on mobile banking usage significantly affects the Perceived Risk	Not Supported
Hypothesis 15	Perceived Privacy on mobile banking usage significantly affects the Perceived Risk	Supported
Hypothesis 16	Perceived Integrity significantly affects the Perceived Trust	Supported

CHAPTER 6
DISCUSSION AND CONCLUSION

6.1 Introduction

This chapter is divided into six different sections. The chapter begins with a recapitulation of the objectives of the study in section 6.2. Next, section 6.3 discusses the findings of the study. Section 6.4 briefs on the contribution of the study, which includes on theoretical contribution, methodological contribution, and managerial contribution. Finally, Section 6.5 addresses the limitations and suggestions for future enhancement before Section 6.6 concludes the whole research.

6.2 Recapitulation of the Study

This study aim to review the intention of an individual to use mobile banking services and the connection with the actual usage behavior by using DTPB by Taylor and Todd (1995) as the underpinning theory. The theory hypothesizes three factors which are Attitude, Subjective Norm, and Perceived Behavioral Control. The theory further decomposes the three factors into specific beliefs.This study extends it by adding Perceived Trust and Perceived Risk as two new constructs. Their influence on Behavioral Intention and on the Actual Usage have been examined. Full time student of four local universities in Klang Valley, Malaysia involved in this study as the respondent.

The main purpose of this study is to analyze the level of actual usage in utilizing the mobile banking service. The second objective is to determine the relationship between Intention to Use and Actual Use Behavior. The third objective is to investigate the

relationship between Attitude, Subjective Norm, Perceived Behavioral Control, Perceived Risk and Perceived Trust influence the student's intention to use mobile banking. The fourth objective is to identify which are the antecedents factors that influence Subjective Norm, Attitude, Perceived Behavioral Control, Perceived Risk and Perceived Trust.

Data were collected through questionnaire, distributed among students of four public local universities in Klang Valley, Malaysia. In total, 800 questionnaire were distributed., Having administered the mechanism of return, 302 questionnaire were found usable (response rate is 37.7%) and proceed with the analysis.

Generally, factor analysis was conducted after gathering the data. Then, the EFA was performed to identify the underlying relationships between measured variables. Then, the reliability was measured by estimating the Cronbach's alpha value. The goodness of fit model was measured using CFA, the Convergent and Discriminant Validity. Lastly, the hypothesis testing was done by using SEM.

The first research question, on the level of Actual Usage, reveals the low level of usage among the university student. The returned questionnaire from respondents was from various levels of academic program, age and ethnicity. However, it shows a similar level of actual usage. Further, the second research question has been answered by the hypotheses that show positive significant relationship between Intention To Use and the Actual Usage Behavior. For the third research question, is justified by the hypothesis testing and shows that the Attitude, Perceived Behavioral Control and Perceived Trust are supported. Thus, there are positive significant relationship and are also significantly related to Intention To Use, except for Subjective Norm and Perceived Risk of which the result does not supported.

Meanwhile, the fourth research question, ten hypotheses has been tested and the result shows that only two hypotheses are not supported which is Perceived Ease of Use and Perceived Security while the other eight hypotheses (Perceived Usefulness, Compatibility, Friends, Family, Self-Efficacy, Resources, Perceived Privacy and Perceived Integrity) are supported. Therefore, there are significant positive relationship.

6.3 Discussion

Basically, this research analyzes on the factors influencing the acceptance of mobile banking services in Malaysia by basing on an extend DTPB by Taylor and Todd (1995). The Perceived Risk and Perceived Trust are newly added to this study as new constructs and with the antecedents and aimed at identifying and analyzing the influence to Intention to Use the mobile banking service. Students of four local public universities have provided the data.

6.3.1 Actual Use of Mobile Banking

The actual use of mobile banking was measured by the level of mobile banking usage among the university students. Regarding the first research question, the results reveal that the utilization of the mobile banking facilities was relatively at low level. Previously, the report by the Malaysia Communications and Multimedia Commission 2013, revealed that the lack of online banking service usage was due to lack of awareness by the public about the procedure of online banking especially on the phishing cases. Therefore, it is partly the reason of the low actual usage level. Besides, their initiative on public awareness programs and activities across the

country, especially to the young adults are also lacking. Nevertheless, Sathye (1999) discovered that the level of information that users have regarding mobile banking is one of the main factors affecting the acceptance and use of online banking. On the other hand, the adoption rate of an innovation could be determined by the level of customer awareness. Currently, the use of mobile banking services are new to many customers and therefore, banks need to create the awareness to impress their customers (Hurley, 1998).

On the other hand, this study is focusing on university student as the respondent and the report shows 26% of them are male , while another 74% are female. This is inline with the report of Ministry of Higher Education Malaysia (MOHE, 2012) the ration between female and male students in 2012 was 61% : 39%. Therefore, imbalanced between male and female might lead to differences in the actual usage levels between male and female. In terms of age, 83% of the respondents are below 26 years old. Hence, age can be considered as not affecting the level of usage because almost all respondents are of similar age group.

Meanwhile the study program that the respondents enroll is mostly Bachelor (77%), followed with master(11%), diploma (9%), and the least is PhD (3%) . Based on the result, it shows that student from bachelor degree program are found to have a higher usage level compared to other program. The variance is because of the fewer or less diploma programes are offered in the four universities. However, previous studies have proven that young consumer intention is more to adopt the technology (Rogers, 1995). Black, Lockett, Winklhofer, & Ennew (2001) had mentioned that highly educated mobile banking users of is influenced by the need to master the complexity of carrying out financial transactions through mobile channels. On the other hand, the

level of actual use in terms of ethnicity had shown that 83% is from malay student, 9% is from chinese, 4% is from india, and 3% is from other ethnics. The highest in ethnic was from Malay, nevertheless, all groups contribute to the usage of mobile banking.

The overall result of the level of actual use of the student shows almost significant in every category. This is similar with the previous studies, that young users have a tendency to accept innovations such as internet banking (Polatoglu & Ekin, 2001; Ainin Sulaiman, 2007). Therefore, practitioners from industry should consider to aggresively promote their mobile banking services to university students.

6.3.2 The Relationship between Intention to Use and Actual Use

The second research question, "does Intention To Use influence Actual Use Behavior of mobile banking and whether Intention To Used have a significant relationship with actual use?" is answered by the results of hypothesis 1.

Hypotheses 1: Intention To Use mobile banking significantly affects the Actual Use of mobile banking.

The results reveal that Behavioral Intention has a positive significant relationship with Actual Use Behavior ($\beta = 0.34$, $p < 0.001$). Previous studies have focused on Behavior Intention or Behavior Intention to Use and interpreted in relation with the context of the study. It is known that TPB and TAM were developed as an extended TRA by Ajzen and Fishbein (1980). TRA is understood as a normal structure, developed to clarify almost all persons' behavior and according to the importance of a person's beliefs for indicating behavior (Fishbein& Ajzen, 1975b). In addition, in the study of information systems, it is proven that intention is a predictor for the use of

technology (e.g. Davis, 1989a; Taylor & Todd, 1995; Venkatesh et al., 2000). Meanwhile, the relationship between Intention To Use and Actual Use Behavior have also been found in other studies (Pedersen, 2005; Sek, Lau, Teoh, Law, & Parumo, 2010; Shin, 2009). As the respondents have had good experience at mobile banking, the significant results of this study have nothing to doubt. Thus, the effect of Behavioral Intention is more on the predictions of behavior if individuals have had experience with behavior (Taylor & Todd, 1995).

After all, the banks should concentrate with the customer intention, who can confirm that they will be influenced by Attitude , Perceived Behavioral Control, Subjective Norm, Perceived Behavioral Control, Perceived Risk, and Perceived Trust which will cultivate their intention to use and thereafter commit to the actual usage behavior.

6.3.3 The Relationship between Attitude and Intention to Use

The relationship between Attitude and Intention To Use is answerable through hypothesis 2.

Hypotheses 2: Attitude significantly affects the Intention To Use mobile banking.

Attitude refers to the positive or negative individual awareness of doing the target behavior (Ajzen, 1991a). In this study, it refers to the customer attitude towards using the mobile banking services. Attitude ($\beta = 0.51$, $p < 0.000$) was found to have a significant positive relationship with intention to use mobile banking. It agrees with prior studies in information system (e.g., Chang & Cheung, 2001; Davis, 1989a; Harrison, Mykytyn, & Riemenschneider, 1997; Mathieson, 1991; Taylor & Todd, 1995) and internet banking (e.g. Khalil & Pearson, 2008; Suh & Han, 2002; Liao,

Shao, Wang, & Chen, 1999). Particularly, it implies that individual attitude significantly influences intention to use of the technology.

The results also show that positive attitude should be developed before the technology can be accepted. This study decomposes the Attitude construct (i.e. Perceived Usefulness, Perceived Ease of Use and Compatibility). This factor can be used by the banks as a tool to gain a positive attitude from their customers. For such reason, communication is important to alert the bank's customer on the benefits of using mobile banking. The front line staff, especially, needs to communicate with their customers besides any other promotion and advertising. The banks can also use the ATM to advertise and promote their mobile banking. Besides, the ATM withdrawal slip can also be used as an advertisement to introduce the product features and the benefit. The banks should create the awareness by selling their product to their staff as to gain better results. They should also know their customer attitude and to understand their customer needs before influencing them to use the technology. Thus, it will create a high intention to use the mobile banking services. Previously, Suki (2011) also found that technology significantly affects the attitude to the intention to use the technology. Hence, banks have to realize that young customers are the potential market segmentation for them in short and longer tenure. Therefore, understanding the consumer's attitude will assist them to further market and improve their products and services.

6.3.4 The Relationship between Subjective Norm and Intention to Use

The following hypothesis are measuring the relationship between Subjective Norm and Intention To Use.

Hypothesis 3 : Subjective Norm significantly affect the Intention To Use mobile banking

Ajzen and Fishbein (1980) define Subjective Norm as the social pressure that may affect a person's intention to perform. Subjective Norm construes the social pressures that may affect the individual's intention to perform. In this study, it consist of friends and family. The results ($\beta = 0.05$, $p>0.10$) show that it does not significantly affect the intention to use mobile banking. Therefore, H2 is not supported.

A few studies have also found similarly, that Subjective Norm has no significant effect on Behavioral Intention (e.g. Chau & Hu, 2001; Davis, 1989a; Hsu, Wang, & Wen, 2006; Mathieson, 1991). In fact, Taylor and Todd (1995) had discovered that inconsistency of the results have been obtained by a number of previous studies, such as those resulting in the use of student subject, real perception consequences related to the behavior targeted can be too influenced by others including professors and friends. This means that professional character may partly explain subtle effects observed of the Subjective Norms on Behavioral Intentions. The students in this study are young generation who are eager to explore new things, especially on the new features of information technology, which can be easily downloaded from their mobile devices and will explore to get further information without seeking help from their friends or family.

However, there are also prior studies that support the relationship between Subjective Norm and Intention to Use especially in information related literature (e.g. Bhattacherjee, 2000; Harrison, Mykytyn, & Riemenschneider, 1997; Taylor & Todd, 1995; Venkatesh, 2000). The studies revealed that Subjective Norm does have a direct significant positive relationship with Intention to Use the technology. In fact, they

also concluded that with the family, friend, and colleague, the banks can promote the technology through referral campaign.

6.3.5 The Relationship between Perceived Behavioral Control and Intention to Use

The fourth hypothesis is to answer the second research question on the relationship between Perceived Behavioral Control and Intention To Use.

Hypothesis 4: Perceived Behavioral Control positively affects the Intention To Use the mobile banking.

The results ($\beta = 0.25$, $p < 0.000$) prove a positive significant relationship between Perceived Behavioral Control and Intention To Use. Perceived Behavioral Control refers to the respondent's perception regarding the access and opportunities towards using the technology. It is consistent with the findings in the previous studies (e.g. Bhattacherjee, 2000; Harrison, Mykytyn, & Riemenschneider, 1997; Liao et al., 1999; Khalil& Pearson, 2008, Taylor & Todd, 1995). Additionally, the results also suggest that the consumers are interested to log-in when they belief they have the capability to use internet banking. The decomposition of Perceived Behavioral Control consist of Self-Efficacy and Resources. The two factors should be noticed by the banks to attract more users of mobile banking. The Perceived Behavioral Control in this study anticipates that they will engage in the mobile banking if they believe that they have a confidence in using the technology. With the beliefs, they will feel confident to use it by themselves. They will also perform their behavior if they have the necessary resources to access to a mobile banking through their mobile phone with internet connection availability. These findings also imply that to use technology such as

mobile phones marketing, the level of control an individual can directly impact aims to use technology (Ramayah et al., 2009).

On the contrary, there are also studies that found Perceived Behavioral Control does not significantly influence the Behavioral Intention (e.g. Hung, Ku, & Chang, 2002; Teo & Pok, 2003; Khalifa & Shen, 2008), partly because the effect of Perceived Behavioral Control might be different that time compared to those studies. The banks should deliver a good service to their customer, guide and convince them on the benefit of using mobile banking.

Nevertheless, the significant result of the effect of Perceived Behavioral Control signifies that resources and ability to use the mobile banking are important in determining the intention to use the technology.

6.3.6 The Relationship between Perceived Risk and Intention to Use

The following hypothesis answers the second research question on the relationship between Perceived Risk and Intention To Use.

Hypotheses 5 = Perceived Risk negatively affect the Intention To Use mobile banking

The Perceived Risk in this study consists of Perceived Privacy and Perceived Security. The results ($\beta = -0.07$, $p > 0.10$) reveal a insignificant relationship between Perceived Risk and Intention to Use, therefore hypothesis 5 is not supported. Perceived Risk is commonly thought as a negative consequence of uncertainty in using the product or service (Featherman & Pavlou, 2002). are few studies have also

found that it has a significant negative relationship with intention to use mobile banking services (e.g. Wu, & Wang, 2005; Chen, 2008). As mentioned earlier, Perceived Risk consists of Perceived Privacy and Perceived Security. The hypothesis for Perceived Privacy results in a significant affect to the Perceived Risk. Meanwhile Perceived Security reveals an insignificant result.

In contrast, some studies have previously indicated that security issues were not seen by the client as a major obstacle in the banking transactions (Laukkanen & Lauronen, 2005; Suoranta, 2003). Therefore, the Perceived Risk can be assumed as partially supported. As the respondents in this study are university, they might have not been exposed to the real risk situation. They might feel secured because they have just seldomly engaged in a huge amount of transactions. More or less the purpose of using mobile banking is for mobile top-up and a few checking of their accounts. Compare with the heaviest transaction users, the customer will always perform their transaction whether personal or business activity, which involve a large transactions and huge balance in their account. Thus, for this type of customers, they might think the security is one of the crucial issues need to be improved by the banks. Besides, the young generation is more alert and concern is on their privacy matter. They have less information and alert on their security, but more concern on their privacy.

6.3.7 The Relationship between Perceived Trust and Intention to Use

Perceived Trust results in positive significant relationship ($\beta = 0.41$, $p < 0.001$). Thus, the hypothesis is supported. According to Bromiley and Cummings (1995), trust has to be understood as a belief in an individual (or common belief within the group) that, when another individual (or group) makes an effort to act in agreement with any

promise that outright or implied, he is honest in the early discussions about it, and he does not push the unjustified benefits from others even when there is a chance. It agrees with the previous studies (such as McKnight et al. 2002; Gefen, 2000; Mayer, Davis, & Schoorman, 1995b) that have found significant results in online users acceptance. Similarly, Jarvenpaa et al. (1999) in his study of consumer trust in an internet store also found to have a similar result of trust.

Trust is a necessity in social behavior, especially on important decisions. Based on the literatures, risk and trust are two important causes of intention behavior for people to carry out activities that involve risk (Gefen, 2000). Theoretically, trust needs to be recognized as one of the critical factors in e-commerce or online acceptance. This study matches with other studies especially in the acceptance of online product (such as Tan & Teo, 2000; Jarvenpaa et al., 1999). In fact, the inadequacy of trust is one of the reasons for consumers to refuse mobile banking (Lin, 2011). Sanayei and Shaemi (2011) when studying mobile banking in Isfahan also found a positive significant result.

Mobile banking is currently in its infancy stage of adoption. Hence, users who are not clear on the technical capabilities of their banks need to afford for the mobile banking services and on the reliability and security of the line and wireless communication channels in providing their conscious transaction data, among other things. This is because the mobile banking activities are performed through online and will be processed virtually. Therefore, the consumer will feel doubt whenever they log-in to the system with personal information being processed either promptly or can it be stolen by the online hackers. Therefore, it requires a high level of trust before they can accept and use the mobile banking system. Moreover, the amount of services and

products offered via the internet grows rapidly, thus, customer will be more concerned about privacy and security issues (Jahangir & Begum, 2008).

This implies that banks should prioritize this issue if they want to improve their customers intention. The strategies to protect and prevent the customer record and need to frequently review in terms of transaction account verification, or the banks can add more security question especially when involved third party or any inter-bank account transfer.

6.3.8 The Relationship between Perceived Ease of Use, Perceived Usefulness, Compatibility and Attitude

The antecedents of Attitude consist of Perceived Ease of Use, Perceived Usefulness, and Compatibility. The next hypothesis is to examine the antecedents of Attitude and also to answer the third research question, to identify which of the antecedent factors influences the Subjective Norm, Attitude , Perceived Behavioral Control, Perceived Risk, and Perceived Trust.

6.3.9 The Relationship between Perceived Ease of Use and Attitude

The followings are the discussion on Perceived Ease of Use and the relationship with Attitude . It is able to answer the third research question.

Hypothesis 7: Perceived Ease of Use significantly affects the Attitude towards using the mobile banking.

Perceived Ease of Use is defined as the extent to which individuals are seen using a simple system with hassle free. If an individual perceives the system is simple, he or

she is most probably happy to use the system, particularly among new users (Sek et al., 2011). Perceived Ease of Use as mentioned by Davis (1989a) is the extent to which a person believes that learning to adopt new technology needs just a little effort (Davis et al., 1989a). The results (β = 0.09, p value = 0.313) show that it does not significantly affect the attitude towards using the technology. Thus, hypothesis 7 is not supported. However, there are previous study that have discovered significant result on Perceived Ease of Use (e.g. Chen, Gillenson, & Sherrell, 2002; Karahanna, Straub, & Chervany, 1999a; Khalil& Pearson, 2008; Taylor & Todd, 1995).

This study found an insignificant result because the data are gathered from university students. The young generation prefers to explore new technology without any guidance. They learn on their own and become skillful in a short tenure. This finding is also significant with Lu et al. (2009), that young consumers treat mobile technology as easy to operate. Thus Perceived Ease of Use has no significant effect on Attitude(Wei, Marthandan, Chong, Ooi, & Arumugam, 2009).

6.3.10 The Relationship between Perceived Usefulness and Attitude

The third research question requires an investigation into the relationship between Perceived Usefulness and Attitude . The results (β = 0.20, p < 0.10) prove a significant positive effect on attitude towards using mobile banking services. Thus, hypothesis 8 is supported.

Hypotheses 8: Perceived usefulness significantly affects the Attitude towards using the mobile banking.

Perceived Usefulness is defined as the extent to which a person trusts that using a particular system will enhance the performance of his or her work. Practical studies have shown that Perceived Usefulness has a greater impact on usage than Perceived Ease of Use (Sek et al., 2011), while several studies have found that it impact on Attitude greatly (e.g. Bhattacherjee, 2000; Khalil& Pearson, 2008; Plouffe, Hulland, & Vandenbosch, 2001). In information system, it has also been found significantly positivly effecing on Attitude (e.g. Horton, Buck, Waterson, & Clegg, 2001; Morris, 1997; Taylor & Todd, 1995).

Generally, the significant effect of Perceived Usefulness on Attitude has been expected as there are wealth benefits of using mobile banking. As an example, consumers can save a lot of time without needing to visit the bank for a single transaction. Consequently, they can save energy, money, and any other cost incurred in the old traditional counter service. The concept of easy, fast and convenient banking, makes sense, especially for those who stay away from their bank or the bank branches. The banks also gain various benefits from mobile services when less customers visit their counter. For instance, they can reduce the counter service staff and can effectively and productively reduce operational cost. Hence, it is obvious that banks should aggressively promote and gain the consumer's positive attitude in using the mobile banking service.

Liao, Tsou, and Huang (2007) had stressed that individuals will prefer more to accept new technologies if it can benefit and give a value to them. Thus, it is proven that Perceived Usefulness is important in influencing the consumer attitude. Focusing on usefulness is important because it has been proven that the active use of mobile technology is motivated by the usefulness of the nature of mobile service such as

personalization, ubiquity, localization, network stability and timeliness (Wong & Hiew, 2005).

6.3.11 The Relationship between Compatibility and Attitude

Hypotheses 9 invokes the following discussion as a response to the third research question.

Hypotheses 9: Compatibility significantly affects the Attitude toward using the mobile banking.

Compatibility refers to the extent to what innovation is seen as consistent with the past experience, existing values, and require of individuals (Rogers, 1995). The results support the hypothesis nine ($\beta = 0.27$, $P < 0.001$), which implies Compatibility significantly positively affects the Attitude towards using mobile banking. Compatibility also refers to the degree to justify customer trust that mobile banking can be incorporated into their daily lives. Similar result has been found in works by Chen et al. (2002), KhalilandPearson (2008), and Tan and Teo (2000). The young generation expects something new that will equip and suite their needs and lifestyle. If possible, the features have to also be attractive, new design and concept, so that they are attracted to. Also, Compatibility has been acknowledged as a basic factor that determines the use of innovation (Kleijnen et al., 2004; Rogers, 1995).

In fact, Compatibility has been proven a the most important determinant in the use of technology (Mallat, Rossi, Tuunainen, & Öörni, 2006), besides being acknowledged as related with adoption of technology (Agarwal & Prasad, 1998; Black et al., 2001). In the context of this study, the young generation concern with the fast and easy way

if they want something different. Thus, the result of this study, recommends that Compatibility is important in order to get a significant attitude, especially among young consumers because it ensures something fits their lifestyle.

6.3.12 The Relationship between Family, Friends and Subjective Norm

Hypotheses 10 and 11 are discussed in this section to answer the third research question, on what will be the most influencing antecedent factors on Subjective Norm, Attitude, Perceived Behavioral Control, Perceived Risk, and Perceived Trust. Family and Friends are the dimensions of Subjective Norm.

Hypotheses 10: Friends influence on mobile banking significantly affects Subjective Norm.

Hypotheses 11: Family influence on mobile banking significantly affects Subjective Norm.

Friends influence refers to any person which is known to the customer and has a direct contact with the customer. The influencing factors could be in terms of opinion of the relatives, friends, and superiors. They could interfere the user's intention to practice and use mobile banking services (Carlsson, Carlsson, Hyvönen, Puhakainen, & Walden, 2006). Meanwhile, Family refers to individual's kin and it can be any person in the family consisting of parents and siblings. The opinion of important possible referents is the basis for the user's feeling related to utility innovations (Rao & Troshani, 2007). The results support the hypothesis for Friends ($\beta = 0.16$, $p < 0.05$) and for Family ($\beta = 0.48$, $p < 0.001$), which imply that they have significant positive relationships with and affecting Subjective Norm. Thus, hypotheses 10 and 11 are

supported, which is consistent with findings in the previous studies (Hsu, Wang, & Wen, 2006c; Khalil& Pearson, 2008). The results convey that friends and family are significantly positively related with Subjective Norm.

The importance of these reference group has also been emphasized by Hsu, Lu, and Hsu (2008), who discovered that people put confidence in decision making with the support of their family and friends. It has been proven and significant with this study that this group can influence others who have closed relationship with them to accept the mobile banking. Thus, they will definitely introduce the product to their family members and friends. Similarly, in Malaysian context, Chong et al. (2010) also confirm that friends and family influence the influential individual decisions to adopt technology. Accordingly, banks need to strategize their promotional activities to increase increase their mobile banking users.

6.3.13 The Relationship between Self-Efficacy, Resources and Perceived Behavioral Control

The third research question is continued with the discussion on the answers to Hypotheses 12 and 13 on the antecedent factors that influence Perceived Behavioral Control.

Hypotheses 12: Self-Efficacy significantly affects Perceived Behavioral Control

Hypotheses 13: Resources significantly affect Perceived Behavioral Control

The results for Hypothesis 12 ($\beta = 0.13$, $p < 0.001$)reveal a positive significant relationship, thus it is supported. Similarly, Hypotheses 13 is also supported because the results ($\beta = 0.574$, $p < 0.001$) reveal a significant relationship with Perceived

Behavioral Control. This agrees the findings in previous studies on information technology (e.g. Bhattacherjee, 2000; Taylor & Todd, 1995). Self Efficacy is defined as disclose to individual confidence of their capability to conduct tasks that have been identified and are expected to influence the work effort, perseverance, real interest, and preferred path of difficulty (Bandura, 1977). This findings suggest that the efficacy may affect the individual perception and then will affect the intention to use the technology. Besides, Khaliland Pearson (2008) found that individuals with have a high self-confidence and hold the control of their intention to use technology. When individuals have a high level of self-efficacy, they tend to use technology because they are not afraid of challenges and overcome difficulties, so they can easily use technology (Chong et al., 2010).

A study by Venkatesh et al. (2000), found that the element of Perceived Ease of Use and revealed that individual computer self-efficacy is a strong element of Perceived Ease of Use, while objective usability influences ease of use only after having an experience when used the system. In addition, Venkatesh et al. (2000) identified that a training mechanism built to enhance the self ability, the user on the computer is more likely to have an acceptance of the user. The respondents in this study are younger users which have no issue to explore the new technologies. Therefore, it can motivate them to use the mobile banking services. This is because the self-efficacy is a set of self belief that users believe in their own ability to do things effectively (Chong et al., 2010).

The banks should provide and deliver opportunities for their customers to venture into mobile banking services. When customers are not familiar with the system, the banks should guide them, demonstrate and brief them on how to encounter problem

happened during the transaction icluding on how to secure their transaction with the assistance of the bank's support team. According to Bandura (1995), people who have a high ability tend to do related behavior compare those with low self-efficacy. Thus, if we need to increase the Perceived Behavioral Control, the Self-Efficacy need to be improved accordingly.

Meanwhile, Resources in this study refers to the amount of resources or opportunities that person in possession or a user will face in using mobile banking services. In this study, resources refers to the belief that the required any other resources (i.e. money, time, etc.) that are needed to performed mobile banking activities. Also, it refers to the beliefs on the availability of resources that should be available in order to perform specific behavior (Triandis, 1980). This study is consistent with previous research (e.g. Bhattacherjee, 2000; Taylor & Todd, 1995) and shows that the influence of external factors (i.e., the availability of resources) can affect a person's perception of the individual facilities or difficulty involved in online banking.

6.3.14 The Relationship between Perceived Security, Perceived Privacy and Perceived Risk

The third research question continues in this section with the relationship between Perceived Security, Perceived Privacy, and Perceived Risk. Accordingly, Hypotheses 14 and 15 are discussed.

Hypotheses 14: Perceived Security on mobile banking usage significantly affects Perceived Risk.

Hypotheses 15: Perceived Privacy on mobile banking usage significantly affects Perceived Risk.

Privacy and security concerns are essential to the success of e-commerce and e-banking (Ratnasingham, 1998; Cheng, Lam, & Yeung, 2006; Lee, 2009; Zhou, 2011). They are two important dimensions that may affect users' intention to adopt e-based transaction systems (Poon, 2008b). The results for Perceived Security show a non-significant effect ($\beta = 0.07$, $p > 0.10$), therefore Hypothesis 14 is not supported. Meanwhile, Hypothesis 15, for Perceived Privacy has been found to have positive significant relationship ($\beta = 0.46$, $p < 0.001$), and is supported.

The significance of Perceived Privacy and Perceived Security for online banking acceptance has been noted in various studies in banking (e.g. Howcroft et al. 2002; Tan & Teo 2000; Sathye 1999). However, this study finds only Perceived Privacy has a significant positive relationship with Perceived Risk. As discussed earlier, perhaps this is influenced by the nature of the respondents, who are full time students. They may have been using limited online transactions and prepaid top-up only. In such situation, they may have not been exposed to the real risk situation. They might feel secure because of seldomly engaged in a huge amount of transactions.

The Perceived Privacy issue involves with personal data, in which it has to be safeguarded (Chen, 2008). In fact, in Malaysia the Banking and Financial Institution Act 1989 (BAFIA) has merged with Financial Institutional Act (FSA) and Islamic Financial Services Act (IFSA) to protect the consumers' rights. The FSA and IFSA are the culmination of efforts to modernize the laws that govern the conduct and supervision of financial institutions in Malaysia to ensure that these laws continue to be relevant and effective to maintain financial stability, support inclusive growth in the financial system and the economy, as well as to provide adequate protection for consumers. The FSA and IFSA amalgamate several separate laws to govern the

financial sector under a single legislative framework for the conventional and Islamic financial sectors respectively, namely, the Banking and Financial Institutions Act 1989 (BAFIA), Islamic Banking Act 1983, Insurance Act 1996 (IA), Takaful Act 1984, Payment Systems Act 2003 and Exchange Control Act 1953 which are repealed on the same date (Bank Negara Malaysia, 2013).

The result of this study is based on the students' feedback represent for the young generation. More effort needs to be done by the banks' if they need to gain a support from a young generation in term of promotion and marketing activities.

6.3.15 The Relationship between Perceived Integrity and Perceived Trust

The final hypothesis is to answer the third research question on what will be the most influencing antecedent factors that influence Subjective Norm, Attitude , Perceived Behavioral Control, Perceived Risk, and Perceived Trust. Therefore, the discussion of the hypothesis is provided.

Hypotheses 16 : Perceived Integrity significantly affects the Perceived Trust

The result (β =0.60, p <0.001) prove a positive significant relationship between Perceived Integrity and Perceived Trust, and recommend to accept Hypotheses 16. Integrity means that the trustor believes that trustees make good faith agreement, telling the truth, behave ethically and meet the promises (Khalil& Pearson, 2008). The relationship between integrity and trust involve perception in trustor, that the trustee has to comply with a set of principles which the trustor finds acceptable (Mayer, Davis, & Schoorman, 2014). In addition, they suggest that integrity is very important to the formation of the initial trust in a relationship. Trusting belief integrity means of

safely trust other people making agreement in good faith, speak the truth, and fulfill the promise (Bromiley& Cummings, 1995). This will reflect the belief that internet vendors will come through on their promises, such as to produce goods or services or to ensure the protection of personal information. According to Mcknight and Chervany (2001a), belief-integrity is a the value of neutral, so that vendors trust predictably do things whether good or bad in the future.

Therefore, to retain a customer, whether new or existing customer, the bank should ensure truthful in their dealings, maintain their commitment, behave ethically and meet promises to make secure online services.

6.4 Implication of the Study

This study contributes to the body of knowledge as well as to the practitioners who are operating mobile banking services.

6.4.1 Theoretical Implication

This study analytically supports the DTPB by Taylor and Todd (1995) as well as TPB to offer some contributions to the existing literature in to body of knowledge. Firstly, this study extends new construct namely Perceived Risk and Perceived Trust into the model. The results show that Perceived Risk and Perceived Trust are important determinants of the acceptance of mobile banking. This suggests that the inclusion of risk and trust is seen as one of the determinants of acceptance of mobile banking services is appropriate. The findings reveal that Perceived Risk and Perceived Trust are important factors to avoid the distortion of Behavioral Intention to accept mobile

banking. Accordingly, it is recommended that Perceived Risk and Perceived Trust are considered when studying mobile banking adoption in the future.

Secondly, the results reveal that Attitude , Perceived Behavioral Control, and Subjective Norm have significant effects on Behavioral Intention to use mobile banking. This study also recognized the efforts undertaken by previous researchers in adopting profound theories from fields such as social psychology and applied in the field of information systems indirectly.

Thirdly, this study decomposes the main beliefs (i.e. Perceived Behavioral Control, Attitude , Subjective Norm, Perceived Risk and Perceived Trust) into multi-dimensional constructs. This study has proved that all of the antecedent factors have been accepted except for Subjective Norm, one of the antecedents of Attitude (i.e. Perceived Ease of Use), and one of the antecedents of Perceived Risk (i.e. Perceived Security). The results of this study can be used for future studies in mobile banking by understanding the influencing factors in the intention to use mobile banking or any other studies especially in information technologies.

Fourthly, to the knowledge of the researchers, this study is one of the first to use the DTPB in determining the acceptance of mobile banking research in Malaysia. In addition, using the DTPB in other cultural settings such as Malaysia has also contributed towards expanding the existing body of knowledge related to this theory.

Finally, this study contributes to the existing literature on mobile technology, on the behavior of the actual use by providing insights from the perspective of Malaysia.

6.4.2 Practical Implication

This study has also contributed to the practitioners in related fields. It has been discussed throughout the discussions on the hypotheses testing and briefly summarized. The positive significant result of Attitude on mobile banking should take place prior to the acceptance of the technology. The antecedents of Attitude: Perceived Ease of Use, Perceived Usefulness, and Compatibility are very significant in developing positive attitude towards using the technology. The banks need to promote and inform the consumers on the benefit of using the mobile banking services. Most importantly, the banks need to educate their consumers and build-up a positive attitude until they register as users. University students can be categorized into a good market segmentation since they will be graduating soon according to their level of studies. The banks can offer financing services as early as they are still in undergraduate studies in intention to build the attitude to use the mobile banking.

Mobile banking should also be highlighted as being compatible with the values and needs of the individual. Since the students are considered as young generation, the banks need to emphasize on the benefits of mobile banking, inform them on the new trend of pre-banking that will fulfill their needs anytime and anywhere they want. The results of this study also show that the intention of the individuals to use mobile banking is influenced by those who are close to them. Hence, the decomposition of Subjective Norm into friends and family members, can influence the individuals to use of mobile banking. This is an opportunity for the banks because they can cross sell their products by promoting and introducing a referral contest and reward. Besides, the banks can also promote their mobile banking product internally, within the staff's family members and relatives. Accordingly, advertising efforts and

promotion by banks should take into account of the reference group. Nevertheless, the results of Self-Efficacy also reveal a positive effect on the perception of an individual to the facility or difficulty involved in mobile banking, then perform the intention. The banks should design an easy guide with an attractive design and excellent support services to increase the self-confidence and perception customers using mobile banking. Support services are important to ensure the mobile banking can be easily accessed and also can be used hassle free.

The results of Perceived Risk reveal significant effect on Perceived Privacy in the perception of the consumers towards mobile banking usage. The privacy of the consumer information must be tactful to build-up the confidence towards mobile banking usage. The banks must ensure that using the mobile banking are safe and secured, since the results show that Perceived Privacy significantly affects Perceived Risk. Hence, continuous efforts in enhancing the level of security and transparency promise to customers that their personal information is considered confidential also can be carried out. The higher the customer viewed using mobile banking is less risky, the higher their intention to use the technology.

Finally, Perceived Trust also has a significant effect on Intention to Use. The decomposition of Trust consists of Perceived Integrity. The results reveal the most important expectation of the respondents (university student), whether the banks can deliver their commitment to their customers as a priority. Hence, banks need to ensure they keep and fulfill their promises and act ethically and deal honestly with their customers.

6.5 Limitations and Suggestions for Future Studies

The level of acceptance and adoption of mobile banking services and factors influences the intention to adopt the technology have been discussed in earlier sections. The findings and conclusions of this study, however, are subject to certain limitations. First, the employment of university student as the respondents limits the conclusion and discussions of the findings. Thus, this study proposes that future studies employ real bank customers. It will expand the age categories, experience, confidence, and further enrich the discussions and conclusions.

Another limitation of this study lies in the high number of female respondents (74%). This leads to some biasness issue on behavioral intention. Therefore, the results of this study should be interpreted carefully. Hence, it is recommended for other studies to use a larger sample size and different population of mobile banking users for future studies.

Thirdly, this study is carried out in Malaysia. The results might be different with the studies in other countries and cultures. Hence, further studies should be carried out to compare the results of this study with other countries. Bank customers from other countries might have different policies, technology infrastructure and level acceptance of the technology and also any other important factors that influence the intention to use and the actual usage behavior.

Also, Perceived Risk is the most important determinant of the acceptance of mobile banking. It can affect the customer perception and consequences of adopting mobile banking and thus, negatively affect the use of the technology. Again, when responses from students might have not been truly real because of their lack in the real

exposition to risk in banking transactions. Thus, further studies should investigate on the risk issue of the banking customer instead of university student.

Finally, Perceived Trust has been found to have a significant positive effect on the intention. To increase the trust of the public, banks should adopt the uncertainty and risk mitigation strategies. Strategies include using certified firewall and encryption technology, adopting privacy policies and security, build the structure guarantees the image on a website and others. On the integrity part, banks must also ensure that they maintain and fulfill their promises and act ethically and dealing honestly with customers. This study is aware of the problems faced in the decomposing building the trust constructs. The revelation of this construct is likely to be needed for this study is one of the first to explore the decomposition of trust in the mobile banking system, and due to the complexity, further validation and verification of Perceived Trust construct may be necessary.

6.6 Conclusion

This study highlights on the issue of determining the antecedents of the adoption of mobile banking based on the DTPB. The decomposition approach adopted by the theory provides a bigger set of backgrounds that can better explain the intention to adopt certain technologies (i.e. mobile banking), thus, will improve the practical contribution of this research.

The study determines the relationship between Intention to Use and Actual Use Behavior. The main objective of this study is to determine the actual usage of mobile banking service. As discussed earlier, this study analyzes the relationship between Attitude, Subjective Norm, Perceived Behavioral Control, Perceived Risk, Perceived

Trust, and Behavioral Intention. Based on the research question and our discussions in earlier sections, this study would like to identify the antecedent factors that affect Attitude, Subjective Norm, Perceived Behavioral Control, Perceived Risk, and Perceived Trust. Having analyzed the results, the proposed framework is proved confirmed and validated. The two new constructs that this study introduces, Perceived Privacy and Perceived Trust, are evidenced positively significantly affect Intention to Use. The results indicate that the model provides insight into factors that affect the intention to use and actual use of mobile banking.

In fact, Attitude , Perceived Behavioral Control, Subjective Norm, Perceived Risk, and Perceived Trust explain approximately 50% of the variance in Behavioral Intention. The results fall within the range and agree with those in the literature. This study also discovers that about 11.6% of the total variance on the actual usage behavior commensurate with the previous studies (e.g. Lu et al., 2009; Pedersen, 2005), with 15% and 16% variance result explained respectively.

In short, Attitude, Perceived Behavioral Control, Subjective Norm, Perceived Risk, and Perceived Trust provide more definite factors that influence the students' behavior to accept and use the mobile banking service. Based on the findings, the implications to the theory and practice is clarified accordingly. Finally, this study has stressed on the limitations, and recommendations for future works.

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