

**ANALYSIS OF ACCEPTANCE FACTORS FOR ELECTRONIC
PAYMENT SERVICES OF THAI PEOPLE BASED ON UTAUT**

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Thesis
entitled
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PAYMENT SERVICES OF THAI PEOPLE BASED ON UTAUT**

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ABSTRACT

The aim of this study is to study the acceptance of factors involved with electronic payment services. Questionnaires were used to collect data from internet users, and electronic payment service users, 400 respondents participated in the study. The model of Unified Theory of Acceptance and Use of Technology (UTAUT), and Structural Equation Modelling (SEM) were used for testing hypotheses. In the addition, this study identifies the external modulators and three factors: service quality, cost and perceived security.

The results showed that performance expectancy, effort expectancy, social influence and facilitating conditions are the main factors enhance in the adoption of electronic payment services for users. Furthermore, this study results found that the perceived security, service quality which included the modulators - age, gender, and experience - supported electronic payment services users' adoption. The results of analysis showed that performance expectancy, effort expectancy, social influence, perceived security directly enhanced behavior intension, in addition to facilitating conditions, service quality enhancement of UTAUT use behavior.

KEY WORDS: ELECTRONIC PAYMENT / UNIFIED THEORY OF ACCEPTANCE AND
USE OF TECHNOLOGY / DELONE AND MCLEAN'S IS SUCCESS
MODEL / STRUCTURAL EQUATION MODELING

119 pages

การวิเคราะห์ปัจจัยการยอมรับบริการชำระเงินอิเล็กทรอนิกส์ของคนไทยด้วยวิธีการ UTAUT
ANALYSIS OF ACCEPTANCE FACTORS FOR ELECTRONIC PAYMENT SERVICES OF
THAI PEOPLE BASE ON UTAUT

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คณะกรรมการที่ปรึกษาวิทยานิพนธ์: อติสร ลีลาสันติ, Ph.D., สุภาภรณ์ เกียรติสิน, Ph.D, บันลือ เอ
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บทคัดย่อ

งานวิจัยชิ้นนี้ศึกษาปัจจัยการยอมรับบริการชำระเงินอิเล็กทรอนิกส์ โดยเก็บแบบสอบถามจากผู้ใช้อินเทอร์เน็ตและผู้ให้บริการชำระเงินอิเล็กทรอนิกส์ จำนวน 400 คน. โดยใช้ทฤษฎีรวมของการยอมรับและการใช้เทคโนโลยีและโมเดลสมการโครงสร้าง ใช้ในการทดสอบปัจจัยและสมมติฐานงานวิจัย. ผู้วิจัยได้เพิ่มปัจจัยจำนวน 3 ปัจจัย คือ การรับรู้ความปลอดภัย, คุณภาพการบริการ, ราคา (ค่าธรรมเนียม) เข้ามาในงานวิจัย. จากการวิจัยค้นพบว่าความคาดหวังในประสิทธิภาพการใช้งาน, ความคาดหวังในเรื่องความง่าย, อิทธิพลทางสังคมบุคคลรอบข้าง, สิ่งอำนวยความสะดวกโครงสร้างพื้นฐาน เป็นปัจจัยหลักทั้งหมดที่สนับสนุนการยอมรับบริการชำระเงินอิเล็กทรอนิกส์ และผู้วิจัยยังค้นพบอีกว่า ความปลอดภัย, คุณภาพของการให้บริการ รวมถึงปัจจัยภายนอก คือ เพศ อายุ และประสบการณ์การใช้ เป็นปัจจัยการยอมรับบริการชำระเงินอิเล็กทรอนิกส์. จากการวิเคราะห์พบว่า ความคาดหวังในประสิทธิภาพการใช้งาน, ความคาดหวังในเรื่องความง่าย, อิทธิพลทางสังคมบุคคลรอบข้าง เป็นปัจจัยโดยตรงที่ส่งผลต่อพฤติกรรมความตั้งใจที่จะใช้บริการชำระเงินอิเล็กทรอนิกส์ รวมทั้ง สิ่งอำนวยความสะดวกโครงสร้างพื้นฐาน, คุณภาพของการให้บริการ ส่งผลต่อการใช้บริการชำระเงินอิเล็กทรอนิกส์จริง.

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CHAPTER I

INTRODUCTION

1.1 Background and Problem Statement

Today information technology is important for human daily life and the facilities such as computer, internet and cellular phone play a key role. The relation between payment system and daily life has existed since start-up of goods trade and exchange and revolution has been varied when there were economic expansion and more technology advance. The complexity of such economic and technological system has multiplied the importance of payment system from money transfer or goods and services payment that the consumer must take time for whole day for transaction contact until completion. We nowadays can quickly precede the transactions without travel, and reducing time and expenses of both service provider and customer. The diverse service types can be easily accessible, easy to use, satisfy living style of new blood, and support both low and high payment values, rapidly making electronics payment become popular. There are also many service providers who are financial institutions and non-financial institutions from natural person to public company. According to more complication of some service types and objectivity of information technology, the consumers may not assure how to select electronics payment and rely on technology acceptance or not. Therefore, if there is no study or research, the user of electronics payment technology may initiate loss and reliance on electronics payment.

Even though the technology will be involved in building E-Commerce business but when mentioned about payment which is considered as the key issue in doing business, technology become unable to play role in this part. Most customers have still used existing payment as ever performed by cash payment via banking counter or ATM. They must waste time to travel to banks or ATM even the customers will have E-Payment or Personal Banking or Internet Banking enabling to quickly pay via computer at home or Smartphone without wasting time or travelling expenses. But such system has not been popular much in Thailand since E-Commerce business itself

did not attempt to promote and encourage the use of E-Payment and the buyers who gained insufficient information for decision making with wrong beliefs on online systems (Study of Electronics Payment via Website in Thailand, 2011).

At present, the varieties of electronic payment services are highly increasing. In Thailand, there have been very few customers of electronics payment when compared to other countries and the customers have still been unconfident on such technology without good enough knowledge, behavior or basis. The researcher therefore has studied figure, statistics, report and internet to cover the following research.

The use of internet in Thailand has been increased nowadays as shown in Figure 1.1 that exhibits the increase on the use of Internet in Thailand in 2011. The populations on Thailand internet in August was 25,090,390 million people and the growth of internet populations from 2010 reached 26.77%.

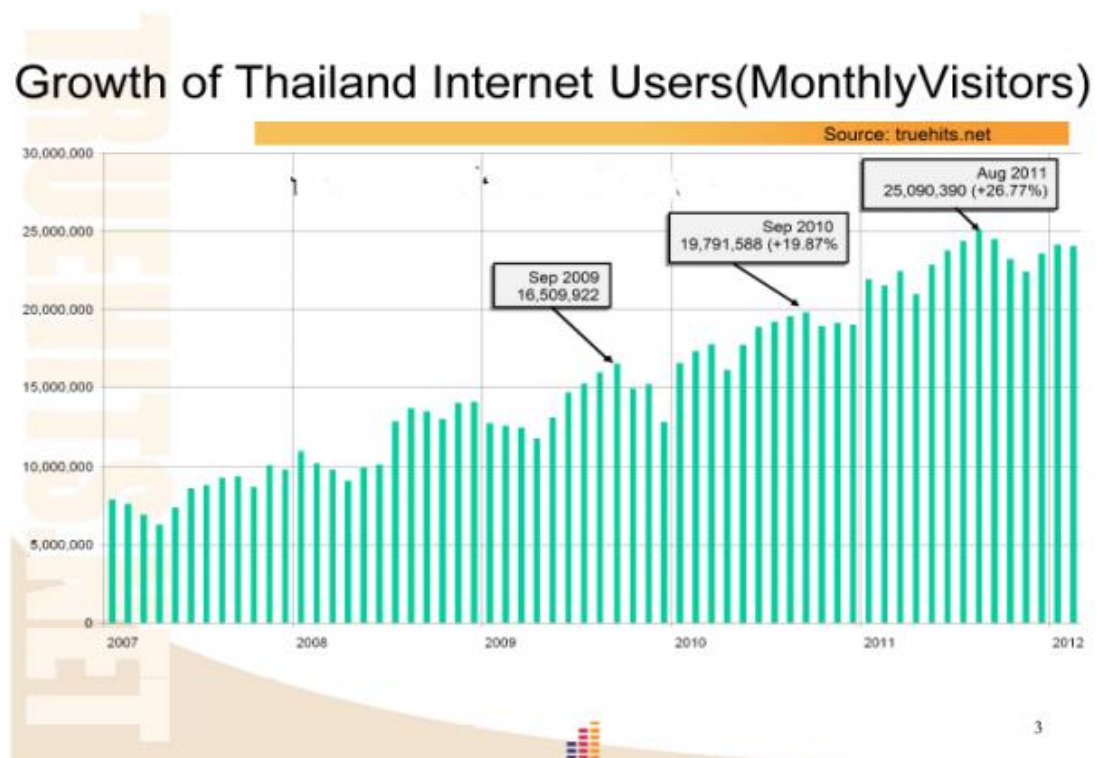


Figure 1.1 Growth of Thailand Internet User (Monthly Visitors)

Source: www.truehits.net

The service of E-Payments is fast and safe service facilitation provided to financial service user in consistent with the way of living in urgent era accompanying with rapid advanced technological development, causing continuous development and growth of existing services of E-Payments. For the past six years, there have been increases of annual growth ratio of numbers of E-Payment transactions per population quantity and it has been expected that such ratio were going to continuously grow in the future in order that the growth rate of E-Payment consumption per population quantity in 2012 would be 24.67% when compared with previous year (Payment Systems Insight, Bank of Thailand, 2012).

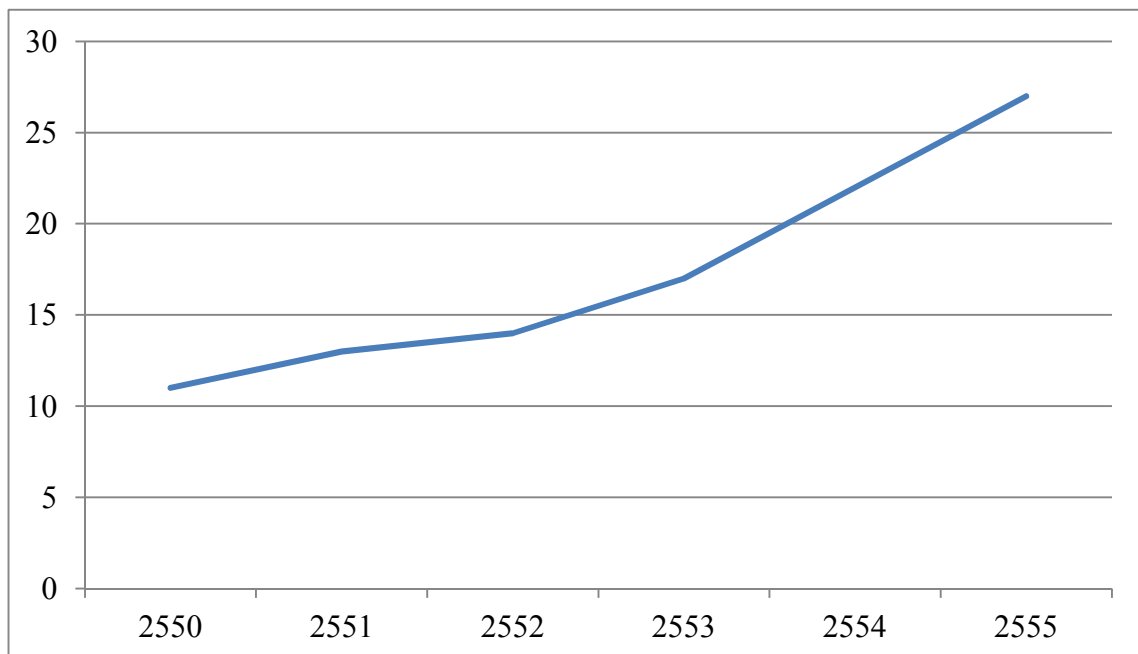


Figure 1.2 E-Payment services per population quantity

Source: Payment Systems Insight Bank of Thailand, 2012

When delving into main services of E-Payments, it would be seen that numbers of transactions per person per day in several services in Thailand was lower than those in foreign countries such as five transactions per person per day for the uses of Thai credit cards while such transactions in South Korea were up to 130 transactions per person per year. Even E-Money service is E-Payment services of Thailand with maximum consumptions per person per year; it has been still lower rate

than those in neighboring countries like Singapore and Malaysia (Payment System Insight, Bank of Thailand, 2012).

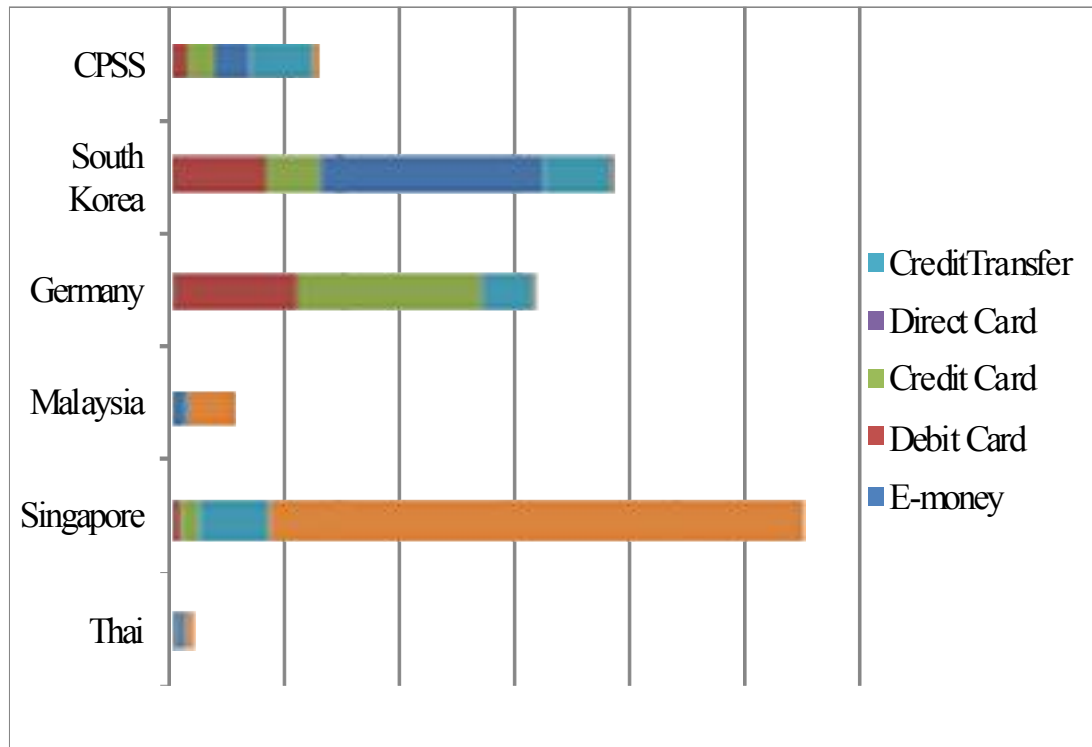


Figure 1.3 Numbers of Transactions per person per years

Source: Payment Systems Insight Bank of Thailand, 2012

This study have been conducted Unified theory of acceptance and use of technology (UTAUT), Using perceived security, service quality, cost and external variable gender, age, experience to identify the factors that affect to use electronic payment services.

The researcher used people using electronic payment services confirm model and hypotheses. First is the introduction, Second research model and review, Third model and hypotheses, Four collect data analyzed are presents, Finally discusses research finding from the survey.

1.2 Objectives

The objectives of this study are as follow:

- 1) To study and develop a model the relationships among each factors that importance for acceptance of electronic payment services to assess the satisfaction level among system administrators and system users towards the enhanced data management system.
- 2) To recommend guideline electronic payment services.
- 3) To collect the perception of difference demographic and usage the factor of electronic payment services.

1.3 Scope of Work

The scope of this study of consists:

- 1) The study Specifically Online Payment Services the only website.
- 2) The study has focused Non-Bank.
- 3) 400 respondents participated.
- 4) Use to gather data from citizen in Thailand who are internet user and electronic payment services users.

1.4 Expect Results

The expected outcomes of this study include:

- 1) The relationships of each factor that importance for acceptance of electronic payment services.
- 2) Guideline electronic payment services to develop the better service.
- 3) Understand the perception of difference demographic and usage the factor of electronic payment services.

CHAPTER II

LITERATURE REVIEW

In the chapter, overview of literature and research model and related to the research problem in the previous chapter are present. Research will Electronic Payment, Unified Theory of Acceptance and Use of technology, the DeLone and Mclean model of information system success, Structure Equation Model and related studies.

2.1 Electronic payment Definition

Electronic payment is a financial exchange that takes place online between payer and payee. The content of this exchange is usually some form of digital financial instrument (credit card debit card online transfer or electronic money) that is backed by a bank or electronic payment service (intermediary). A payment system consists of a set of instruments, banking procedures and, typically, interbank funds transfer systems that ensure the circulation of money (BIS, 2003).

When EC created the need for e-payment services, traditional cash-based and account-based payment instruments were used as a model. Simultaneously, new intermediaries such as PayPal succeeded in fulfilling some of the new needs of online merchants and consumers (Dahlberg et al. 2008).

E-Payment is defined here as the transfer of an electronic value of payment from a payer to a payee through an e-payment mechanism-Payment services exist as web-based user-interfaces that allow customers to remotely access and manage their bank accounts and transactions (Weir et al. 2006, Lim 2008).

2.2 Classification of electronic payment systems

Theodosios and George (2005) show that popular payment instruments used for payment in general. Electronic payment can be classified in to five categories.

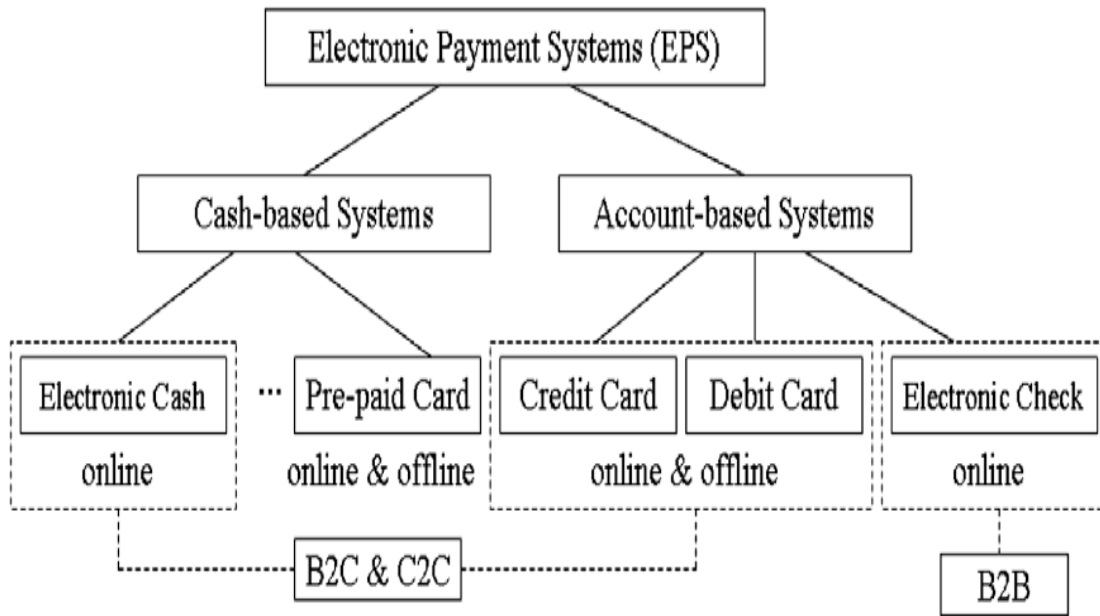


Figure 2.1 Classification of electronic payment systems

Source: Theodosios and George (2005)

1) Electronic-cash: transactions are settled via the exchange of electronic currency.

2) Pre-paid card: customers use a pre-paid card for a specified amount by making an entry of the unique card number on merchant sites. The value of the card is decreased by the amount paid to the merchant.

3) Credit cards: a server authenticates consumers and verifies with the bank whether adequate funds are available prior to purchase; charges are posted against a customer’s account; and the customer is billed later for the charges and pays the balance of the account to the bank.

4) Debit cards: a customer maintains a positive balance in the account, and money is deducted from the account when a debit transaction is performed.

5) Electronic checks: an institution electronically settles transactions between the buyer's bank and the seller's bank in the form of an electronic check.

2.3 Characteristics of electronic payment services

Characteristics of electronic payment services perform in type of online services offered, as follow:

E-payment Gateway: This system is developed to cooperate between the customer and bank. For advantage, the payer is assured that the webmaster cannot view their credit card number and password, because the payer must enter their information on bank's homepage with amount of money as follow the transaction that their selected. In addition, the webmaster is assured that the payer is trust and the webmaster can check for the customer's payment transaction from bank all the time. For using E-payment Gateway System, the website must have the SSL Certificate System which is the security system that used for data protection.

E-payment System by service provider: this system is using for online purchase of goods and can be available all 24 hours. For the customer want to purchase of goods from online merchant, they can manage for payment with themselves and they can perceive from their payment transaction by real time. The advantage from this system, the customer can be assured for high system security and fee is less than the bank.

In abroad, there are service providers for payment as follow:

- Paypal.com, this payment system by EBay and that is the most popular system in the world.

-Clickandbuy.com, this system has a low cost fee.

-Siampay.com is a service provider in Thailand but this system has owner in abroad.

-Moneybooker.com, the money receiver has not been added the card, they can be -withdrawal from bank in Thailand at once.

-Libertyserve.com, this is the most popular system in the Forex money trader and not expensive for fee.

-Alertpay.com

Example for credit card payment through e-Payment Gateway process as follow Figure 2.2:

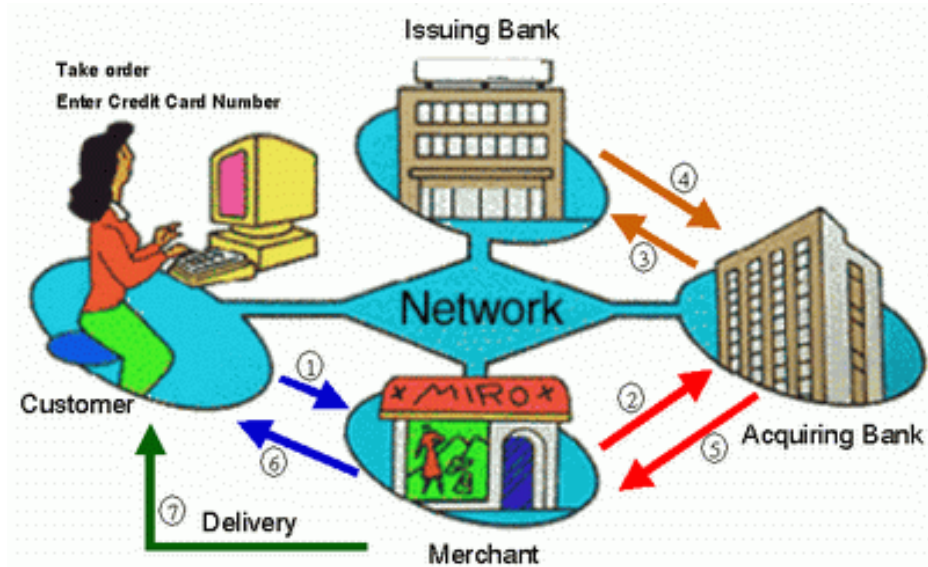


Figure 2.2: Credit Card Payment Process

Source : Pattamawan Witthayapa (2008)

The component of payment process as follow:

- 1) Customer
- 2) Merchant
- 3) Acquiring Bank
- 4) Issuing Bank

The customer can put their credit card data and click to send, the order will send to the Merchant (1) The credit card data will send to Acquiring Bank (2) and send to Issuing Bank (3) due to check for card using and card expiry date. In this place, the bank cannot check for card user that is true. If the card can use, the bank can send back to the merchant and the customer for acknowledgement that they can pay into their financial amount (4-6) after that, the customer must agree with order and payment in finally. When the merchant received for payment notification, the goods will send to the customer in next step (7) and the customer can pay normally within credit card period.

2.4 List of electronic payment service providers (http://en.wikipedia.org/wiki/List_of_online_payment_service_providers)

The following is a list of notable on-line payment services providers:

Ayden, Alipay, Amazon Payments, Asia Pay, Atos, Authorize.Net

BPAY, Braintree

Chargify, Citibank, ClickandBuy, Credit Call, Cyber Source

Data Cash, DigiCash, Dwolla

ecoPayz, Edy, Elavon, Euro net, Worldwide, eWAY

Flooz

Google (Googlewallet)

HSBC

iKobo, iZettle, IP Payments

Klarna

Mobilpenge, ModusLink, MPP, Global Solutions

Neteller, Nochex

Ogone

Paymate, PayPal, Payoneer, PayPoint, Paysafecard, PayXpert, Payza,

Peppercoin, Playspan, Pop money, Realex, Payments, Recurly

Sage Group, Skrill (Moneybookers), Stripe, Square, Inc.

TFI Markets, TIMWE

VeriFone, Vindicia

Web Money, We Pay, Wire card, Western Union, World Pay

2.5 Model of technology acceptance

Technology acceptance is a theory for finding factors which they help support technology adoption by personal behavior. The factors will help the researchers for choosing direction of support behavior adoption. There are many technology acceptance theories such as Technology Acceptance model is called as "TAM" mainly offers a basic framework so as to explain the influence of external variables towards behavioral idea by David (1989). Technology Acceptance Model

based on theory of reasoned action (TRA) and theory of planned behavior (TPB). And, TAM2 is a new structure, which skimps behavioral attitude (ATU) because ATU is non-significant influence effect towards BI and actual system usage (AU) by Vankatesh and Morris (2000). With the vigorous development of TAM'2 s relevant studies (Venkatesh et al., 2003). And, finally, Vankatesh and our research teams developed new technology acceptance model from 8 theories to the Unified Theory of Acceptance and Use of Technology or UTAUT. Therefore, this topic is show other technology acceptance theories as per below;

2.5.1 Theory of Reasoned Action (TRA)

Fishbein and Ajen's, (1975) Theory of Reasoned Action (TRA) was purpose by Martin Fishbein and IcekAjzen as an improvement over Information Integration theory. The model had developed for predicted human behavioral intention. In the Model used two variables (Attitude toward Behavior and Subjective Norm) for measured Behavioral intention.

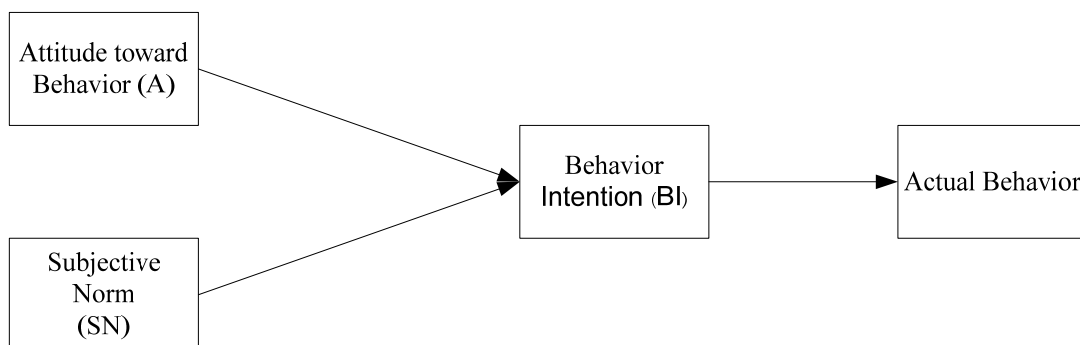


Figure 2.3 Theory of Reasoned Action (TRA)

2.5.2 Theory of planned behavior (TPB)

Fishbein and Ajen's(1975) theory of planned behavior (TPB) is an extension of theory of reasoned action (TRA), which has as its main goal the prediction and understanding of human behavior. It postulates that individual 'behavioral intensions are determinants: attitude, subjective norm, and perceived behavioral control.

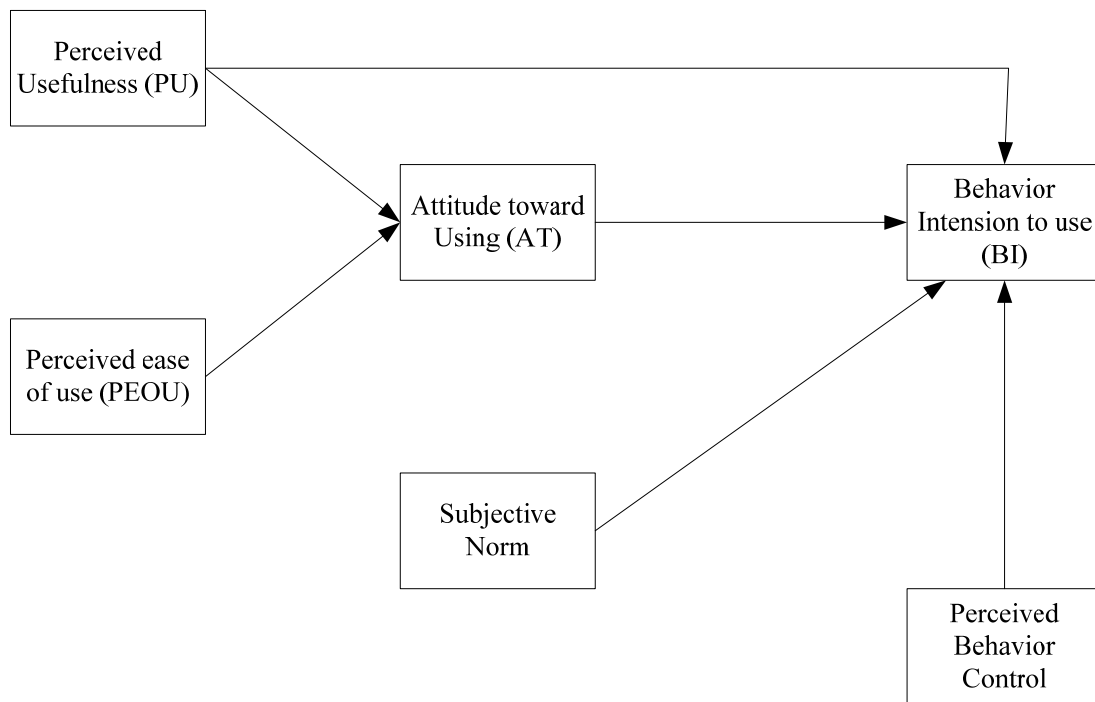


Figure 2.4 Theory of Planned Behavior (TPB)

2.5.3 Technology Acceptance Model

Technology Acceptance Model (TAM) was proposed by Davis (1989) which concerned about adaptation of the Theory of Reasoned Action (TRA) (Fishbein and Ajzen, 1975). TAM is the model to explain and predict individual acceptance toward using the information technology (IT) is determined by intension to use. The TAM proposes two important determinants are perceived usefulness (PU) and perceived ease of use (PEOU). Perceived usefulness is defined as “the degree to which a person believes that using a particular would enhance his or her job performance” (Davis, 1989), while perceived ease of use is defined as “the degree to which a person believes that using a particular system would be free of effort” (Davis, 1989). While perceive ease of use is define as “the degree to which a person believes that using a particular system would be to free of effort” (Davis, 1989).

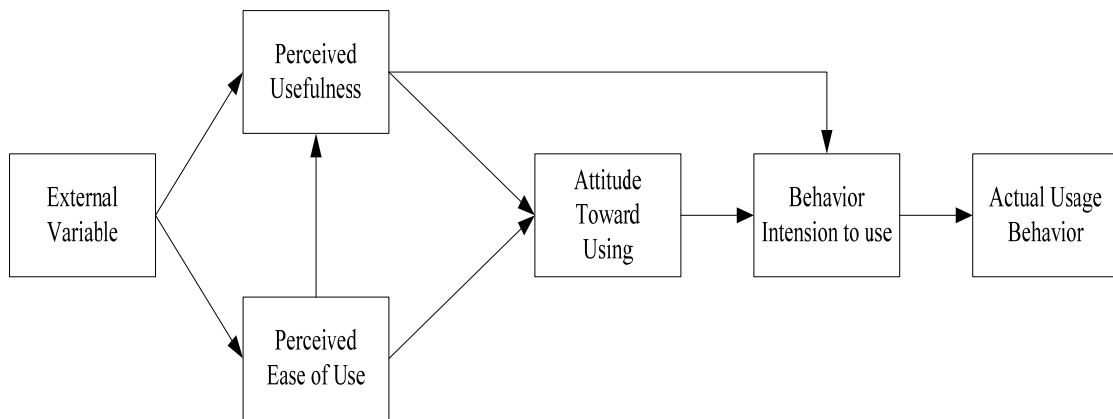


Figure 2.5 Technology Acceptance Model (TAM) (Davis, 1989)

2.5.4 Unified Theory of Acceptance and Use of technology (UTAUT)

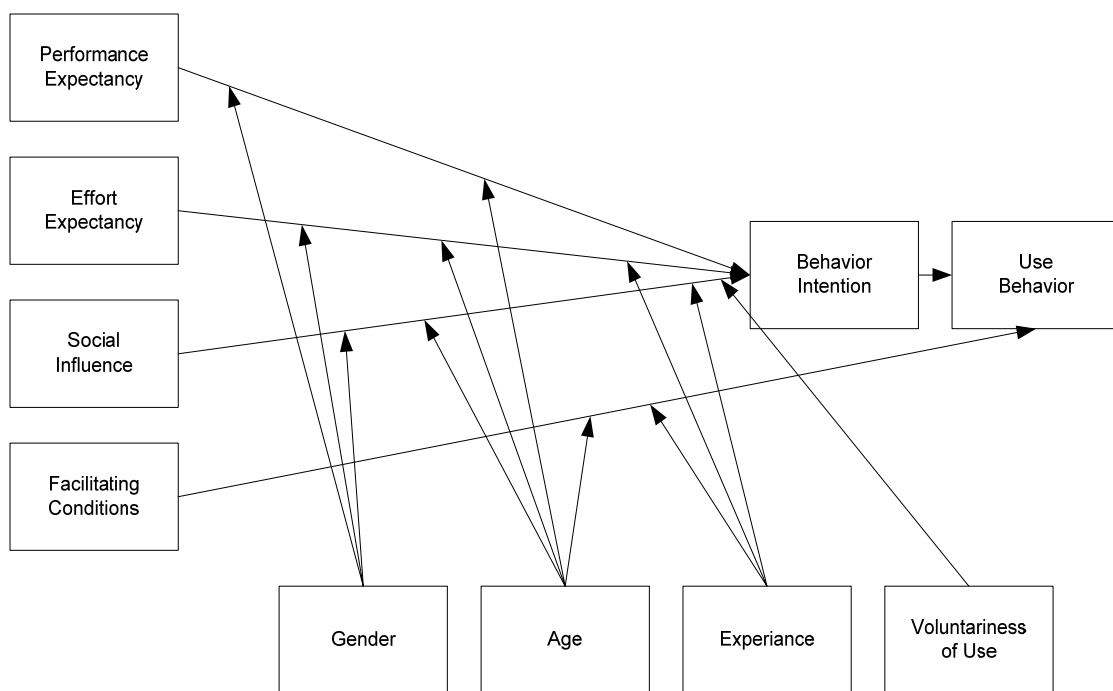


Figure 2.6 Unified Theory of Acceptance and Use of technology (UTAUT)
(Venkatesh, 2003)

The Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al. 2003) is one of the latest developments in the field of general technology acceptance models. Like earlier acceptance models, it aims to explain user intentions to use an IS and increase usage behavior. Venkatesh et al. (2003) developed this synthesized model to present a more complete picture of the acceptance process than previous individual models had been able to do. The UTAUT model successfully integrates key elements from eight models previously used in the IS field. These models are the TRA, TPB, TAM, MPCU, MM, SCT, TAM2, and DOI and they each attempt to predict and explain user behavior using a variety of independent variables. A unified model was created based on the conceptual and empirical similarities across these eight models. The theory holds that four key constructs (performance expectancy, effort expectancy, social influence, and facilitating conditions) are direct determinants of usage intention and behavior (Venkatesh et al. 2003). The variables of gender, age, experience and voluntariness of use all work to moderate the impact of the four key constructs on usage intention and behavior as indicated in Figure 1. The UTAUT has four core determinants that influence behavioral intention (BI) to use a technology; these determinants are defined as follows (Venkatesh et al. 2003, pp 447-453):

Performance expectancy (PE): “the degree to which an individual believes that using the system will help him or her to attain gains in job performance.”

Effort expectancy (EE): “the degree of ease associated with use of the system.”

Social influence (SI): “the degree to which an individual perceives that important others believe he or she should use the new system.”

Facilitating conditions (FC): “the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system.”

2.5.5 DeLone and McLean’s IS Success Model

DeLone and Mclean’s (1992) proposed the Information System Success model. This model composes of six IS dimensions: (1) system quality, (2) information quality, (3) IS use, (4) User satisfaction, (5) individual impact, and (6) organization impact. This model users system quality and information quality separately and jointly

affects to use and user satisfaction. Both use and user satisfaction are determined to affect individual when using the information technology. As a result . organization impact for user that user an information system. DeLone and McLean”s (1992) suggest the model has interrelated among six dimensions.

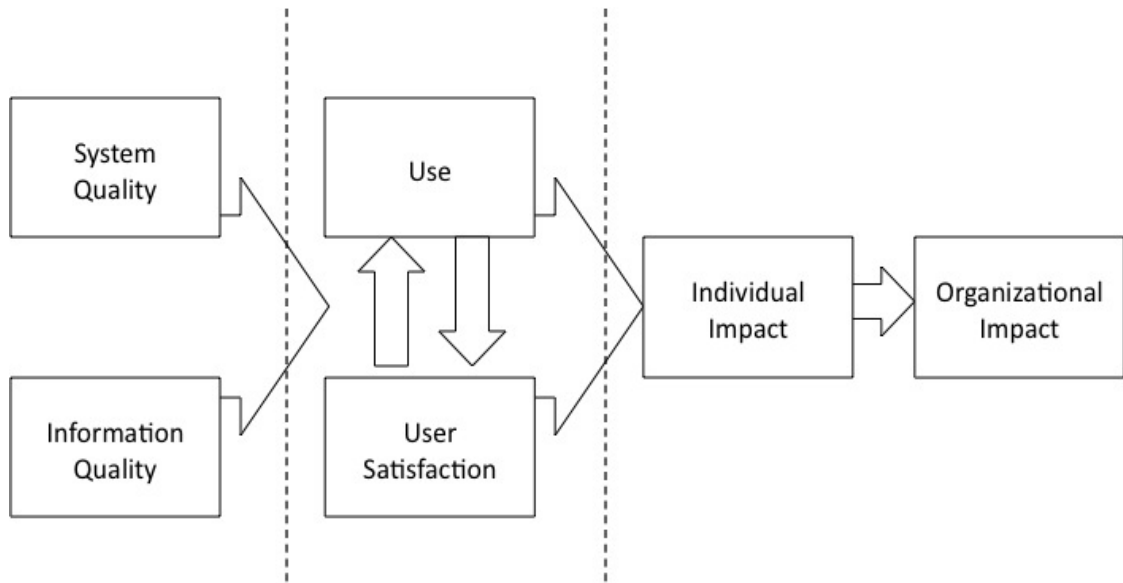


Figure 2.7 Information Systems Success Model (DeLone& McLean 1992)

Pitt et al. (1995) adapted DeLone and McLean model by adding service quality to measure information system effectiveness. Delone and McLean (2003) proposed updated IS success model later. A new dimension service quality including for IS success measurement, employing intention to use have affectation from user satisfaction and reexamine causal relationships among 6 dimensions. The system quality, information quality and quality are affecting user satisfaction, intention to use and use, as final result net benefits when using the system. The update model contained six dimensions: (1) system quality, (2) information quality, (3) service quality, (4) use/intension to use,(5) user satisfaction , and (6) net benefits.

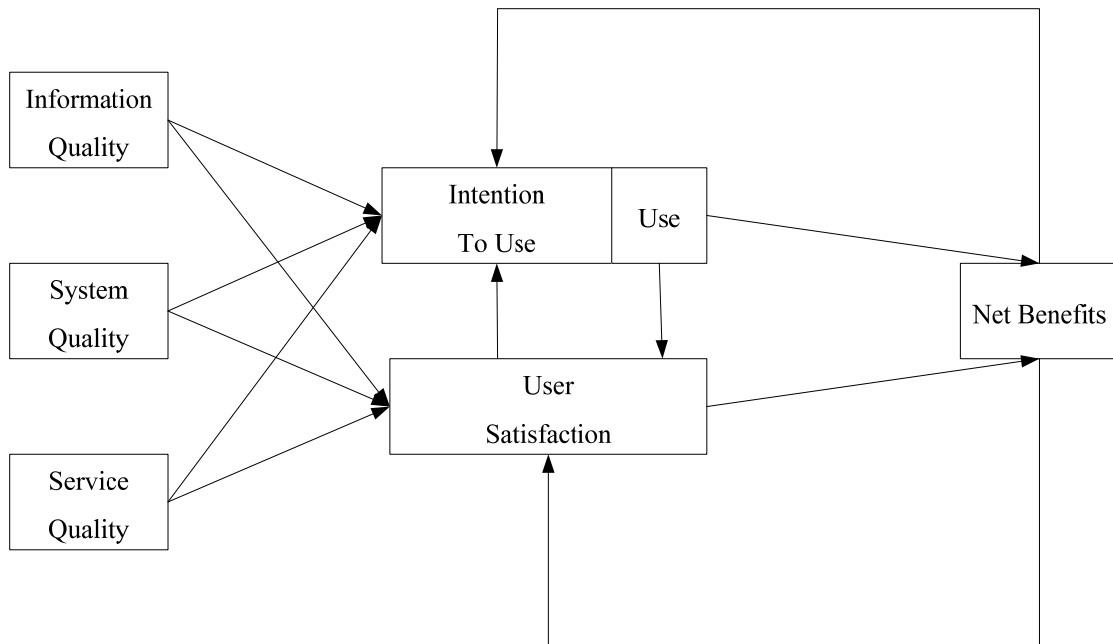


Figure 2.8 DeLone and McLean’s (2003) IS success model Update

Table 2.1 Research of Unified Theory of Acceptance and Use of Technology

| Studies | Technologies | Sampling | UTAUT | Antecedents |
|--|---|---------------------|-------------------------|--|
| Chian-Son Yu (2012) | Factors Affecting Individuals to Adopt Mobile Banking | 441 respondent | PE,EE,SI,FC,BI,USE, G,A | Perceived credibility and self-efficacy |
| James Tetteh, Ami-Narh, Patricia A H Williams (2012) | Electronic health | 200 users in Africa | PE,EE,SI,FC,BI,USE | Computer Anxiety,Attitude towards technology |

Table 2.1 Research of Unified Theory of Acceptance and Use of Technology (cont.)

| Studies | Technologies | Sampling | UTAUT | Antecedent |
|---|---|---|------------------------------|--|
| Niexi | Online Virtual | 226 online | PE,EE,SI,FC,BI,USE | Privacy |
| Huang, Guifeng Qin (2011) | Fitting Room | virtual fitting room users | | Concerns, Perceived Risk, Security |
| HeeSeo Lee, Taek Gyeom Kimand JiYoun Choi (2012) | Smart Phone Application | 215 person experience in using Smartphone including college students and office workers | PE,EE,SI,FC,BI,USE | Credibility, Flow |
| Saleh Alwahaishi, Vaclav Snasel (2013) | Information and Communications Technology | 238 citizens of different educational and industrial backgrounds | PE,EE,SI,FC,BI,USE, G,A,E | Perceived Value , Perceived Playfulness , Attention Focus |
| PENG Hongxia, XU Xianhao, LIU Weidan (2011) | Mobile Payment | 200 students | PE,EE,SI,FC,BI,USE | Cost, perceive risk |

Table 2.1 Research of Unified Theory of Acceptance and Use of Technology (cont.)

| Studies | Technologies | Sampling | UTAUT | Antecedent |
|--|--|--|---------------------------|---|
| Donny Chi-Fai Lai, Ivan Ka-Wai Lai, Ernest Jordan (2009) | Mobile Commerce | 200 mobile device users | PE,EE,SI,FC,BI,USE | Disturbance Concerns of mobile commerce |
| AlAwadhi and Morris (2008) | Adoption of Electronic government services | 880 students | PE,EE,SI,FC,BI,USE | performance expectancy, effort expectancy, and peer influence |
| Marchewka et al., (2007) | Course Management Software | 132 undergraduate and graduate business school university students | PE,EE,SI,FC,BI,USE, G,A,E | Subjective Norm |
| Carlsson et al., (2006) | Mobile Devices/ Services | 157 Finnish consumers | PE,EE,SI,FC,BI,USE | Anxiety, attitude towards mobile device/ services |

Table 2.1 Research of Unified Theory of Acceptance and Use of Technology (cont.)

| Studies | Technologies | Sampling | UTAUT | Antecedent |
|--|--|---|------------------------------|--|
| Al-Gahtani et al., Geoffrey S. Hubona, Jijie Wang (2007) | Using desktop computer applications | 722 knowledge workers | PE,EE,SI,FC,BI,USE, G,A,E | Effort expectancy and subjective norm have a significant effect on intention. |
| Isabelle and Sandrine, (2009) | Knowledge Management Systems (KMS) | 200 employees | PE,EE,SI,FC,BI,USE | performance expectancy, Subjective norms have, Facilitating conditions, Effort expectancy |
| Kijsanayoting et al., (2009) | Employees of community health centers | 1607 Employees of community health centers | PE,EE,SI,FC,BI,USE, G,A,E | Voluntariness , Knowledge |

Note : (Constructions)Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), Facilitating Conditions (FC)
: (Dummy Variables) Gender (G), Age (A), Experience (E).

2.6 Structural Equation Modeling (SEM)

LISREL, for linear structural relations, is a statistical software package used in structural equation modeling. LISREL was developed in 1970s by Karl Jöreskog, then a scientist at Educational Testing Service in Princeton, NJ, and Dag Sörbom, later both professors of Uppsala University, Sweden. The most current version, as of January 2012, is LISREL 8.8.

The model of structural equation had completed component with exogenous variables and endogenous variable. Both of variables, there are composed of latent variable and observed variable (Observed Structural Equation Modeling and Travel Behavior Study Asst.Prof. SuramesPiriyawat, Ph.D. 3/22 Dept. of Civil Eng, Burapha University variable). Latent variable could not be measurable with itself. But, it could measure from observed variable which is a component in each latent variable (NonglakWiratchai, 1999).

2.6.1 Structural Equation Modeling Symbol

Structural Equation Modeling picture (Figure 2.9) and symbol meaning (Table 2.2). As follows:

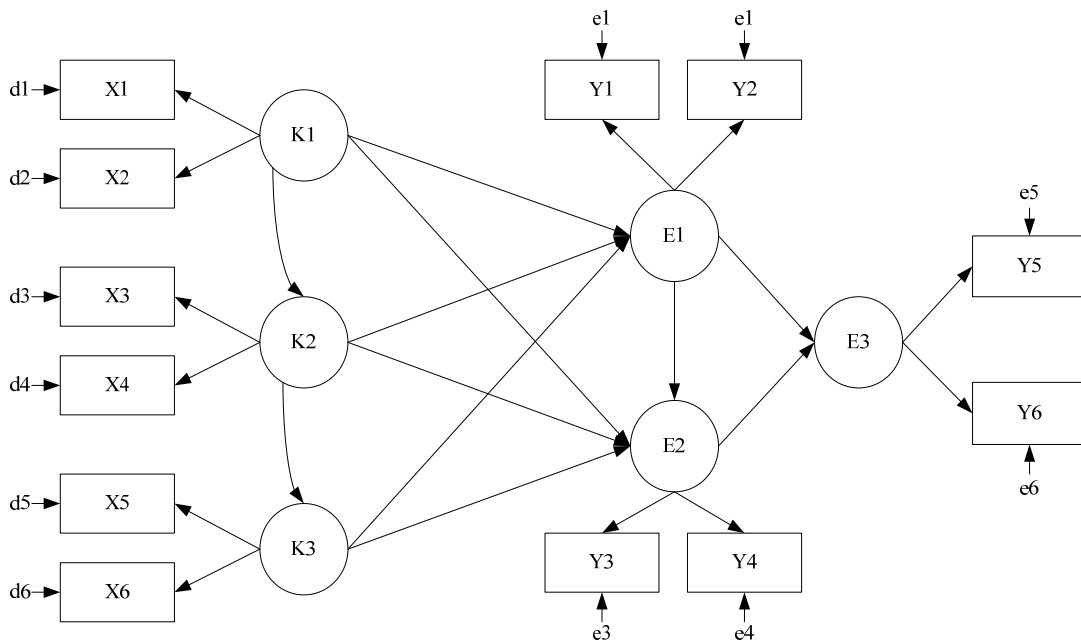
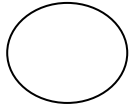





Figure 2.9 Structural Equation Modeling Symbol

Table 2.2 Symbol picture and meaning

| Symbol Picture | Meaning |
|---|---|
|  | Observed Variable |
|  | Latent Variable |
|  | Path analysis / Factor analysis Relationship |
|  | Covariance or Relationship Of 2 variable |

2.6.2 Data analysis process by SEM

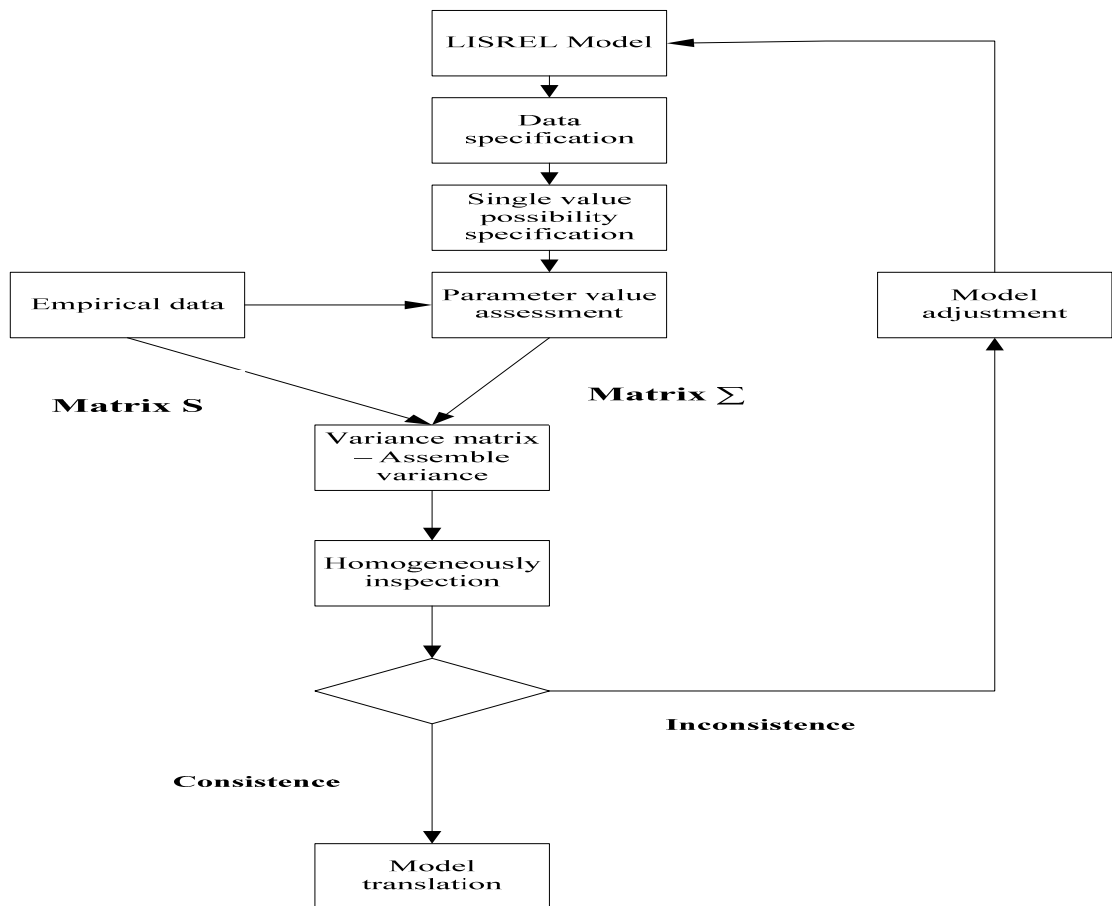


Figure 2.10 show data analysis process

The reliability and validity of the measurement model was assessed by a confirmatory factor analysis (CFA) using the LISREL software was to perform the structure modeling analysis. Model fit using comparative. Table 2.3 explains all measurement value for scaling in using SEM following.

Table 2.3 Indices in using for SEM

| Type of indices | Recommended Value |
|---|-------------------|
| d.f. (Degree of freedom) | Less 3 or 5 |
| Goodness-of-fit (GFI) | More 0.90 |
| Adjusted goodness-of-fit (AGFI) | More 0.90 |
| Normalized fit index (NFI) | More 0.90 |
| Non-normalizes fit index (NNFI) | More 0.90 |
| Comparative fit index (CFI) | More 0.90 |
| Root mean square residual | Less 0.05 |
| Standardized RMR | Less 0.05 |
| Root mean square error of Approximation (RMSEA) | Less 0.10 |

* Recommended values have been adapted since Hair et al. (1998)

2.7 Dummy Variable

A dummy or indicator variable is any variable in a regression equation that takes on a finite number of values so that different categories of a nominal variable can be identified. Variable are divided into 2 type :quantitative variables and qualitative variables

H0: Hypothesis model consistent with interpretation data

H1: Hypothesis model does not consistent with interpretation data

Example1: the variable sex

$$\text{Sex} = \begin{cases} 0 & \text{if the subject is male} \\ 1 & \text{if the subject is female} \end{cases}$$

Example2: the variable residence in Chicago

$$\text{Residence} = \begin{cases} 0 & \text{of living in south} \\ 1 & \text{of living in downtown} \\ 2 & \text{of living in north} \\ 3 & \text{of living in west} \end{cases}$$

The researcher had used variable as follow unified theory of acceptance and use of technology (UTAUT) model, which are variables as age gender experience. Within SPSS version 20 (Statistical Analysis System) and RISREL version 9.1.

2.8Relation Studies

There are been various studies that have examined Unified Theory of Acceptance and Use of Technology (UTAUT) in electronic payment and other technologies. It is show as follow.

Pattamawan Witthayapa, 2008 found that most people who held credit cards were used to purchase via online system but they often dared not to pay for goods by credit cards via online system since they were unconfident about the security of personal data and credit card data caused from indecision on website securities accompanied with trust and confusion on how data security system and credit card data protection would be available for work system of goods payment by credit cards via online system. 35% of most population groups would mainly select for goods payment via ATM while only 22% would be paid via online system.

Pornpong Chongprasitipol, 2010 found that there was highly growth on the use of E-commerce. The methods of E-Commerce payments in Thailand are online payment via credit card and financial service providers such as PayPal, Paysbuy, ThaiePay via Mobile Payment, but the most popular method is money transfer via

bank. For goods/services payment, 63.7% use offline goods payment method. 28.3% use both online and offline goods payment method. 6.7% use online method only.

Changsu Kim, 2009 study customers' perceptions of security and trust Electronic payment system. This model base on the security, trust and technology acceptance model (TAM).

Muhayiddin, Ahmed, and Ismail (2012) offer UTAUT research about electronic dinar payment system adoption by collected questionnaire survey 436 user in Malaysia.

L. Abdulwahab and ZulkhairiMdDahalin(2010) The paper's approach is base on literature review on the basis that, the incorporation of these constructs into UTAUT model in context of Telecentre demand attention. The research proposed as antecedent factors of user acceptance of this useful tool of bridging digital divide. They founded performance expectancy, effort expectancy, social influence, facilitating conditions. Anxiety, management effectiveness, program effectiveness also was significant in Context of Telecentre.

Mary Mathew, Balakrishnan N., Pratheeba S. (2010) studies about mobile payment technologies. They shows an unexpected superiority of difference SMS technology, over other technologies like NFC, WAP and others We also used a Delphi based survey with experts to address the possibility that SMS will gain superiority in market diffusion.

Oye, N. D.; A.Iahad, N. and Ab.Rahim, N. (2012) studies about acceptance and usage of ICTin University of Port Harcourt, Nigeria. He use 100 questionnaires were administered and collected They used UTAUT model mainly support for usage of ICT in Nigeria. He also found all determinants affected, performance expectancy, effort expectancy, social influence, facilitating conditions, anxie, attitude towards, self efficacy were found to be significant on behavior intention to use behavior.

Jarno van de Moosdijk (2009) Use unified theory of acceptance and use of technology (UTAUT) and technology acceptance model (TAM) to examine acceptance of electronic payment systems. They used to evaluate the most popular Online payment method in the Netherlands. The results found that all determinant significant Acceptance of electronic payment systems in Netherlands.

Zon-Yau Lee, Hsiao-Cheng Yu, Pei-Jen Kuo (2009) They explores the advantages and limitations of four types of electronic payment systems different types of electronic payment systems online credit card payment, electronic cash, electronic checks, smart cards Each payment system was assessed from four perspectives: the technological aspect, theeconomic aspect, the social aspect, and the regulatory aspect.

Kholoud Ibrahim Al-Qeisi (2009) The proposed research model is tested into two countries (UK and Jordan) to investigate the viability of the unified model of technology acceptance in different boundaries as a model of individuals' discretionary usage of Internet banking. The researcher found the total effect of this extension exhibited website quality perceptions the most influential determinant of usage behavior in both models and performance expectancy construct was second in effect. Social influence had no impact on the usage behavior in both models social influence under discretionary usage and increased experience conditions.

Horst Treiblmaier, Andreas Pinterits, Arne Floh (2004) Studies technology acceptance model (TAM) to electronic payment services in the public sector.

Lily Shui-Lien Chen, Chi Jung Kuan, Yung-Hsin Lee and Hsiang-Ling Huang (2011). This study is to explore consumer acceptance after implement the system based on "the Unified Theory of Acceptance and Use of Technology" (UTAUT) model. The purpose of our research empirically examined how UTAUT helped online game companies understand consumer intention to play online game through mobile phones and how this changed as a consumer gained experience of playing online game and web browsing on mobile phones. The consumer's experience of playing online game and web browsing on mobile phones played moderating roles. Used the questionnaire method to engage in exploration. Then, tested the construct validity by confirmatory factor analysis (CFA), and applied the structural equation modeling (SEM) to examine consumer attitude toward using technology.

Chian-Son Yu (2012) applied unified theory of acceptance and use of technology (UTAUT) model to factor affecting individuals to adopt mobile banking. Sampling 441 respondents, they found social influence, perceived financial cost, performance expectancy, and perceived credibility significant adoption behavior.

Al-Gahtaniet al. (2007) studies about adoption of mobile technologies for Chinese. His research use the UTAUT model with constructs. He also founded

Performance expectation, effort expectation, and social influence has a significant impact on attitude toward using mobile devices. Facilitation conditions have an insignificant impact on attitude. Attitude has a significant effect on behavioral intention toward mobile technology and Gender and education have a significant effect on performance expectation, effort expectation, and social influence. Internet usage experience has an insignificant effect on performance expectation, effort expectation, and social influence.

Zhou et al. (2010) add to task characteristics, technology characteristics and task technology to original UTAUT model. His studies UTAUT to explain mobile banking user adoption by respondent from 250 valid responses data was collected from two universities and three mobile service halls in a city located in eastern China. The results found that performance expectancy, task technology fit, social influence, And facilitating conditions have significant effects on user adoption.

Riffai et al. (2012) studies on-line banking in Oman. They used unified theory of acceptance and use of technology (UTAUT) model and they found results all constructs contributed to explain intention and use of internet banking, except social influence Moderating effects from UTAUT model were not important to explain intention.

CHAPTER III

RESEARCH METHODOLOGY

In this chapter, present an overview of methodology used in study methods, research, tool, and schedule which are from the beginning until the end of the research.

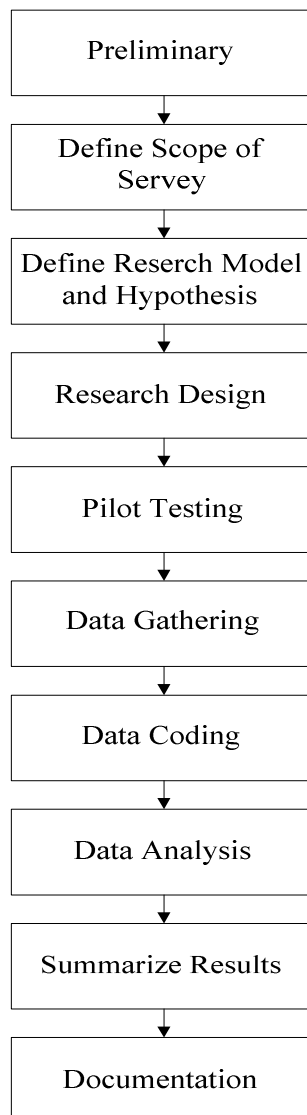


Figure 3.1 Research Methodology

3.1 Preliminary Study

At present, the varieties of electronic payment services are highly increasing. In Thailand, there have been very few customers of electronics payment when compared to other countries and the customers have still been unconfident on such technology without good enough knowledge, behavior or basis. Therefore, the researcher had studied from various figure, statistics, report and internet to cover the following research.

- The importance of Internet and Electronic payment services.
- To study and develop a model the relationships among each factors that importance for acceptance of electronic payment services.
- The factors which influence of information technology adoption.

3.2 Define Scope of Survey

3.2.1 Target Group

The target population for this study included population in Thailand. They were individual, which are internet users and had experience using electronic payment services.

3.2.2 Population and Sampling

Research selected population in Thailand for the sampling in this study. Next step, the sampling method to select sample from all of population was conducted. There are 25,090,390 internet users (www.truehits.net) Taro Yamane theoretical statistics were used to calculate the size of sampling group. The size 400 sample conforms to Yamane's finite population sampling formula, along with a 95% confident level and a 5% precision level (Sinjaru, 2007).

$$N = \frac{n}{1 + N(e)^2}$$

Where

n = Sample size

N = Population size

e = Level of precision

3.3 Define Research Model and Hypotheses

The proposed model of this study was developed based on the Unified Theory of Acceptance and Use of Technology (UTAUT). This study had nine constructs in this model with include performance expectancy, effort expectancy, social influence, facilitating condition, facilitating condition, behavior intension, perceived security, service quality, cost and three dummy variables with included gender, age, and experience

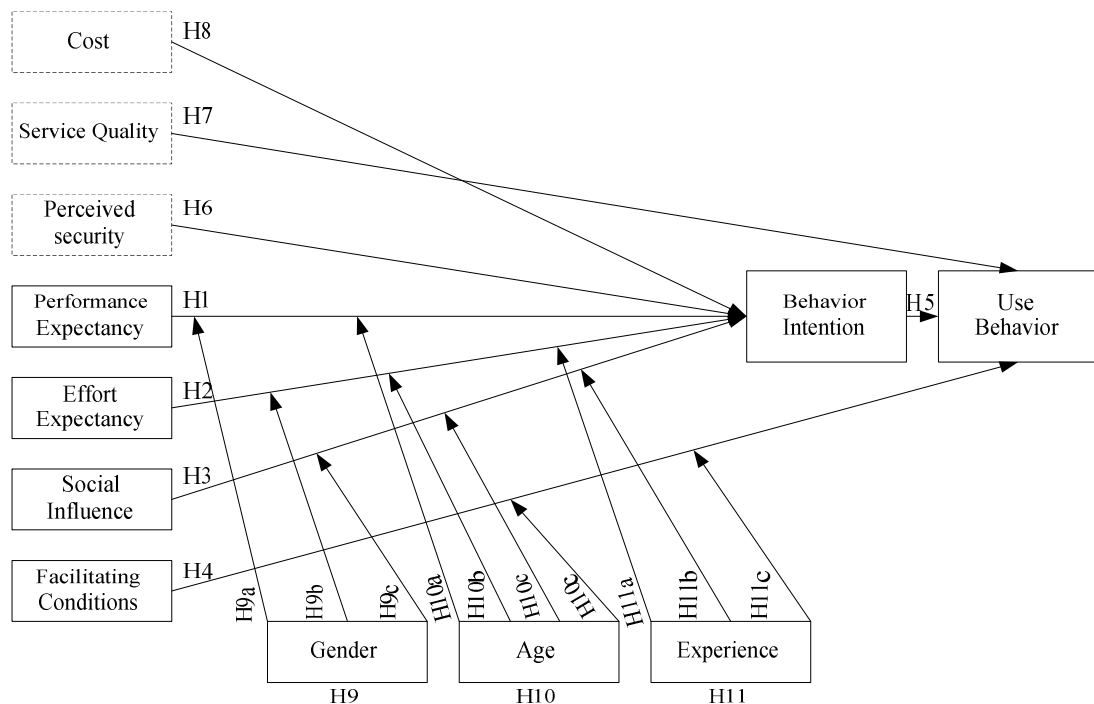


Figure 3.2 Proposed model and Hypotheses

3.3.1 Determining Factors

Performance Expectancy

Performance expectancy in UTAUT, performance expectancy is driven from perceived usefulness (TAM/TAM2) is defined as the degree to which a user perceives that the performance of an information system will enhance their performance or productivity (Venkatesh et al., (2003). Research from Chian-Son Yu (2012) found that social influence, perceived financial cost, performance expectancy, and perceived credibility significantly affect mobile banking adoption behavior. The following hypothesis is proposed:

H1: Performance expectancy will have a positive influence on behavior intention to use electronic payment services.

Effort Expectancy

Effort expectancy is defined as the degree of ease associated with the use of the particular information system (Venkatesh et al., (2003). Al-Gahtani et al. (2007) studies about adoption of mobile technologies for Chinese his research use the UTAUT model with constructs he also found that effort expectancy has a significant impact on attitude toward using mobile devices. The following hypothesis is proposed:

H2: Effort expectancy will have a positive influence on behavior intention to use electronic payment services.

Social Influence

Social influence is defined as the degree to which an individual perceives that important others believe he or she should use the new system. Social influence is a direct determinant of behavioral intention by Venkatesh et al., (2003). An individual's perceptions that people who are important think he or she should perform the behavior (Ajzen, I., & Fishbein, M. (1980). Result from Muhayiddin, Ahmed, and Ismail (2012) offer UTAUT research about electronic dinar payment system adoption by collected questionnaire survey 436 users in Malaysia is Social Influence significantly with model. The following hypothesis is proposed:

H3: Social influence will have a positive influence on behavior intention to use electronic payment services.

Facilitating Conditions

Facilitating conditions are defined as the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system. This definition captures concepts embodied by three different constructs: perceived behavioral control (TPB/ DTPB, C-TAM-TPB), facilitating conditions (MPCU), and compatibility (IDT) by Venkatesh et al., (2003). Ian Phau, Min Teah, Michael Lwin (2009) studies Facilitating conditions and social factors as predictors of attitudes and intentions to illegally download. They add factor facilitating conditions to model for hypotheses. Follow hypothesis:

H4: Facilitating condition will have a positive influence on to use electronic payment services.

Behavior Intension

Behavior intension is defined as the degree behavior intension to be direct use behavior. Behavior is an important factor various factors will affect the behavior of the previous results to use behavior

H5: Behavior intension will have a positive influence to use electronic payment services.

Perceived Security

Perceived security is very important in electronic payments users the confidence to trust electronic payments. Changsu Kim (2009) studies an empirical study of customers' perceptions of security and trust in e-payment systems. His found that perceived security important factor to electronic payment systems. Tsiakis and Sthephanides (2005). Found the concept of security and trust in electronic payments explained if the level of perceived security in an e-payment transaction is too low, consumers are unlikely to participate in the transaction until solutions are implemented to allay their fears. Follow hypothesis:

H6: Perceived security will have a positive influence on behavior intention to use electronic payment services.

Service Quality

Service quality is define user is perception on service provider's performance parasuraman et al (1988). Delone and McLean (2003) proposed updated IS success model later. A new dimension service quality including for IS success measurement. Researcher add service quality as a factor in electronic payment services because service quality is affect satisfy customers and study focuses on service quality delivered by electronic payment service. Follow hypothesis:

H7: Service quality will have a positive influence on to use electronic payment services.

Cost

T. Dahlberg, et al (2008) said cost or perceived cost refers to the extent to which a person believes that using mobile payment will cost money. Cost is considered as another important inhibitor affecting user's behavioral intention in mobile payment. Peng Hongxia (2011) found cost have negative effect on consumer adoption. Prices or fees are an important for technology users Price or value of the rules will result in higher rounds the less. At the same price or lower the fees will result in more users. Follow hypothesis:

H8: Cost will have a positive influence on behavior intention to use electronic payment services.

Gender

The rate of demography of the electronic payment services 2 levels of gender: man, woman. As follow assumption.

H9 a: Gender will be a positive moderate the influence between gender and performance expectancy.

H9 b: Gender will be a positive moderate the influence between gender and effort expectancy.

H9 c: Gender will be a positive moderate the influence between gender and social influence.

Age

The rate of demography of the electronic payment services 4 levels of gender: 21-30 years old, 31-40 years old, 41-50 years old, over 50 years old. As follow assumption.

H10 a: Age will be a positive moderate the influence between age and performance expectancy.

H10 b: Age will be a positive moderate the influence between age and effort expectancy.

H10 c: Age will be a positive moderate the influence between age and social influence.

H10 d: Age will be a positive moderate the influence between age and facilitation conditions.

Experience

The rate of demography of the electronic payment services 4 levels of gender: below 1 year, 1-3 years, 3-5 years, over 5 years. As follow assumption.

H11 a: Experience will be a positive moderate the influence between age and effort expectancy.

H11 b: Experience will be a positive moderate the influence between age and social influence.

H11 c: Experience will be a positive moderate the influence between age and facilitation conditions.

3.4 Research Design

The survey was developed from many researcher papers. There are 3 sections in this questionnaire.

Questionnaires: There was divided into 3 parts a show in Table 3.1

Table 3.1 Topic of the Questionnaire

| Parts | Topic |
|-------|--|
| 1. | Information about the demographics of the respondents. |
| 2 | The usage of the electronic payment services. |
| 3 | The acceptance of electronic payment services. |

Part1: Information about the demographics of the respondents

The first part consists of a request for demographic information about respondents' characteristics including gender, age, education, occupation, income, experience, using internet, average weekly hours spent on surfing the internet, and internet access location. There are 8 items in this part.

Part2: The usage of the electronic payment services

The second part there was 5 items in this part, focuses on the usage of electronic payment services, frequencies using electronic payment services purpose of electronic payment use for experienced users.

Part3: The acceptance of electronic payment services

The third part including 34 items has questions measuring the constructs in the research model. All constructs were measured using multiple items consisting of the nine constructs: (1) performance expectancy (2) effort expectancy (3) social influence (4) facilitating conditions (5) behavior intention (6) use behavior (7) perceived security (8) service quality and (9) cost.

Table 3.2 Measure item for performance expectancy

| Constructs | Reference | Variable name | Measurement items |
|-----------------------------|--|----------------------|---|
| Performance Expectancy (PE) | (Venkatesh et al., 2003), (Chian-Son Yu (2012) | PE1 | Electronic payment services are useful for your financial transaction. |
| | | PE2 | Electronic payment services prompts for your payment anytime and anywhere. |
| | | PE3 | Electronic payment services provide you more convenience and quick. |
| | | PE4 | Electronic payment services are another channel for making your payment electronically. |

Table 3.3 Measure item for effort expectancy

| Constructs | Reference | Variable name | Measurement items |
|------------------------|---|----------------------|---|
| Effort Expectancy (EE) | (Venkatesh et al., 2003), Al-Gahtaniet al. (2007) | EE1 | You consider that using electronic payment services is easy for you. |
| | | EE2 | You consider that it is easy to learn how to use electronic payment services. |
| | | EE3 | It is easy to have skill in using electronic payment Services. |

Table 3.4 Measure item for social influence

| Constructs | Reference | Variable name | Measurement items |
|--------------------------|---|----------------------|--|
| Social Influence (SI) | Venkatesh et al., (2003). Ajzen, I., & Fishbein, M. (1980). | SI1 | You use electronic payment services because it is well-known. |
| | | SI2 | You decide to use electronic payment services to reduce carrying high amount of cash and avoid it from being stolen or loosen. |
| | | SI3 | Your friend or the other people around you have influence on your decision about using electronic payment services. |
| | | SI4 | You decide to use electronic payment services based on other's usage. |
| | | SI5 | You decide to use electronic payment services according to other's suggestion. |

Table 3.5 Measure item for facilitation conditions

| Constructs | Reference | Variable name | Measurement items |
|------------------------------------|--|----------------------|--|
| Facilitation Conditions (FC) | Venkatesh et al., (2003), Thatcher et al, 2007 | FC1 | There are variety patterns of electronic payment services. |

Table 3.5 Measure item for facilitation conditions (cont.)

| Constructs | Reference | Variable name | Measurement items |
|-------------------|------------------|----------------------|---|
| | | FC2 | You have enough computer or internet for using electronic payment services. |
| | | FC3 | You can reach necessary computer or internet for using electronic payment services. |

Table 3.6 Measure item for behavior intention

| Constructs | Reference | Variable name | Measurement items |
|-------------------------|---|----------------------|---|
| Behavior Intension (BI) | Supaporn Chomchalao (2010), A-porn Molee (2011), Premsiri Sangpoom (2013) | BI1 | You intend to use electronic payment services because it is useful for you. |
| | | BI2 | You intend to suggest other person to use electronic payment services. |
| | | BI3 | You intend to use more electronic payment services. |
| | | BI4 | You intend to use electronic payment services in the future. |

Table 3.7 Measure item for use behavior

| Constructs | Reference | Variable name | Measurement items |
|-----------------------|---|----------------------|---|
| Use Behavior (USE) | Supaporn Chomchalao (2010), A-porn Molee (2011), Premsiri Sangpoom (2013) | USE1 | Generally, you are satisfied in electronic payment services. |
| | | USE2 | Generally, an electronic payment service provides more convenience and quick in your daily-life. |
| | | USE3 | Generally, you resume using electronic payment services because of your good experience about it. |
| | | USE4 | Generally, electronic payment services are interesting for you. |

Table 3.8 Measure item for security

| Constructs | Reference | Variable name | Measurement items |
|----------------------------|--|----------------------|---|
| Perceived Security (PS) | Changsu Kim (2009), Tsiakis and Sthephanides (2005) | SI1 | Safety is the main criteria of your decision in using electronic payment services. |
| | | SI2 | Personal information protection, encryption, privacy protection, or standard certification has an influence on your decision in using the services. |

Table 3.8 Measure item for security (cont.)

| Constructs | Reference | Variable name | Measurement items |
|-------------------|------------------|----------------------|---|
| | | SI3 | You rely on electronic payment service which has high security. |
| | | SI4 | You require security standard and privacy protection of electronic payment service. |

Table 3.9 Measure item for service quality

| Constructs | Reference | Variable name | Measurement items |
|----------------------|--|----------------------|---|
| Service Quality (SQ) | parasuraman et al (1988), Delone and McLean (2003) | SQ1 | The system or website has consultancy or monitoring service after completion of electronic payment services. |
| | | SQ2 | The system or website can response users' requirement, for example, answering a question via e-mail, 24-hour web board. |
| | | SQ3 | The system or website can provide variety kinds of electronic payment services. |
| | | SQ4 | Generally, you are satisfied in the quality of electronic payment services. |

Table 3.10 Measure item for cost

| Constructs | Reference | Variable name | Measurement items |
|-------------------|--|----------------------|---|
| Cost (CO) | PENG Hongxia (2011), T. Dahlberg, et al (2008) | FE1 | You consider that the transaction fee is quite expensive or high. |
| | | FE2 | You consider that the way to reach electronic payment services cost you too high. |
| | | FE3 | The current electronic payment services charges high or expensive fee. |

3.5 Pilot Testing

The pilot test was conducted before the main survey to determine the problem of the instrument. The pilot test of the questionnaire involved 30 people who had experience with internet and electronic payment service. Respondents were asked the understanding about the meaning, comment on the length of the questionnaire, list item all constructs complete questionnaire. After their comment had been the questionnaire was review which the word style of the item will be clear and easy for respondents to understand. All structures in constructs in the questionnaire are factor loading and cronbach's alpha to assess reliability. Cronbach's alpha analysis acceptable minimum value of the reliability than 0.7 which indicates reliability (Siljaru, 2009).

Table 3.11 Reliability analysis of pilot test

| Construct | item | cronbach's Alpha |
|-------------------------|-------------|-------------------------|
| Performance Expectancy | PE1 | 0.739 |
| | PE2 | |
| | PE3 | |
| | PE4 | |
| Effort Expectancy | EE1 | 0.700 |
| | EE2 | |
| | EE3 | |
| Social Influence | SI1 | 0.756 |
| | SI2 | |
| | SI4 | |
| | SI5 | |
| Facilitating Conditions | FC1 | 0.823 |
| | FC2 | |
| | FC3 | |
| Perceived Security | SE1 | 0.891 |
| | SE2 | |
| | SE3 | |
| | SE4 | |
| Service Quality | SQ1 | 0.739 |
| | SQ2 | |
| | SQ3 | |
| | SQ4 | |

Table 3.11 Reliability analysis of pilot test (cont.)

| Construct | item | cronbach's Alpha |
|--------------------|-------------|-------------------------|
| Cost | FE1 | 0.899 |
| | FE2 | |
| | FE3 | |
| Behavior Intension | BI1 | 0.836 |
| | BI2 | |
| | BI3 | |
| | BI4 | |
| Use Behavior | USE1 | 0.831 |
| | USE2 | |
| | USE3 | |
| | USE4 | |

3.6 Data Gathering

The questionnaire included three methodologies to gather data from information in the survey:

1. The first part is the demographic profile of the participants including (gender, age, education, occupation, income, experience year of using the electronic payment services, average weekly hours spent on surfing the internet, place of using internet services).
2. The second part asked the respondents what the electronic payment service they had used, frequencies using electronic payment services and purpose of electronic payment services.
3. The third part is factor associated with electronic payment services adoption base on the factors of performance expectancy, effort expectancy, social influence, facilitating conditions, security, service quality, cost, behavior intention, and use behavior.

Each item was measured using five-point Likert-type scale, with answer choice ranging from disagree (1) to strongly agree (5) The perceptions were also interpreted for the five levels in Likert's scale (Silpjaru, 2007), as following:

Point average 4.50 – 5.00 = highest level

Point average 3.50 – 4.49 = high level

Point average 2.50 – 3.49 = medium level

Point average 1.50 – 2.49 = low level

Point average 1.00 – 1.49 = lowest level

3.7 Data Coding

After the questionnaires had been return, data ware screened and uncompleted answers were eliminated and data from respondents Questionnaire into Microsoft Excel and converted to Statistical Package for the Social Science for Window (SPSS) version 20 And Linear Structure Relationship (LISREL) version 9.1 for student edition for analysis.

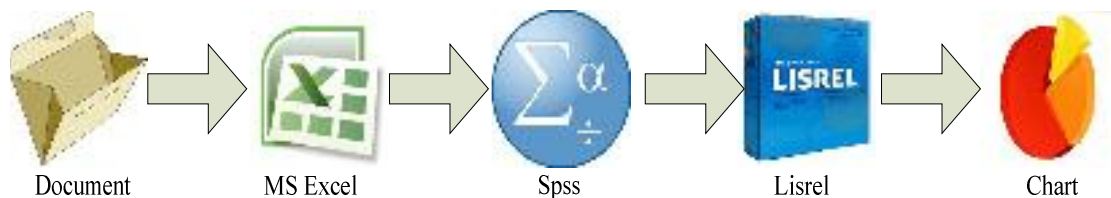


Figure 3.3 Methodology of data from document to chart

3.8 Data Analysis

Data was analyzed by using SPSS (Statistical Package for the Social Science for Window) version 20 for window and LISREL (Linear Structure Relationship) version 9.1 for student edition. SPSS result is show in from of chart, table, relation, cronbach's alpha. LISREL results is showing all relationship factors.

The first part: The first part includes nominal scale. This part was used to collect demographics information about respondents including gender, age, education, and occupation, and income, experience year of using the electronic payment service, average weekly hours spent on surfing the internet, and place of using internet service. The researcher use frequency method and percentage format and some demographic information as gender, age, experience year of using the electronic payment services which they are the modulator for co-analyzed with the main factor in part 3 by LISREL analysis.

The second part: The second part focuses on the usage of electronic payment services which are checklist. Researcher use frequency and percentage approaches which are described results in table and graph patterns.

The third part: This part consist of the constructs of information performance expectancy, effort expectancy, social influence, facilitating conditions, security, service quality, cost, behavior intention, use behavior. This part related to main factors influenced the decision to use electronic payment services. This part is rating scale type. The researcher used standard deviation value (S.D.), and the correlation matrix analyzed the data, the results were shown in table and graph result model formats.

3.9 Documentation

Final, follow the methodology researcher collected most of results mentioned above. All documents related and concerned had been carefully found out, considered, inspected, and referred for confident reliability.

3.10 Research Tools

Hardware

| | |
|-----------|---------------------------------------|
| CPU | : Intel(R) core(TM) i5 2410M @2.30GHz |
| Hard disk | : 650GB HDD |
| Ram | : 4GB DDR3 Memory |
| Monitor | : Acer 14.0' HD LED LCD |

Software

| | |
|---------------------|--|
| Peripheral Devices | : Keyboard Mouse Printer |
| Operating System | : Microsoft window 7 |
| Statistical Program | : SPSS version 20 (Statistical Analysis System) RISREL version 9.1 and AMOS |
| PDF View Tool | : Adobe Acrobat 9.0 Professional |
| Document Generator | : Microsoft Word 2007 and Microsoft Excel 2007 |

CHAPTER IV

RESULTS AND DISCUSSION

In this chapter, the results from the survey are presented. Researcher will analyze show the data and collect. This chapter is divided into main part.

Firstly. Present the result data in this survey. There are three part of questionnaire which includes respondent profiles, the usage of the electronic payment services, and the acceptance of electronic payment services.

The second part present of hypothesis testing with main factors and all modulator for study of acceptance factors for electronic payment services. Structure equation model testing (sem) analysis to investigate for relationship among all factors on this research model.

4.1 The Survey Results

This topic present show results demographic characteristics of the sampling and amount of electronic payment services. The population in this study is 400 people are users use electronic payment service and internet users in Bangkok. Finally, an overall 400 questionnaires from Google document, questionnaires were used for analyze, response rate 100 %. Table 4.1 shows the summary of all respondents.

Descriptive statistics of respondents were shows in table 4.1 show that; the researcher found that 55% were female. Age of respondents by 62.5% was 21-30 year olds. Education levels of respondent by 71.2% associate's or bachelor' degree. Company employees/Private sector employees 49.5%. Income per month of respondents 47.5% were 15,000-20,000 baths. Respondents use the experience using electronic payment services 1-3 years which is frequency most used by respondents 53.2%. Respondents use the experience using internet 11-15 years 50.2%. About of

respondents 50.2% using electronic payment services place at home. 46.7 percent most used www.paypal.com.

Table 4.1 Summaries demographics of the respondents

| Measure | Item | Frequency | Percentage (%) |
|---------------------|--|------------------|-----------------------|
| Total | Total | 400 | 100 |
| Gender | Male | 170 | 42.5 |
| | Female | 230 | 57.5 |
| Age | 21-30 years old | 250 | 62.5 |
| | 31-40 years old | 89 | 22.5 |
| | 41-50 years old | 41 | 10.2 |
| | Over 51years old | 20 | 5.0 |
| Education level | Bachelor's degree | 285 | 71.2 |
| | Master's degree or higher | 115 | 28.7 |
| Occupation | Students | 15 | 3.75 |
| | Government officials/State enterprise employees | 140 | 35.0 |
| | Company employee/Private sector employees | 198 | 49.5 |
| | Owner/Freelance | 40 | 10.0 |
| | Unemployment/Retire | 5 | 1.2 |
| | Others | 2 | 0.5 |
| Income per month | 15,000-20,000 baths | 190 | 47.5 |
| | 20,001-25,000 baths | 143 | 35.7 |
| | 25,001-30,000 baths | 40 | 10.0 |
| | 35,001-40,000 baths | 12 | 3.0 |
| | 40,001-45,000 baths | 12 | 3.0 |
| | Over 45,001 baths | 3 | 0.7 |

Table 4.1 Summaries demographics of the respondents (cont.)

| Measure | Item | Frequency | Percentage (%) |
|--|--------------------|------------------|-----------------------|
| Total | Total | 400 | 100 |
| Experience using electronic payment services | Below 1 year | 7 | 1.7 |
| | 1-3 years | 213 | 53.2 |
| | 3-5 years | 156 | 39.0 |
| Experience using internet | Over 5 years | 24 | 6.0 |
| | 1-5 years | 10 | 2.5 |
| | 6-10 years | 87 | 21.7 |
| | 11-15 years | 201 | 50.2 |
| | 16-20 years | 90 | 22.5 |
| Internet access location | Over 20 years | 12 | 3.0 |
| | Home | 201 | 50.2 |
| | University/office | 157 | 39.2 |
| | Internet cafe/Shop | 40 | 10.0 |
| Electronic payment services website ever used (multiple choices) | Others | 2 | 0.5 |
| | www.paypal.com | 187 | 46.7 |
| | www.paysbuy.com | 60 | 15.0 |
| | www.taradpay.com / | 41 | 10.25 |
| | www.tarad.com | | |
| | www.thaiepay.com | 3 | 0.7 |
| | www.siampay.com | 2 | 0.5 |
| | www.chiyopay.com | 2 | 0.5 |
| | www.amazonpay.com | 5 | 1.25 |
| | www.asiapay.com | 4 | 1.0 |
| | www.authorize.net | 7 | 1.7 |
| | www.worldpay.com | 6 | 1.5 |
| | www.dwolla.com | 2 | 0.5 |
| www.wepay.com | 2 | 0.5 | |
| others | 79 | 19.75 | |
| Respondent's profile (n=400) | | | |

4.2 Demographic Characteristics of the sample

4.2.1 Profile of Respondents

4.2.1.1 Gender

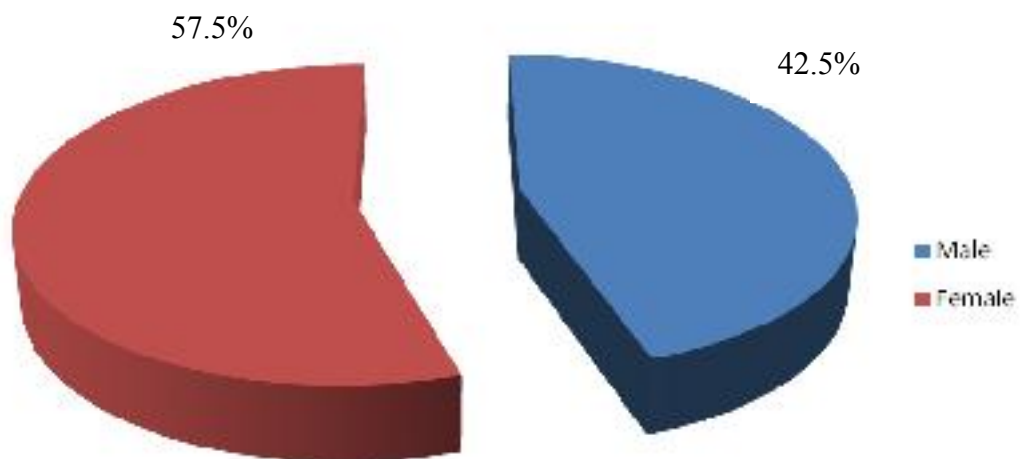


Figure 4.1 The gender of respondents

As figure 4.1 show the gender of respondents, the totals of respondents were 400. 45% of respondent were male, 55% of respondent were female.

4.2.1.2 Age

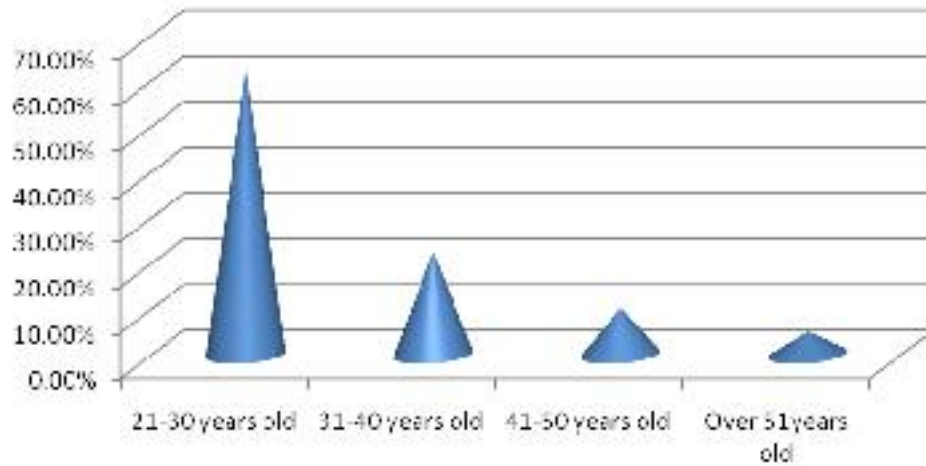


Figure 4.2 The age of respondents

As figure 4.2 show the age of respondents the total of respondents was 400. The majority of the respondent's sixty-two point five percents have age between 21-30 year olds.

4.2.1.3 Education

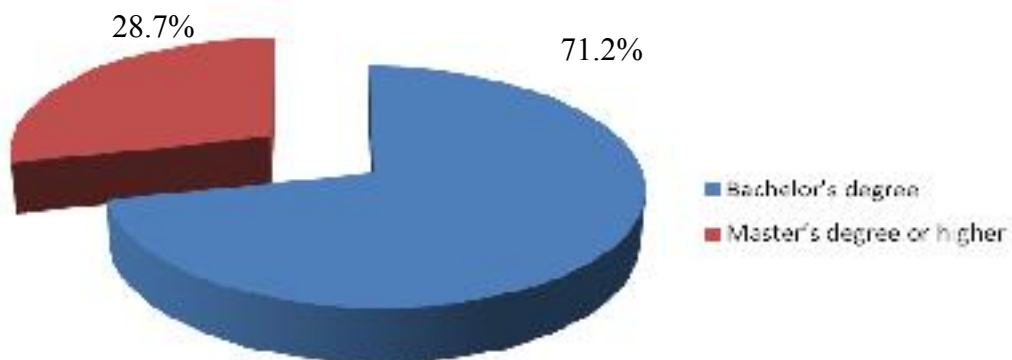


Figure 4.3 The education of respondents

As figure 4.3 show the education of respondents the total of respondents was 400. 71.2 % of respondent were Bachelor's degree Master's degree or higher, 28.7% of respondent were master degree.

4.2.1.4 Occupation

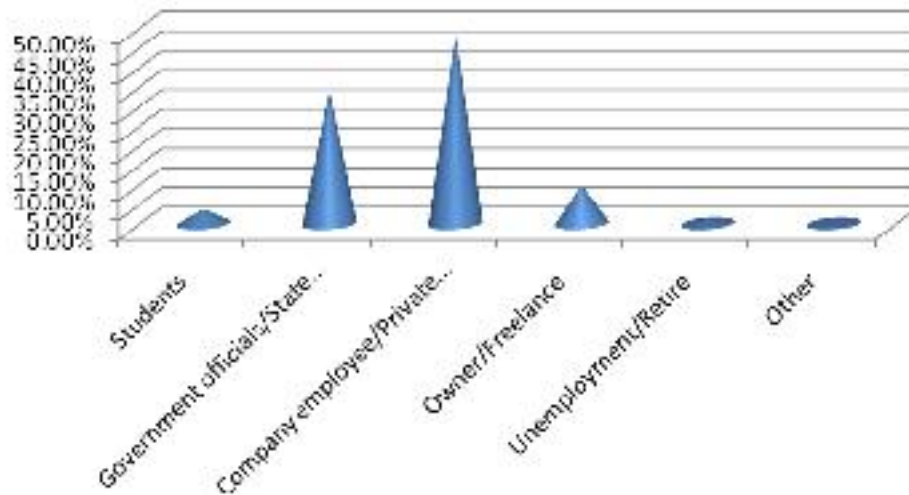


Figure 4.4 The occupation of respondents

As figure 4.4 show the occupation of respondents, the majority company employee/Private sector employees 49.5%. The smallest respondents were students 3.75%, owner/freelance 10%, and unemployment/retire 1.2%, other 0.5%.

4.2.1.5 Income per Month

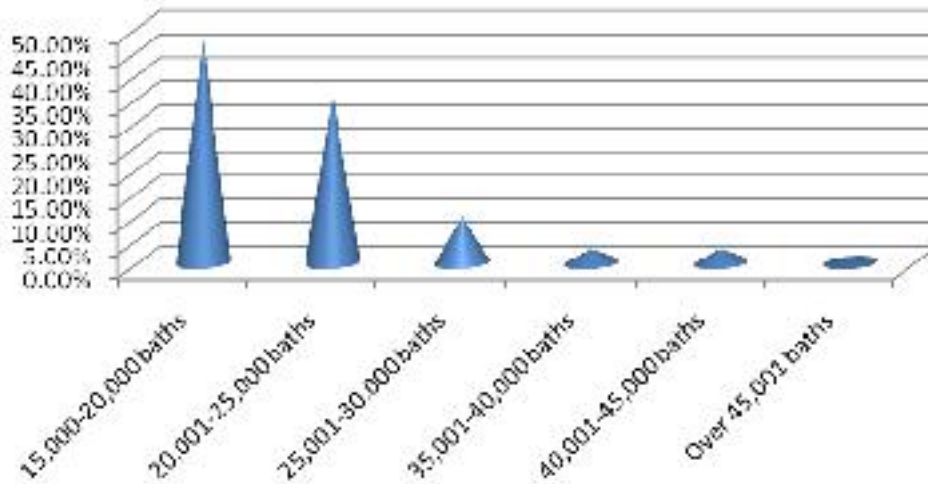


Figure 4.5 The income per month of respondents

As figure 4.5 show the income per month of respondents, the largest number of the respondents were income 15,000-20,000 (47.5%) bath. Follow by, income 20,000-25,000 bath (35.7%), income 25,000-30,000 bath (10.0%).

4.2.1.6 Experience Using Electronic Payment Services

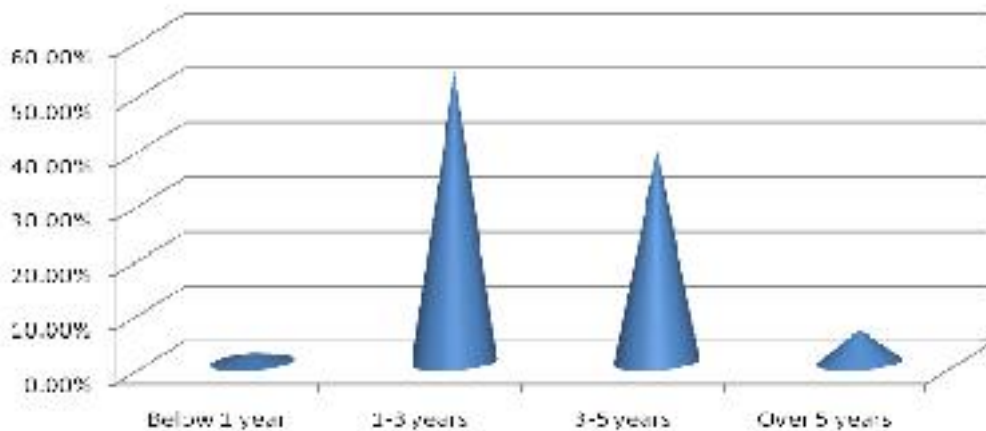


Figure 4.6 The experience using electronic payment services

As figure 4.6 show the experience using electronic payment services. The majority of respondents have experience using electronic payment services 1-3 years 53.2 %. The smallest respondents have experience using electronic payment services below 1 year 1.7 %.

4.2.1.7 Experience Using Internet

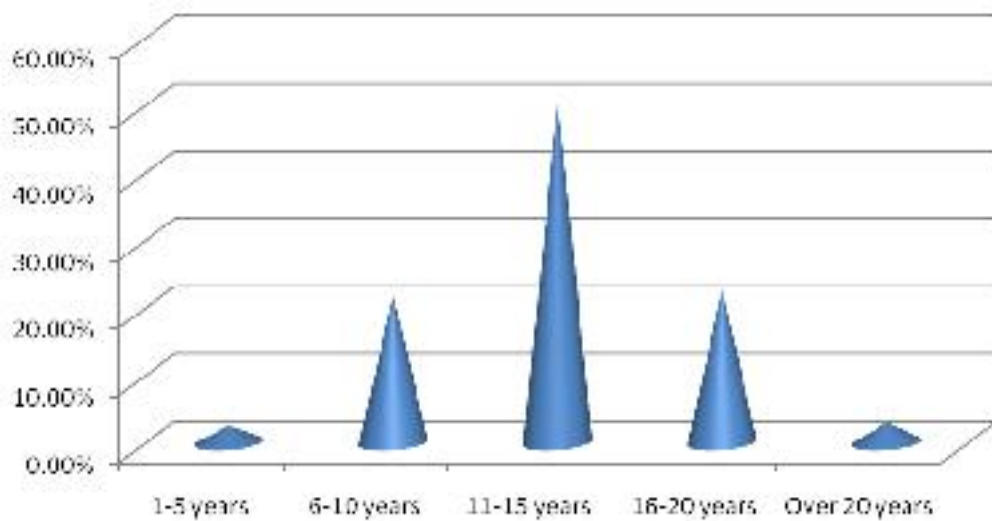


Figure 4.7 The experience using internet

As figure 4.7 show the experience using internet of respondents, the respondents of 400 respondents the largest number of respondents were 11-15 year olds (50.2%). 6-10 years and 16-20 years are nearly value of 21.7% and 22.5% respectively.

4.2.1.8 Internet Access Location

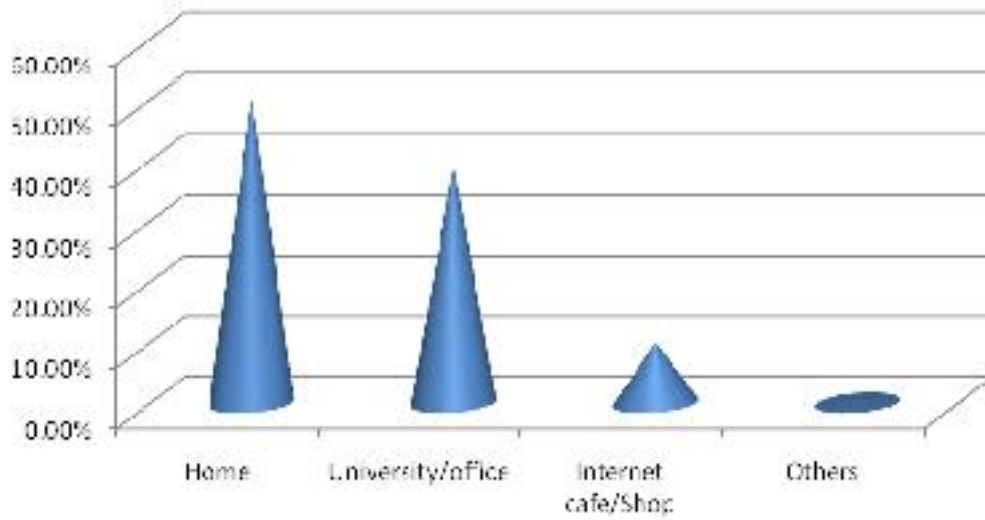


Figure 4.8 Internet access locations

As figure 4.8 show the internet access location of the respondents were 400. Among the respondents 50.2% of respondents were home. 39.2% were also University/office. internetcafe/shop 10.0%, others 0.5%.

4.2.2 Use of electronic payment services

4.2.2.1 Electronic Payment Services Ever Used

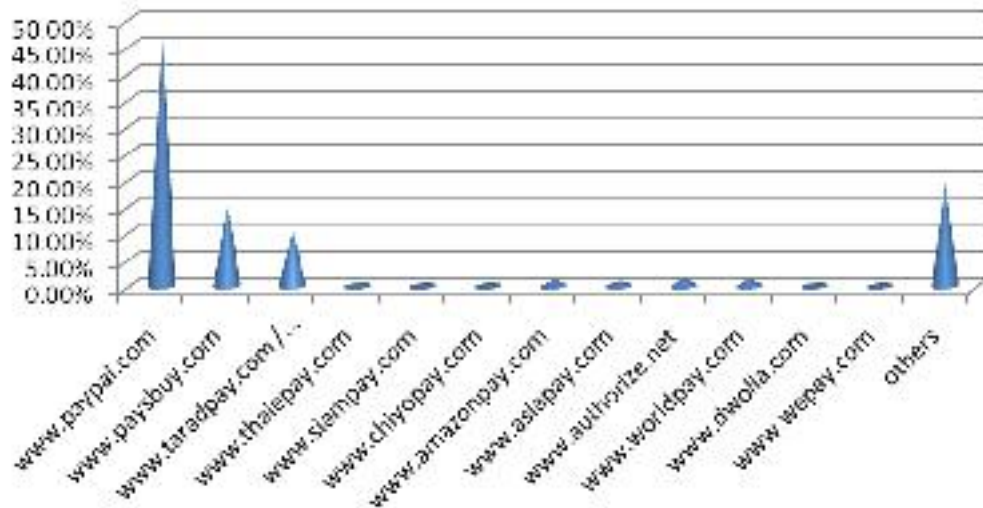


Figure 4.9 Electronic payment services ever used

As figure 4.9 show the electronic payment services ever used. The majority of respondent's www.paypal.com 46.7 % most uses electronic payment services. Others 19.75%. www.paysbuy.com 15.0%. www.tarad.com 10.25%.

4.3 Descriptive Analysis of electronic payment services

4.3.1 Performance Expectancy

Table 4.2 Performance expectancy perception of electronic payment services

| Measurement items | Mean (n=400) | Standard Deviation (n=400) | Min | Max | Interpretation |
|--------------------------|---------------------|-----------------------------------|------------|------------|-----------------------|
| 1. | 4.21 | 0.570 | 1 | 5 | high |
| 2. | 4.23 | 0.512 | 1 | 5 | high |
| 3. | 4.68 | 0.521 | 1 | 5 | highest |
| 4. | 4.13 | 0.456 | 1 | 5 | high |

4.3.2 Effort Expectancy

Table 4.3 Effort expectancy perception of electronic payment services

| Measurement items | Mean (n=400) | Standard Deviation (n=400) | Min | Max | Interpretation |
|--------------------------|---------------------|-----------------------------------|------------|------------|-----------------------|
| 1. | 4.03 | 0.438 | 1 | 5 | high |
| 2. | 3.99 | 0.415 | 1 | 5 | high |
| 3. | 4.00 | 0.421 | 1 | 5 | high |

4.3.3 Social Influence

Table 4.4 Social influence perception of electronic payment services

| Measurement items | Mean (n=400) | Standard Deviation (n=400) | Min | Max | Interpretation |
|-------------------|--------------|----------------------------|-----|-----|----------------|
| 1. | 3.75 | 0.624 | 1 | 5 | high |
| 2. | 3.38 | 0.743 | 1 | 5 | medium |
| 3. | 3.26 | 0.753 | 1 | 5 | medium |
| 4. | 3.42 | 0.851 | 1 | 5 | medium |
| 5. | 3.34 | 0.742 | 1 | 5 | medium |

4.3.4 Facilitation Conditions

Table 4.5 Facilitation conditions perception of electronic payment services

| Measurement items | Mean (n=400) | Standard Deviation (n=400) | Min | Max | Interpretation |
|-------------------|--------------|----------------------------|-----|-----|----------------|
| 1. | 3.77 | 0.508 | 1 | 5 | high |
| 2. | 4.40 | 0.700 | 1 | 5 | high |
| 3. | 4.45 | 0.627 | 1 | 5 | high |

4.3.5 Behavior Intension

Table 4.6 Behavior intension perception of electronic payment services

| Measurement items | Mean (n=400) | Standard Deviation (n=400) | Min | Max | Interpretation |
|-------------------|--------------|----------------------------|-----|-----|----------------|
| 1. | 4.55 | 0.669 | 1 | 5 | highest |
| 2. | 4.04 | 0.623 | 1 | 5 | high |
| 3. | 4.12 | 0.776 | 1 | 5 | high |
| 4. | 4.03 | 0.597 | 1 | 5 | high |

4.3.6 Use Behavior

Table 4.7 Use Behavior perception of electronic payment services

| Measurement items | Mean (n=400) | Standard Deviation (n=400) | Min | Max | Interpretation |
|-------------------|--------------|----------------------------|-----|-----|----------------|
| 1. | 4.05 | 0.583 | 1 | 5 | high |
| 2. | 4.51 | 0.587 | 1 | 5 | highest |
| 3. | 4.11 | 0.483 | 1 | 5 | high |
| 4. | 4.07 | 0.568 | 1 | 5 | high |

4.3.7 Perceived Security

Table 4.8 Perceived security perception of electronic payment services

| Measurement items | Mean (n=400) | Standard Deviation (n=400) | Min | Max | Interpretation |
|-------------------|--------------|----------------------------|-----|-----|----------------|
| 1. | 4.60 | 0.739 | 1 | 5 | highest |
| 2. | 4.56 | 0.753 | 1 | 5 | highest |
| 3. | 4.03 | 0.674 | 1 | 5 | high |
| 4. | 4.69 | 0.831 | 1 | 5 | highest |

4.3.8 Service Quality

Table 4.9 Service quality perception of electronic payment services

| Measurement items | Mean (n=400) | Standard Deviation (n=400) | Min | Max | Interpretation |
|-------------------|--------------|----------------------------|-----|-----|----------------|
| 1. | 4.51 | 0.772 | 1 | 5 | highest |
| 2. | 4.18 | 0.857 | 1 | 5 | high |
| 3. | 4.05 | 0.441 | 1 | 5 | high |
| 4. | 4.01 | 0.570 | 1 | 5 | high |

4.3.9 Cost

Table 4.10 Cost of electronic payment services

| Measurement items | Mean (n=400) | Standard Deviation (n=400) | Min | Max | Interpretation |
|-------------------|--------------|----------------------------|-----|-----|----------------|
| 1. | 3.32 | 0.937 | 1 | 5 | medium |
| 2. | 3.30 | 0.734 | 1 | 5 | medium |
| 3. | 3.13 | 0.806 | 1 | 5 | medium |

4.4 Hypothesis Testing

In this study, researcher has conducted the following statistical analysis to test hypotheses. Researcher used structure equation modeling to test of overall constructs.

4.4.1 Structure Equation Model Testing

Researcher used Lisrel 9.1 software to analysis the hypothesis model because was efficient for analysis to find path analysis and research model validity according to the specified hypothesis that electronic payment services.

From figure 4.10 the analysis results show correlation matrix value (KM) were lower than 0.9 at the significant level of 0.01 (Hair et al., 1995).

| | BI | USE | PE | EE | SI | FC | PS | SQ | CO | G*EE | G*SI | A*EE | A*SI | A*FC | E*FC | SD |
|------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|-------|------|
| BI | 1.000 | | | | | | | | | | | | | | | 0.55 |
| USE | **0.727 | 1.000 | | | | | | | | | | | | | | 0.45 |
| PE | **0.427 | **0.561 | 1.000 | | | | | | | | | | | | | 0.39 |
| EE | **0.609 | **0.712 | **0.386 | 1.000 | | | | | | | | | | | | 0.34 |
| SI | **0.521 | **0.416 | **0.301 | **0.398 | 1.000 | | | | | | | | | | | 0.53 |
| FC | **0.367 | **0.307 | **0.020 | **0.459 | **0.424 | 1.000 | | | | | | | | | | 0.53 |
| PS | **0.295 | **0.489 | **0.244 | **0.591 | **0.217 | **0.680 | 1.000 | | | | | | | | | 0.65 |
| SQ | **0.475 | **0.600 | **0.399 | **0.727 | **0.351 | **0.530 | **0.774 | 1.000 | | | | | | | | 0.53 |
| CO | **0.362 | **0.198 | **0.237 | **0.016 | **0.228 | **0.178 | **0.177 | **0.072 | 1.000 | | | | | | | 0.76 |
| G*EE | **0.148 | **0.211 | **0.201 | **0.295 | **0.179 | **0.455 | **0.340 | **0.454 | **0.107 | 1.000 | | | | | | 2.04 |
| G*SI | **0.213 | **0.221 | **0.198 | **0.294 | **0.305 | **0.507 | **0.345 | **0.435 | **0.141 | **0.981 | 1.000 | | | | | 1.79 |
| A*EE | **0.185 | **0.024 | **0.175 | **0.033 | **0.011 | **0.131 | **0.057 | **0.117 | **0.098 | **0.273 | **0.270 | 1.000 | | | | 1.65 |
| A*SI | **0.213 | **0.221 | **0.198 | **0.294 | **0.305 | **0.507 | **0.345 | **0.435 | **0.141 | **0.981 | **0.297 | **0.270 | 1.000 | | | 1.79 |
| A*FC | **0.167 | **0.017 | **0.083 | **0.064 | **0.047 | **0.298 | **0.123 | **0.127 | **0.147 | **0.325 | **0.338 | **0.971 | **0.338 | 1.000 | | 1.79 |
| E*FC | **0.099 | **0.085 | **0.040 | **0.014 | **0.078 | **0.431 | **0.313 | **0.334 | **0.051 | **0.391 | **0.408 | **0.451 | **0.408 | **0.531 | 1.000 | 2.21 |

Figure 4.10 Standard Deviation value (SD), and Correlation Matrix (KM)

According to the Table 4.11, chi-square was 25.20 and degree of freedom was 12. All values of the ratio of chi-square to degree of freedom ($\chi^2/d.f.$) at 2.1, Goodness-of-fit (GFI) at 0.992, Adjusted goodness-of-fit (AGFI) at 0.918, Normalized fit index (NFI) at 0.997, NNFI at 0.989, Comparative fit index (CFI) at 0.999, Root mean square residual (RMR) at 0.007. Standardized RMR at 0.009. Root mean square error of Approximation (RMSEA) at 0.052 are accepted and indicate a good model fit. Apart from examination of these values, the researcher used to examine values of reliability and convergent validity using cronbach’s alpha and factor loading, respectively.

Table 4.11 Fit indices for measurement

| Goodness-of-fit measures | Recommend Value | Model Value |
|---|-----------------|-------------|
| Fit measure | | |
| χ^2 | N/A | 12.70 |
| d.f. (Degree of freedom) | N/A | 5 |
| $\chi^2/d.f.$ | ≤ 3.00 | 2.54 |
| Goodness-of-fit(GFI) | ≥ 0.90 | 0.992 |
| Adjusted goodness-of-fit (AGFI) | ≥ 0.90 | 0.918 |
| Normalized fit index (NFI) | ≥ 0.90 | 0.997 |
| Non-Normalized fit index (NNFI) | ≥ 0.90 | 0.989 |
| Comparative fit index (CFI) | ≥ 0.90 | 0.999 |
| Root mean square residual (RMR) | ≤ 0.05 | 0.007 |
| Standardized RMR | ≤ 0.05 | 0.009 |
| Root mean square error of Approximation (RMSEA) | ≤ 0.10 | 0.052 |

*Recommended values have been adapted since Hair et al. (1998)

4.4.2 The Modulators of Preliminary analysis

Preliminary analysis all factors, the research needs test each modulators or dummy variable for finding dummy variables which they are suitable and affected really. Dummy variables of hypothesis have three modulator: gender (male), (female), age (21-30 years olds), (31-40 years olds), (41-50 years olds), (over 51 years olds), experience (below 1 years) (1-3 years) (3-5 years) (over 5 years). T-values have or equal at 1.96, it will be significant and model adjustment was used for investigating the modulators in 9.1 for student edition.

Table 4.12 Meaning of Dummy variables

| Dummy variable names | Value of dummy variables | |
|----------------------|--------------------------|-------------------|
| | 1 | 0 |
| Gender | female | male |
| Age | below 30 years olds | over 31 year olds |
| Experience | Less than 3 years | Over than 3 years |

Gender

The researcher defined 1 was female and 0 was male. Researcher founded value of dummy variables genders: G*EE, G*SI.

Table 4.13 Pretesting with the modulators (gender)

| Factor names / T-value | original | th (6,1) | - | - |
|------------------------|----------|----------|---|---|
| PE | 1.49 | 2.35 | - | - |
| EE | 10.60 | 10.02 | - | - |
| SI | 4.61 | 4.11 | - | - |
| FC | -3.00 | -4.39 | - | - |
| PS | 0.26 | 0.48 | - | - |
| SQ | 9.96 | 12.63 | - | - |
| CO | -14.97 | -14.00 | - | - |
| G*PE | -0.27 | -1.15 | - | - |
| G*EE | -3.99 | -2.99 | - | - |
| G*SI | 6.69 | 6.41 | - | - |

Age

The researcher defined 1 was below 30 years old and 0 was over 31 years old. Researcher founded value of dummy variables age: A*EE, A*SI, A*FC.

Table 4.14 Pretesting with the modulators (age)

| Factor names / T-value | original | th (6,2) | - | - |
|------------------------|----------|----------|---|---|
| PE | 0.25 | 0.51 | - | - |
| EE | 6.86 | 6.62 | - | - |
| SI | 16.00 | 15.43 | - | - |
| FC | -1.77 | -2.45 | - | - |
| PS | -0.69 | 0.67 | - | - |
| SQ | 9.70 | 10.93 | - | - |
| CO | -18.22 | -17.59 | - | - |
| A*PE | -1.30 | -1.40 | - | - |
| A*EE | 2.18 | 2.26 | - | - |
| A*SI | -2.43 | -2.40 | - | - |
| A*FC | -4.59 | -4.74 | - | - |

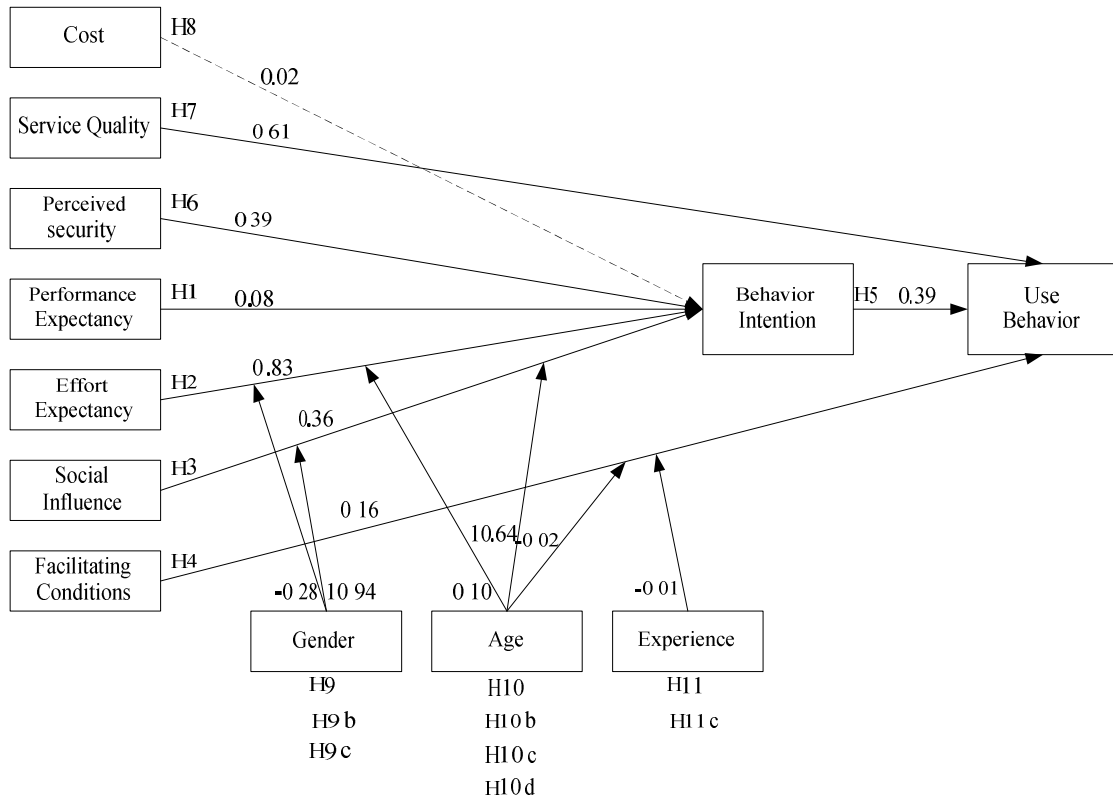
Experience

The researcher defined 1 was 21 - 30 years and 0 was over 31 years. Researcher founded value of dummy variables experience: E*FC.

Table 4.15 Pretesting with the modulators (experience)

| Factor names / T-value | original | th (6,2) | th (1,2) | - |
|------------------------|----------|----------|----------|---|
| PE | 0.37 | 0.37 | 0.74 | - |
| EE | 10.51 | 10.51 | 10.50 | - |
| SI | 8.78 | 8.78 | -8.69 | - |
| FC | 0.67 | -4.38 | -4.14 | - |
| PS | -0.11 | -0.11 | -0.15 | - |
| SQ | 13.38 | 13.14 | 12.78 | - |
| CO | -14.33 | -14.33 | -14.32 | - |
| E*EE | -0.94 | -0.94 | -1.03 | - |
| E*SI | 1.30 | 1.30 | 1.39 | - |
| E*FC | -3.15 | -3.02 | -2.95 | - |

4.4.3 Results model



Note: Dotted line and dotted square indicates that the path relationship is not significant

Figure 4.11 Results of electronic payment services model

These result of hypothesis show statistic significant on research model by path relationship with all factors of research 13 hypotheses were supported and 1 hypotheses were not supported.

Data analysis factors that the path between performance expectancy and behavior intention (H1; $\beta=0.08$, t-value 3.47), the path between effort expectancy and behavior intension (H2; $\beta=0.83$, t-value 10.02), the path social influence and behavior intension (H3; $\beta=0.36$, t-value 5.58), the path facilitation conditions and use behavior (H4; $\beta=0.16$, t-value 4.09), the path behavior intension and use behavior (H5; $\beta=0.39$, t-value 15.45), the path perceived security and behavior intension (H6; $\beta=0.39$, t-value

12.73) , the path service quality and use behavior (H6; $\beta=0.61$, t-value 11.72), the path cost and behavior intension (H7; $\beta=0.02$, t-value 0.58) not significant.

Data analysis modulators which are consisted of gender, age, experience respectively. The path between gender and performance expectancy (H9a; confuted), the path between gender and effort expectancy (H9b; $\beta=0.28$, t-value 3.97) support male, the path between gender and social influence (H9c; $\beta=-13.56$, t-value 2.98) support female, the path between age and performance expectancy (H10a; confuted), the path between gender and effort expectancy (H10b; $\beta=0.10$, t-value 6.14) support below 31 years olds, the path between gender and social influence (H10c; $\beta=-10.94$, t-value 4.70) support over 31 years olds, the path between gender and facilitation conditions (H10d; $\beta=-0.02$, t-value -2.91) support over 31 years olds, the path between experience and effort expectancy (H11a; confuted), the path between experience and social influence (H11b; confuted), the path between experience and social influence (H11c; $\beta=-0.01$, t-value -5.82) support over than 3 years.

Table 4.16 Summary of the hypotheses testing

| Hypotheses | The | Path | Result | Meaning |
|-------------------|------------------------|-----------------------------|---------------|---------------------|
| No | relationship of | coefficient | | |
| | hypotheses | (β) | | |
| H1 | PE - BI | 0.08 | Supported | - |
| H2 | EE - BI | 0.83 | Supported | - |
| H3 | SI - BI | 0.36 | Supported | - |
| H4 | FC - USE | 0.16 | Supported | - |
| H9a | G*PE - BI | - | Refuted | - |
| H9b | G*EE - BI | -0.28 | Supported | Male |
| H9c | G*SI - BI | 10.94 | Supported | Female |
| H10a | A*PE - BI | - | Refuted | - |
| H10b | A*EE - BI | 0.10 | Supported | Below 31 years olds |
| H10c | A*SI - BI | -10.64 | supported | Over 31 years olds |
| H10d | A*FC - Use | -0.02 | Supported | Over 31 years olds |
| H11a | E*EE - BI | - | Refuted | - |
| H11b | E*SI - BI | - | Refuted | - |

Table 4.16 Summary of the hypotheses testing (cont.)

| Hypotheses No | The relationship of hypotheses | Path coefficient (β) | Result | Meaning |
|----------------------|---------------------------------------|-----------------------------|---------------|-------------------|
| H11c | E*FC - Use | -0.01 | Supported | Over than 3 years |
| H5 | BI - USE | 0.39 | Supported | - |
| H6 | PS - BI | 0.39 | Supported | - |
| H7 | SQ - USE | 0.61 | Supported | - |
| H8 | CO - BI | 0.02 | Not supported | - |

Note : (Constructions) performance expectancy (PE), effort expectancy (EE), social influence (SI), facilitating conditions (FC), perceived security (PS), service quality (SQ), cost (CO), use behavior (USE)

: (Dummy variables) gender (G), age (A), experience (E)

4.5 Discussion of Findings

Performance Expectancy

The user is considered for service efficiency. Electronic payment services can be quick and convenience, these issues are useful for the user and to be considering in another opportunity for electronic payment services. E-payment service has a lot of efficiency that the user can be confident and can assure for the service. This time of the research, performance expectancy as affect with agree of factor to electronic payment services.

Effort Expectancy

The user is selected for electronic payment services that regarding from easy to use and not complicated. For electronic payment services is complicated, the user cannot be possibly to use again. Therefore electronic payment services provider

should have complicated of system, the user manual guide and ease navigation of system for the user.

From the research was found the modulators that has affected by male with age below 30 years. The researcher had analyzed and found that male gender has easy in their habit. Therefore male gender with age below 30 years, these are affecting to effort expectancy.

Social Influence

Friend or another relationship is affected for using such as the recommendation, the word of mouth and using as their friends or other users.

From the research was found modulators that has affected by female gender with age over than 31 years, their colleagues or their closely friends are recommended for using electronic payment services.

Facilitation Conditions

At the present, Internet and computer are as the part of human life. The user can access to Internet and computer with efficiency. Therefore, Internet and computer are as to be important factor for using electronic payment services.

From the research was found the modulators that has affected by the user with age below 30 years, they have experience for using e-payment service more than 3 years. These users are worker group and teenage group that they can access to Internet and computer more than other groups.

Behavior Intension

From the research was found the factor that has affected to Behavior Intension are performance expectancy, effort expectancy, social influence, perceived security and service quality. These factors are affected with agree of factor to electronic payment services. Therefore, electronic payment services provider should consider for performance expectancy, effort expectancy, social influence, perceived security and service quality with completely. In order to the user can assure and most satisfy, any organization that they want to build for electronic payment business, they

must consider from these factors which are cause of completely to electronic payment services.

Perceived Security

From many research, the researcher had found for security was important to electronic payment services. This issue is first considered for the users. Therefore, electronic payment services provider should develop for security. In order to the user can be confident and can assure for electronic payment services.

Service Quality

The user was satisfied that they received from good service quality. The user will come back to use electronic payment services again when the service provider has considered for service quality that cause of the highest user' satisfied. Service Quality is included E-mail, telephone and web board answer etc.

Cost

This time of the research, the researcher had found that price or fee is not affected for using behavior in electronic payment services. Because the users in Thailand, they have enough for purchasing power. The user has not considered to price and fee which are changed with their convenience, quickly and easy for their daily life or they are willing to pay for their electronic payment services.

CHAPTER V

CONCLUSION AND RECOMMENDATIONS

The study conclusion of final research results and recommendations for future research. As follow;

5.1 Conclusions

Study of acceptance factors for electronic payments services using model of Unified Theory of Acceptance and Use of Technology (UTAUT) and Structural Equation Modeling (SEM) are used for testing hypotheses. In the addition, this study extends the modulators and three factors: Service Quality, Cost and Perceived Security, By Perceived Security form An empirical study of customers' perceptions of security and trust in e-payment systems, Service Quality from DeLone and McLean's IS Success Model, Cost from Drivers and Barriers in the Acceptance of Mobile Payment in China. Questionnaires are used to gather data from internet users and electronic payment service users, and 400 respondents participated in the study. The results presents that most of respondents that 55% were female. Age of respondents by 62.5% was 21-30 year olds. Education levels of respondent by 71.2% associate's or bachelor' degree. Company employees/Private sector employees 49.5%. Income per month of respondents 47.5% were 15,000-20,000 baths. Respondents use the experience using electronic payment services 1-3 years which is frequency most used by respondents 53.2%. Respondents use the experience using internet 11-15 years 50.2%. About of respondents 50.2% using electronic payment services place at home. 46.7 percent most used www.paypal.com. These results of hypothesis statistic significant on research model all factors of research. The perception of electronic payment services, According to descriptive statistics as follow; perception of performance expectancy was high with the mean of 4.31, perception of effort expectancy was high with the mean of 4.00, perception of social influence was medium with the mean of 3.43,

perception of facilitation conditions was high with the mean of 4.20, perception of perceived security was high with the mean of 4.47, perception of service quality was high with the mean of 4.18, perception of cost was medium with the mean of 3.25, perception of behavior intension was high with the mean of 4.18, perception of use behavior was high with the mean of 4.18.

13 hypotheses (Performance expectancy will have a positive influence on behavior intention to use electronic payment services, Effort expectancy will have a positive influence on behavior intention to use electronic payment services, Social influence will have a positive influence on behavior intention to use electronic payment services, Facilitating condition will have a positive influence on to use electronic payment services, Behavior intension will have a positive influence to use electronic payment services, Perceived security will have a positive influence on behavior intention to use electronic payment services, Service quality will have a positive influence on to use electronic payment services, Gender will be a positive moderate the influence between gender and effort expectancy, Gender will be a positive moderate the influence between gender and social influence, Age will be a positive moderate the influence between age and effort expectancy, Age will be a positive moderate the influence between age and social influence, Age will be a positive moderate the influence between age and facilitation conditions, Experience will be a positive moderate the influence between age and facilitation conditions). And 1 hypotheses were rejected (Cost will have a positive influence on behavior intention to use electronic payment services).

From the research was found that the user is consider for useful from their using e-payment service as quickly, convenience in daily life, easy to use and friend or colleague which are cause of using electronic payment services. Internet and computer are easy to access at the present time. Security is the most important issue for the users because they afraid of their personal data and electronic payment transaction are not secure. In the part of the answer, E-mail is the part of factor that agrees with electronic payment services. Therefore these factors are affected with agreement of electronic payment services from the users in Thailand.

5.2 Research limitations

The lisrel program version 9.1 free for student, this program was designed for variable not over 17 variables. It is the most important of the limitation in this research. The researcher had variable for 19 variables (not cut from variables), these are cause of the researcher cannot look at all the model and cannot analyze in some part of the research.

5.3 Recommendations for Future Research

In the future, the researcher will select other model for using in the research such as Information Technology Acceptance2 (TAM2), Unified theory of acceptance and use of technology2 (UTAUT2) and will select other theory that are relate with technology agreement for absolutely and correctly of the research because the model development can add to affect for factor or hypothesis in the research. In the part of questionnaire respondents, the researcher will collect the respondents more than this time of the research, that can add to the answer, comment and accurate from the answer. This research can measure the Thailand of using electronic payment services. Companies or organizations can apply this research to analyze the use of electronic payment services. This will make people aware of the needs of Thailand, as when there is information or things for themselves. The word of mouth and using as their friends or other users. The user has not considered to price and fee which are changed with their convenience, quickly and easy for their daily life or they are willing to pay for their electronic payment services.

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APPENDIX

QUESTIONNAIRE

เรื่อง ปัจจัยการยอมรับบริการชำระเงินอิเล็กทรอนิกส์

เรียน ท่านผู้ตอบแบบสอบถาม

แบบสอบถามฉบับนี้เป็นส่วนหนึ่งของการทำวิทยานิพนธ์ในระดับปริญญาโท สาขาวิชาเทคโนโลยีการจัดการระบบสารสนเทศ คณะวิศวกรรมศาสตร์ มหาวิทยาลัยมหิดล โดยมีวัตถุประสงค์เพื่อวิจัยปัจจัยที่มีผลต่อการยอมรับธุรกิจบริการชำระเงินอิเล็กทรอนิกส์ คำตอบของท่านจักมีคุณค่าอย่างยิ่งต่องานวิจัยครั้งนี้ ผู้วิจัยจะเก็บข้อมูลที่ได้รับจากท่านไว้เป็นความลับ ข้อมูลที่ตรงกับความเป็นจริงและสมบูรณ์จะช่วยให้การวิจัยดำเนินไปด้วยความถูกต้อง ผู้วิจัยจึงใคร่ขอความอนุเคราะห์จากท่าน โปรดตอบแบบสอบถามตามความคิดเห็นของท่านอย่างรอบคอบให้ครบทุกข้อ แบบสอบถามที่ตอบครบสมบูรณ์เท่านั้นที่สามารถนำไปใช้ในการวิจัยได้

แบบสอบถามนี้แบ่งออกเป็น 3 ตอน มีจำนวนหน้า

ตอนที่ 1 เป็นแบบสอบถามข้อมูลเกี่ยวกับสภาพทั่วไปของผู้ตอบแบบสอบถาม ลักษณะแบบสอบถามเป็นแบบตรวจสอบรายการ (Check List) มีจำนวน 8 ข้อ

ตอนที่ 2 เป็นแบบสอบถามเกี่ยวกับการใช้บริการชำระเงินอิเล็กทรอนิกส์ ลักษณะแบบสอบถามเป็นแบบตรวจสอบรายการ (Check List) มีจำนวน 5 ข้อ

ตอนที่ 3 เป็นแบบสอบถามเกี่ยวกับปัจจัยการยอมรับธุรกิจบริการชำระเงินอิเล็กทรอนิกส์ ในประเทศไทย มีลักษณะแบบสอบถามเป็นแบบมาตราส่วนประเมินค่า (Rating Scale) จำนวน 37 ข้อ

ขอขอบพระคุณในความกรุณาของท่านมา ณ โอกาสนี้

นาย ชีรพัฒน์ จันทร

นักศึกษาระดับปริญญาโท สาขาวิชาเทคโนโลยีการจัดการระบบสารสนเทศ

คณะวิศวกรรมศาสตร์ มหาวิทยาลัยมหิดล

QUESTIONNAIRE

ตอนที่ 1 ข้อมูลสภาพทั่วไปของผู้ตอบแบบสอบถาม

คำชี้แจง โปรดทำเครื่องหมาย ลงในช่องว่างหน้าคำตอบที่ตรงตามความเป็นจริงเพียง 1 ข้อ ถ้าไม่มีการระบุไว้เป็นอย่างอื่น และหากท่านเลือกคำตอบที่ระบุว่า อื่นๆ กรุณาระบุรายละเอียดเพิ่มเติมในช่องว่าง

1. เพศ

- 1) ชาย
 2) หญิง

2. อายุ

- 1) 21 – 30 ปี
 2) 31 – 40 ปี
 3) 41 – 50 ปี
 4) 51 – ขึ้นไป

3. ระดับการศึกษา

- 1) ปริญญาตรี
 2) สูงกว่าปริญญาตรี

4. อาชีพ

- 1) นักเรียน , นักศึกษา , นิสิต
 2) ข้าราชการ, พนักงานรัฐวิสาหกิจ
 3) พนักงานบริษัท, พนักงานมหาวิทยาลัย
 4) เจ้าของกิจการอาชีพอิสระ
 5) ว่างาน , เกษียณอายุ
 6) อื่นๆ โปรดระบุ

5. รายได้โดยเฉลี่ยต่อเดือน

- 1) 15,000 – 20,000 บาท
- 2) 20,001– 25,000 บาท
- 3) 25,001 – 30,000 บาท
- 4) 30,001 – 35,000 บาท
- 5) 35,001 – 40,000 บาท
- 6) 40,001 ขึ้นไป

6. คุณเคยมีประสบการณ์ในการใช้บริการชำระเงินอิเล็กทรอนิกส์กี่ปี

- 1) น้อยกว่า 1 ปี
- 2) 1 – 3 ปี
- 3) 3 – 5 ปี
- 4) มากกว่า 5 ปี

7. คุณเคยมีประสบการณ์ในการใช้อินเทอร์เน็ต (ปี)

- 1) 1 – 5 ปี
- 2) 6 – 10 ปี
- 3) 11 – 15 ปี
- 4) 16 – 20 ปี
- 5) 20 ปี ขึ้นไป

8. คุณใช้อินเทอร์เน็ตจากที่ใด

- 1) บ้าน, หอพัก, บ้านเช่า
- 2) มหาวิทยาลัย, ที่ทำงาน
- 3) ร้านอินเทอร์เน็ต
- 4) อื่นๆ โปรดระบุ

| |
|--|
| ตอนที่ 2 แบบสอบถามเกี่ยวกับการใช้บริการชำระเงินอิเล็กทรอนิกส์ |
|--|

คำชี้แจง โปรดทำเครื่องหมาย ลงในช่องว่าง หน้าคำตอบที่ตรงตามความเป็นจริงเพียง 1 ข้อ ถ้าไม่มีการระบุไว้เป็นอย่างอื่น และหากท่านเลือกคำตอบที่ระบุว่า อื่นๆ กรุณาระบุรายละเอียดเพิ่มเติมในช่องว่าง

1. คุณเคยใช้บริการชำระเงินอิเล็กทรอนิกส์ หรือไม่

- 1) เคย
 2) ไม่เคย

2. บริการชำระเงินอิเล็กทรอนิกส์ใดที่ท่านเข้าใช้งานบ่อยที่สุด

- 1) www.paypal.com
 2) www.paysbuy.com
 3) www.taradpay.com / www.tarad.com
 4) www.thaipay.com
 5) www.siampay.com/
 6) www.chiyopay.com
 7) www.amazonpay.com
 8) www.asiapay.com
 9) www.authorize.net
 10) www.worldpay.com
 11) www.dwolla.com
 12) www.wepay.com
 13) อื่นๆ โปรดระบุ

3. ท่านใช้บริการชำระเงินอิเล็กทรอนิกส์เพื่อทำธุรกรรมหรือชำระเงินอิเล็กทรอนิกส์เพื่อ

วัตถุประสงค์ใด

- 1) ชำระค่าสินค้าออนไลน์ เว็บไซต์พาณิชย์อิเล็กทรอนิกส์
 2) ชำระค่าบริการหรือโอนเงินต่างๆ
 3) อื่นๆ โปรดระบุ

4. จำนวนเงินเท่าใดที่คุณจ่ายในการทำธุรกรรมผ่านบริการชำระเงินอิเล็กทรอนิกส์หรือชำระเงินอิเล็กทรอนิกส์

- 1) 0 บาท – 10,000 บาท
- 2) 10,001 – 20,000 บาท
- 3) 20,001– 30,000 บาท
- 4) 30,001 – 40,000 บาท
- 5) 40,001 – 50,000 บาท
- 6) 50,001 บาท ขึ้นไป

5. สื่อชำระเงินอิเล็กทรอนิกส์ชนิดใดที่ท่านใช้ในการชำระเงินอิเล็กทรอนิกส์หรือการทำธุรกรรมต่างๆ

- 1) บัตรเครดิต Credit Card Payment
- 2) บัตรเดบิต Debit Card Payment
- 3) บัตรพลาสติก Smart Card
- 4) เงินอิเล็กทรอนิกส์ Electronic Money
- 5) กระเป๋าเงินอิเล็กทรอนิกส์ Electronic Wallet
- 6) อื่นๆ โปรดระบุ.....

ตอนที่ 3 แบบสอบถามเกี่ยวกับการใช้บริการชำระเงินอิเล็กทรอนิกส์

5= เห็นด้วยมากที่สุด 4= เห็นด้วยมาก 3= เห็นด้วยปานกลาง 2= เห็นด้วยน้อย 1= เห็นด้วยน้อยที่สุด

| การศึกษารายการยอมรับบริการชำระเงินอิเล็กทรอนิกส์ (Electronic payment services) | ระดับความคิดเห็น | | | | |
|---|-----------------------|-----------------|---------------------|------------------|------------------------|
| | (5) เห็นด้วยมากที่สุด | (4) เห็นด้วยมาก | (3) เห็นด้วยปานกลาง | (2) เห็นด้วยน้อย | (1) เห็นด้วยน้อยที่สุด |
| Performance Expectancy (ความคาดหวังในประสิทธิภาพต่อการใช้บริการชำระเงินอิเล็กทรอนิกส์) | 5 | 4 | 3 | 2 | 1 |
| 1. บริการชำระเงินอิเล็กทรอนิกส์มีประโยชน์ต่อการทำธุรกรรมทางการเงินสำหรับคุณ(PE1) | | | | | |
| 2. บริการชำระเงินอิเล็กทรอนิกส์ช่วยให้สามารถชำระเงินอิเล็กทรอนิกส์ได้ทุกที่ทุกเวลาสำหรับคุณ(PE2) | | | | | |
| 3. บริการชำระเงินอิเล็กทรอนิกส์เพิ่มความสะดวก รวดเร็ว สำหรับคุณ (PE3) | | | | | |
| 4. บริการชำระเงินอิเล็กทรอนิกส์เพิ่มช่องทางการชำระเงินอิเล็กทรอนิกส์อีกหนึ่งช่องทางสำหรับคุณ(PE4) | | | | | |
| Effort Expectancy (ความคาดหวังในเรื่องความง่ายต่อการใช้บริการชำระเงินอิเล็กทรอนิกส์) | 5 | 4 | 3 | 2 | 1 |
| 1. คุณคิดว่าการใช้บริการชำระเงินอิเล็กทรอนิกส์ เป็นเรื่องง่ายสำหรับคุณ(EE1) | | | | | |

| | | | | | |
|---|----------|----------|----------|----------|----------|
| 2. คุณคิดว่าการใช้บริการชำระเงินอิเล็กทรอนิกส์นั้นเป็นเรื่องง่ายที่จะสามารถเรียนรู้ได้(EE2) | | | | | |
| 3. การใช้บริการชำระเงินอิเล็กทรอนิกส์เป็นเรื่องง่ายที่จะสามารถใช้งานได้อย่างชำนาญ(EE3) | | | | | |
| Social Influence (อิทธิพลทางสังคมที่ส่งผลต่อการใช้บริการชำระเงินอิเล็กทรอนิกส์) | 5 | 4 | 3 | 2 | 1 |
| 1. คุณใช้บริการชำระเงินอิเล็กทรอนิกส์เพราะเป็นที่รู้จักอย่างแพร่หลาย (SI1) | | | | | |
| 2. คุณตัดสินใจใช้บริการชำระเงินอิเล็กทรอนิกส์เพื่อลดการถือเงินสดจำนวนมากเพื่อความปลอดภัยจากมิจฉาชีพการสูญหาย(SI2) | | | | | |
| 3. เพื่อนหรือคนรอบข้างมีส่วนในการการตัดสินใจใช้บริการชำระเงินอิเล็กทรอนิกส์(SI3) | | | | | |
| 4. คุณตัดสินใจที่จะใช้บริการชำระเงินอิเล็กทรอนิกส์เพราะคนอื่นๆก็ใช้ (SI4) | | | | | |
| 5. คุณใช้บริการชำระเงินอิเล็กทรอนิกส์จากการแนะนำของผู้อื่น (SI5) | | | | | |
| Facilitation Conditions (สิ่งอำนวยความสะดวกในการใช้บริการชำระเงินอิเล็กทรอนิกส์) | 5 | 4 | 3 | 2 | 1 |
| 1. บริการชำระเงินอิเล็กทรอนิกส์มีรูปแบบที่หลากหลาย(FC1) | | | | | |
| 2. คุณมีอุปกรณ์คอมพิวเตอร์หรืออินเทอร์เน็ตที่เพียงพอสำหรับเข้าไปใช้บริการชำระเงินอิเล็กทรอนิกส์(FC2) | | | | | |

| | | | | | |
|--|----------|----------|----------|----------|----------|
| 3. คุณสามารถเข้าถึงอุปกรณ์คอมพิวเตอร์หรืออินเทอร์เน็ตที่จำเป็นในการใช้บริการชำระเงินอิเล็กทรอนิกส์(FC3) | | | | | |
| Perceived Security (ความปลอดภัยระบบชำระเงินอิเล็กทรอนิกส์) | 5 | 4 | 3 | 2 | 1 |
| 1. ความปลอดภัยเป็นส่วนสำคัญที่สุดในการตัดสินใจใช้บริการชำระเงินอิเล็กทรอนิกส์(PS1) | | | | | |
| 2. การคุ้มครองข้อมูลส่วนบุคคล,เข้ารหัสข้อมูล,ความเป็นส่วนตัว,การรับรองจากมาตรฐานต่างๆมีผลต่อการตัดสินใจ(PS2) | | | | | |
| 3. คุณไว้วางใจกับบริการชำระเงินอิเล็กทรอนิกส์ที่มีความปลอดภัยสูง(PS3) | | | | | |
| 4. คุณอยากให้บริการชำระเงินอิเล็กทรอนิกส์มีมาตรฐานความปลอดภัยและความเป็นส่วนตัว(PS4) | | | | | |
| Service Quality (คุณภาพการให้บริการชำระเงินอิเล็กทรอนิกส์) | 5 | 4 | 3 | 2 | 1 |
| 1. ระบบหรือเว็บไซต์มีการบริการ ปรีกษา ตรวจสอบ หลังจากชำระเงินอิเล็กทรอนิกส์(SQ1) | | | | | |
| 2. ระบบหรือเว็บไซต์ตอบสนองความต้องการของผู้ใช้ เช่นการตอบคำถามผ่านทางอีเมล ,เว็บบอร์ด 24 ชั่วโมง(SQ2) | | | | | |
| 3. ระบบหรือเว็บไซต์ช่วยให้สามารถชำระเงินอิเล็กทรอนิกส์ได้อย่างหลากหลาย(SQ3) | | | | | |
| 4. โดยรวมคุณภาพในการบริการชำระเงินอิเล็กทรอนิกส์ทำให้คุณพึงพอใจ(SQ4) | | | | | |

| Cost (ค่าธรรมเนียมบริการชำระเงินอิเล็กทรอนิกส์) | 5 | 4 | 3 | 2 | 1 |
|---|----------|----------|----------|----------|----------|
| 1. คุณคิดว่าค่าใช้จ่ายในการทำธุรกรรมทางการเงิน ยังแพงหรือสูงอยู่ (CO1) | | | | | |
| 2. คุณคิดว่าค่าใช้จ่ายในการเข้าถึงบริการชำระเงินอิเล็กทรอนิกส์อยู่ยังสูงอยู่สำหรับคุณ(CO2) | | | | | |
| 3. ค่าธรรมเนียมยังแพงหรือสูงอยู่สำหรับการใช้บริการชำระเงินอิเล็กทรอนิกส์ในปัจจุบัน(CO3) | | | | | |
| Behavior Intention (พฤติกรรมความตั้งใจที่จะใช้บริการธุรกิจชำระเงินอิเล็กทรอนิกส์) | 5 | 4 | 3 | 2 | 1 |
| 1. คุณมีความตั้งใจใช้บริการชำระเงินอิเล็กทรอนิกส์ เพราะมีประโยชน์ต่อคุณ(BI1) | | | | | |
| 2. คุณมีความตั้งใจที่จะแนะนำให้คนอื่นมาใช้บริการชำระเงินอิเล็กทรอนิกส์ (BI2) | | | | | |
| 3. คุณมีความตั้งใจว่าจะเพิ่มการใช้บริการชำระเงินอิเล็กทรอนิกส์ (BI3) | | | | | |
| 4. คุณมีความตั้งใจว่าในอนาคตจะใช้บริการชำระเงินอิเล็กทรอนิกส์ (BI4) | | | | | |
| Use Behavior (พฤติกรรมการใช้บริการชำระเงินอิเล็กทรอนิกส์) | 5 | 4 | 3 | 2 | 1 |
| 1. โดยรวมแล้วบริการชำระเงินอิเล็กทรอนิกส์ทำให้คุณรู้สึกพึงพอใจ (USE1) | | | | | |
| 2. โดยรวมแล้วบริการชำระเงินอิเล็กทรอนิกส์ ช่วยเพิ่มความสะดวกสบาย รวดเร็วในชีวิตประจำวัน(USE2) | | | | | |

| | | | | | |
|--|--|--|--|--|--|
| 3. โดยรวมแล้วประสบการณ์ที่ใช้บริการชำระเงินอิเล็กทรอนิกส์ทำให้คุณกลับมาใช้อีกครั้ง(USE3) | | | | | |
| | | | | | |
| 4. โดยรวมแล้วบริการชำระเงินอิเล็กทรอนิกส์เป็นสิ่งที่น่าสนใจสำหรับคุณ(USE4) | | | | | |
| | | | | | |

FACTORS

Performance Expectancy (PE)

- 1.1 Electronic payment services are useful for your financial transaction.
- 1.2 Electronic payment services prompts for your payment anytime and anywhere.
- 1.3 Electronic payment services provide you more convenience and quick.
- 1.4 Electronic payment services are another channel for making your payment electronically.

Effort Expectancy (EE)

- 2.1 You consider that using electronic payment services is easy for you.
- 2.2 You consider that it is easy to learn how to use electronic payment services.
- 2.3 It is easy to have skill in using electronic payment services.

Social Influence (SI)

- 3.1 You use electronic payment services because it is well-known.
- 3.2 You decide to use electronic payment services to reduce carrying high amount of cash and avoid it from being stolen or loosen.
- 3.3 Your friend or the other people around you have influence on your decision about using electronic payment services.

3.4 You decide to use electronic payment services based on other's usage.

3.5 You decide to use electronic payment services according to other's suggestion.

Facilitation Conditions (FC)

4.1 There are variety patterns of electronic payment services.

4.2 You have enough computer or internet for using electronic payment services.

4.3 You can reach necessary computer or internet for using electronic payment services.

Perceived Security (PS)

5.1 Safety is the main criteria of your decision in using electronic payment services.

5.2 Personal information protection, encryption, privacy protection, or standard certification has an influence on your decision in using the services.

5.3 You rely on electronic payment services which have high security.

5.4 You require security standard and privacy protection of electronic payment services.

Service Quality (SQ)

6.1 The system or website has consultancy or monitoring service after completion of electronic payment services.

6.2 The system or website can response users' requirement, for example, answering a question via e-mail, 24-hour web board.

6.3 The system or website can provide variety kinds of electronic payment services.

6.4 Generally, you are satisfied in the quality of electronic payment services.

Cost (CO)

7.1 You consider that the transaction fee is quite expensive or high.

7.2 You consider that the way to reach electronic payment services cost you too high.

7.3 The current electronic payment services charges high or expensive fee.

Behavior Intention (BI)

8.1 You intend to use electronic payment services because it is useful for you.

8.2 You intend to suggest other person to use electronic payment services.

8.3 You intend to use more electronic payment services.

8.4 You intend to use electronic payment services in the future.

Use Behavior (USE)

9.1 Generally, you are satisfied in electronic payment services.

9.2 Generally, electronic payment services provide more convenience and quick in your daily-life.

9.3 Generally, you resume using electronic payment services because of your good experience about it.

9.4 Generally, electronic payment services are interesting for you.

ตัวอย่างการหาค่า Conbach's alpha ด้วยโปรแกรม Spss

1 นำผลที่ได้จาก microsoft office มาใส่ในโปรแกรม spss

The screenshot shows the IBM SPSS Statistics Data Editor window. The title bar reads 'ค่าก่อนมาหาคัดเลือ.sav [DataSet1] - IBM SPSS Statistics Data Editor'. The menu bar includes File, Edit, View, Data, Transform, Analyze, Direct Marketing, Graphs, Utilities, Add-ons, Window, and Help. The toolbar contains various icons for file operations and data manipulation. The main data grid displays 23 rows of data across 17 columns. The columns are labeled PE1, PE2, PE3, PE4, EE1, EE2, EE3, SI1, SI2, SI3, SI4, SI5, FC1, FC2, FC3, and f. The data values are numerical, ranging from 2.00 to 5.00. The status bar at the bottom indicates 'Visible: 34 of 34 Variables' and shows 'Data View' and 'Variable View' tabs.

| | PE1 | PE2 | PE3 | PE4 | EE1 | EE2 | EE3 | SI1 | SI2 | SI3 | SI4 | SI5 | FC1 | FC2 | FC3 | f |
|----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---|
| 1 | 5.00 | 5.00 | 5.00 | 5.00 | 4.00 | 4.00 | 5.00 | 4.00 | 5.00 | 4.00 | 2.00 | 2.00 | 3.00 | 4.00 | 4.00 | |
| 2 | 4.00 | 4.00 | 4.00 | 4.00 | 5.00 | 4.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 | 4.00 | 4.00 | 5.00 | |
| 3 | 4.00 | 4.00 | 5.00 | 4.00 | 4.00 | 4.00 | 3.00 | 2.00 | 3.00 | 2.00 | 1.00 | 3.00 | 3.00 | 4.00 | 4.00 | |
| 4 | 4.00 | 4.00 | 4.00 | 4.00 | 5.00 | 5.00 | 4.00 | 4.00 | 5.00 | 3.00 | 4.00 | 3.00 | 4.00 | 4.00 | 5.00 | |
| 5 | 5.00 | 5.00 | 5.00 | 5.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | |
| 6 | 3.00 | 3.00 | 4.00 | 4.00 | 3.00 | 3.00 | 4.00 | 3.00 | 3.00 | 2.00 | 4.00 | 2.00 | 3.00 | 3.00 | 4.00 | |
| 7 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 1.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | |
| 8 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 4.00 | 4.00 | 4.00 | |
| 9 | 3.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 3.00 | 2.00 | 3.00 | 3.00 | 3.00 | 4.00 | 5.00 | 5.00 | |
| 10 | 4.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 4.00 | 3.00 | 3.00 | |
| 11 | 5.00 | 5.00 | 5.00 | 5.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 | 3.00 | 2.00 | 3.00 | 3.00 | 3.00 | |
| 12 | 4.00 | 4.00 | 5.00 | 5.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 4.00 | 4.00 | |
| 13 | 5.00 | 5.00 | 5.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 5.00 | 5.00 | |
| 14 | 5.00 | 5.00 | 5.00 | 5.00 | 4.00 | 4.00 | 5.00 | 4.00 | 5.00 | 4.00 | 2.00 | 2.00 | 3.00 | 4.00 | 4.00 | |
| 15 | 4.00 | 4.00 | 4.00 | 4.00 | 5.00 | 4.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 | 4.00 | 4.00 | 5.00 | |
| 16 | 4.00 | 4.00 | 5.00 | 4.00 | 4.00 | 4.00 | 3.00 | 2.00 | 3.00 | 2.00 | 1.00 | 3.00 | 3.00 | 4.00 | 4.00 | |
| 17 | 4.00 | 4.00 | 4.00 | 4.00 | 5.00 | 5.00 | 4.00 | 4.00 | 5.00 | 3.00 | 4.00 | 3.00 | 4.00 | 5.00 | 5.00 | |
| 18 | 5.00 | 5.00 | 5.00 | 5.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | |
| 19 | 3.00 | 3.00 | 4.00 | 4.00 | 3.00 | 3.00 | 4.00 | 3.00 | 3.00 | 2.00 | 4.00 | 2.00 | 3.00 | 3.00 | 4.00 | |
| 20 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 1.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | |
| 21 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 4.00 | 4.00 | 4.00 | |
| 22 | 3.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 3.00 | 2.00 | 3.00 | 3.00 | 3.00 | 3.00 | 4.00 | 5.00 | |
| 23 | 4.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 4.00 | 3.00 | 3.00 | |

2 โดยกำหนดหัวข้อปัจจัยแต่ละปัจจัยเพื่อให้ง่ายต่อการวิเคราะห์ข้อมูล เช่น PE1 PE2 PE3 PE4 ไล่ไปตามลำดับปัจจัย

| | Name | Type | Width | Decimals | Label | Values | Missing | Columns | Align | Measure | Role |
|----|------|---------|-------|----------|-------|--------|---------|---------|-------|---------|-------|
| 1 | PE1 | Numeric | 8 | 2 | | None | None | 8 | Right | Nominal | Input |
| 2 | PE2 | Numeric | 8 | 2 | | None | None | 8 | Right | Nominal | Input |
| 3 | PE3 | Numeric | 8 | 2 | | None | None | 8 | Right | Nominal | Input |
| 4 | PE4 | Numeric | 8 | 2 | | None | None | 8 | Right | Nominal | Input |
| 5 | EE1 | Numeric | 8 | 2 | | None | None | 8 | Right | Nominal | Input |
| 6 | EE2 | Numeric | 8 | 2 | | None | None | 8 | Right | Nominal | Input |
| 7 | EE3 | Numeric | 8 | 2 | | None | None | 8 | Right | Nominal | Input |
| 8 | SI1 | Numeric | 8 | 2 | | None | None | 8 | Right | Nominal | Input |
| 9 | SI2 | Numeric | 8 | 2 | | None | None | 8 | Right | Nominal | Input |
| 10 | SI3 | Numeric | 8 | 2 | | None | None | 8 | Right | Nominal | Input |
| 11 | SI4 | Numeric | 8 | 2 | | None | None | 8 | Right | Nominal | Input |
| 12 | SI5 | Numeric | 8 | 2 | | None | None | 8 | Right | Nominal | Input |
| 13 | FC1 | Numeric | 8 | 2 | | None | None | 8 | Right | Nominal | Input |
| 14 | FC2 | Numeric | 8 | 2 | | None | None | 8 | Right | Nominal | Input |
| 15 | FC3 | Numeric | 8 | 2 | | None | None | 8 | Right | Nominal | Input |
| 16 | PS1 | Numeric | 8 | 2 | | None | None | 8 | Right | Nominal | Input |
| 17 | PS2 | Numeric | 8 | 2 | | None | None | 8 | Right | Nominal | Input |
| 18 | PS3 | Numeric | 8 | 2 | | None | None | 8 | Right | Nominal | Input |
| 19 | PS4 | Numeric | 8 | 2 | | None | None | 8 | Right | Nominal | Input |
| 20 | SQ1 | Numeric | 8 | 2 | | None | None | 8 | Right | Nominal | Input |
| 21 | SQ2 | Numeric | 8 | 2 | | None | None | 8 | Right | Nominal | Input |
| 22 | SQ3 | Numeric | 8 | 2 | | None | None | 8 | Right | Nominal | Input |
| 23 | SQ4 | Numeric | 8 | 2 | | None | None | 8 | Right | Nominal | Input |
| 24 | CO1 | Numeric | 8 | 2 | | None | None | 8 | Right | Nominal | Input |

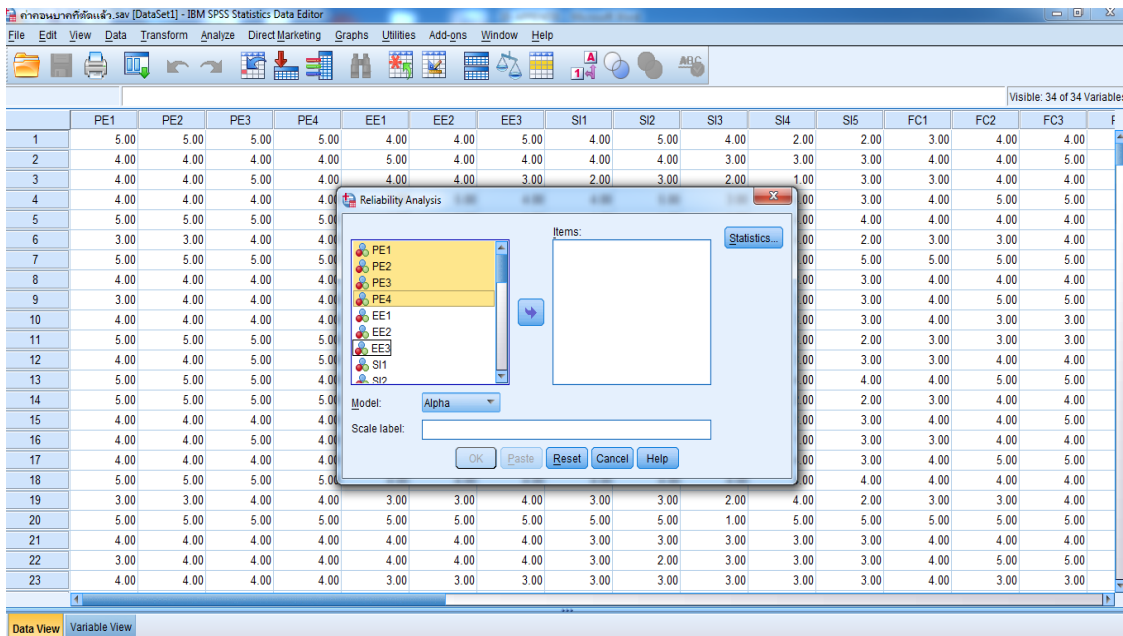
3 เลือกที่ analyze > scale > reliability analysis

Scale

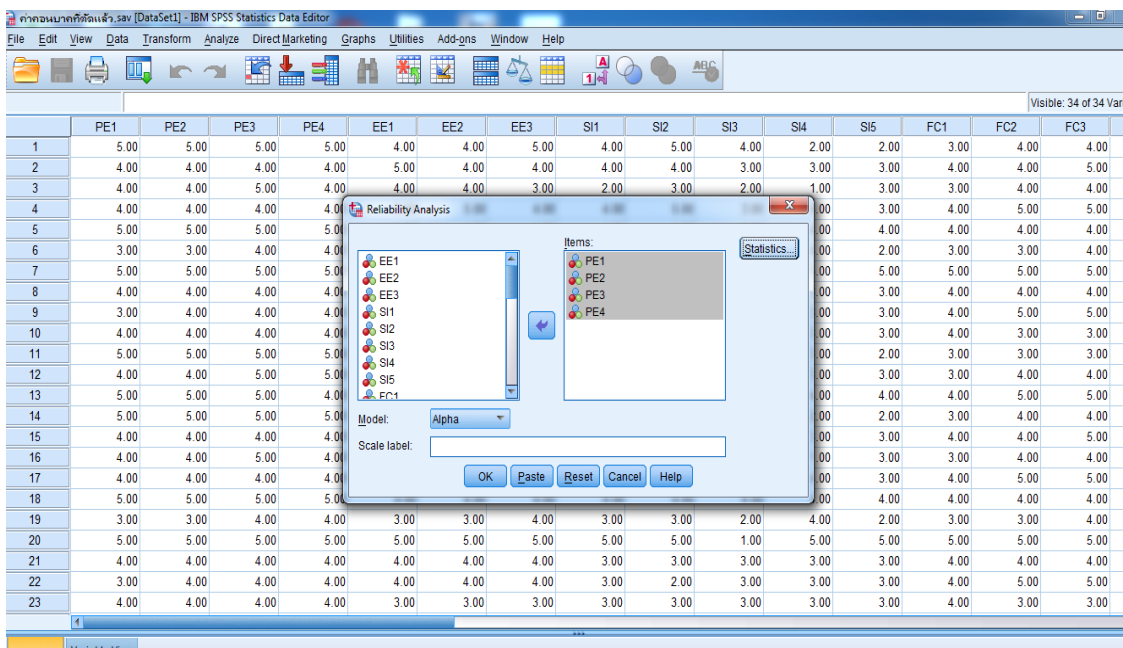
- Reliability Analysis...
- Multidimensional Unfolding (PREFSCAL)...
- Multidimensional Scaling (PROXSCAL)...
- Multidimensional Scaling (ALSCAL)...

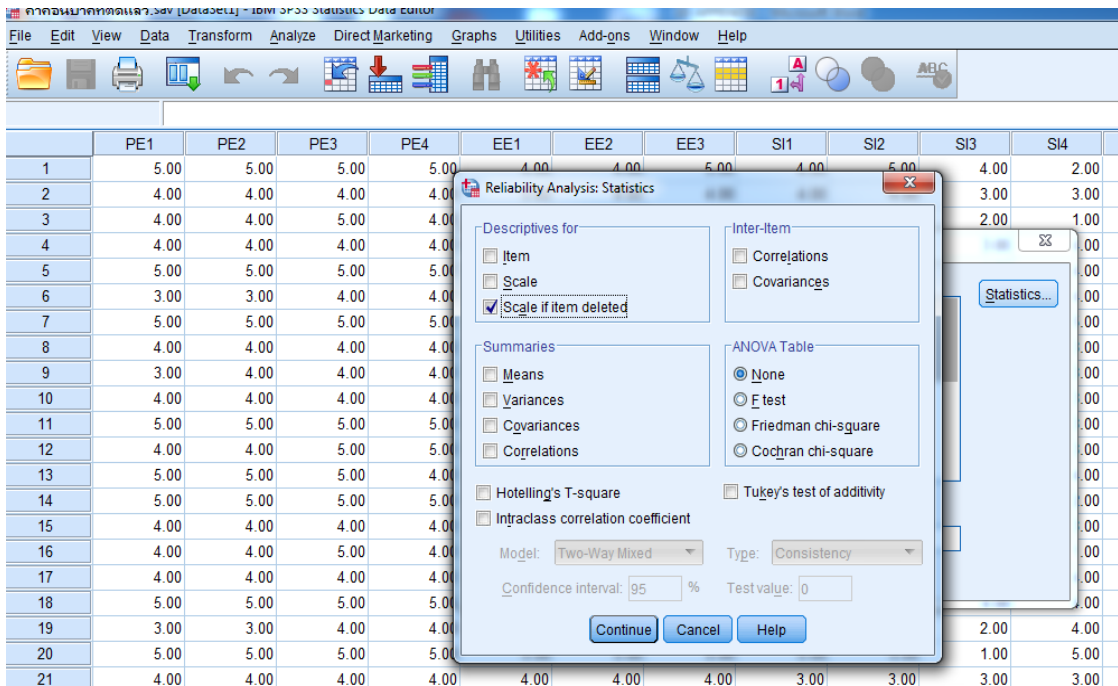
| | PE1 | PE2 | EE1 | EE2 | EE3 | SI1 | SI2 | SI3 | SI4 | SI5 | FC1 | FC2 | FC3 | f |
|----|------|------|------|------|------|------|------|------|------|------|------|------|------|---|
| 1 | 5.00 | 5.00 | 4.00 | 4.00 | 5.00 | 4.00 | 5.00 | 4.00 | 2.00 | 2.00 | 3.00 | 4.00 | 4.00 | |
| 2 | 4.00 | 4.00 | 5.00 | 4.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 | 4.00 | 4.00 | 5.00 | |
| 3 | 4.00 | 4.00 | 4.00 | 4.00 | 3.00 | 2.00 | 3.00 | 2.00 | 1.00 | 3.00 | 3.00 | 4.00 | 4.00 | |
| 4 | 4.00 | 4.00 | 5.00 | 5.00 | 4.00 | 4.00 | 5.00 | 3.00 | 4.00 | 3.00 | 4.00 | 5.00 | 5.00 | |
| 5 | 5.00 | 5.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | |
| 6 | 3.00 | 3.00 | 3.00 | 3.00 | 4.00 | 3.00 | 3.00 | 2.00 | 4.00 | 2.00 | 3.00 | 3.00 | 4.00 | |
| 7 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 1.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | |
| 8 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 4.00 | 4.00 | 4.00 | |
| 9 | 3.00 | 4.00 | 4.00 | 4.00 | 4.00 | 3.00 | 2.00 | 3.00 | 3.00 | 3.00 | 4.00 | 5.00 | 5.00 | |
| 10 | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 4.00 | 3.00 | 3.00 | |
| 11 | 5.00 | 5.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 2.00 | 3.00 | 3.00 | 3.00 | |
| 12 | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 | 2.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 4.00 | 4.00 | |
| 13 | 5.00 | 5.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 5.00 | 5.00 | |
| 14 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 4.00 | 2.00 | 2.00 | 3.00 | 4.00 | 4.00 | |
| 15 | 4.00 | 4.00 | 5.00 | 4.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 | 4.00 | 4.00 | 5.00 | |
| 16 | 4.00 | 4.00 | 4.00 | 4.00 | 3.00 | 2.00 | 3.00 | 2.00 | 1.00 | 3.00 | 3.00 | 4.00 | 4.00 | |
| 17 | 4.00 | 4.00 | 5.00 | 5.00 | 4.00 | 4.00 | 5.00 | 3.00 | 4.00 | 3.00 | 4.00 | 5.00 | 5.00 | |
| 18 | 5.00 | 5.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | |
| 19 | 3.00 | 3.00 | 3.00 | 3.00 | 4.00 | 3.00 | 3.00 | 2.00 | 4.00 | 2.00 | 3.00 | 3.00 | 4.00 | |
| 20 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 1.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | |
| 21 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 4.00 | 4.00 | 4.00 | |
| 22 | 3.00 | 4.00 | 4.00 | 4.00 | 4.00 | 3.00 | 2.00 | 3.00 | 3.00 | 3.00 | 4.00 | 5.00 | 5.00 | |
| 23 | 4.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 4.00 | 3.00 | 3.00 | |

4 เลือกปัจจัย PE1 PE2 PE3 PE4 ทั้งหมด แล้วกดที่ลูกศรตรงกลางเพื่อให้ปัจจัย PE1 PE2 PE3 PE4 มาอยู่ที่ช่อง items โดย model= alpha

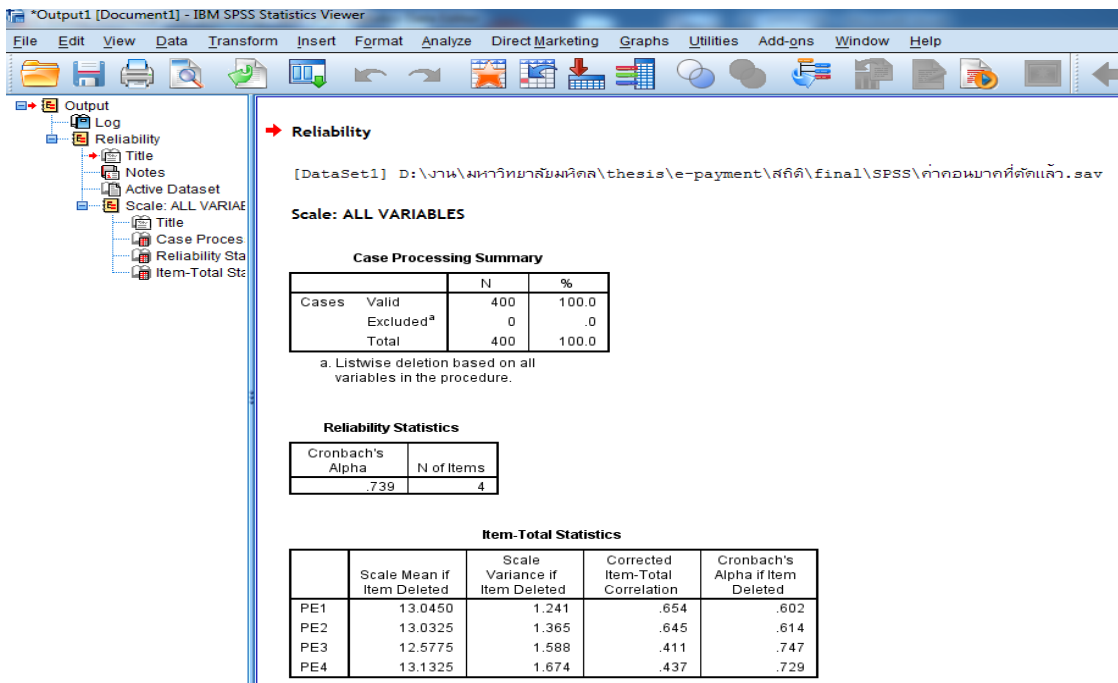


5 เลือกที่ statistic คลิกเครื่องหมายถูกที่หน้า scale of item deleted แล้วกด continue แล้วกด ok อีกครั้ง





6 ก็จะได้อ่า conbach's alpha



* ในการหาค่าปัจจัย EE SI FC หรือตัวแปรอื่นๆ ก็ทำวิธีเดียวกัน

ตัวอย่างการหาค่า ด้วยโปรแกรม Lisrel

นำผลที่ได้มาใส่ในโปรแกรม microsoft excel โดยแยกตามหัวข้อแต่ละปัจจัย

| | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | AA | AB | AC | AD | AE | |
|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|
| 1 | PE1 | PE2 | PE3 | PE4 | EE1 | EE2 | EE3 | EE4 | SI1 | SI2 | SI3 | SI4 | SI5 | FC1 | FC2 | FC3 | FC4 | PS1 | PS2 | PS3 | PS4 | SO1 | SO2 | SO3 | SO4 | CO1 | CO2 | CO3 | CO4 | BI1 | BI2 | |
| 2 | 5 | 5 | 5 | 5 | 4 | 4 | 5 | 5 | 4 | 5 | 4 | 2 | 2 | 3 | 4 | 4 | 5 | 4 | 4 | 4 | 5 | 5 | 3 | 4 | 4 | 5 | 2 | 2 | 2 | 5 | 5 | |
| 3 | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 4 | 4 | 5 | 4 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 5 | 3 | 3 | 3 | 5 | 5 | |
| 4 | 4 | 4 | 5 | 4 | 4 | 5 | 3 | 2 | 3 | 2 | 1 | 3 | 3 | 4 | 4 | 4 | 5 | 5 | 3 | 3 | 3 | 3 | 4 | 3 | 3 | 4 | 3 | 3 | 4 | 3 | 3 | |
| 5 | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 4 | 5 | 3 | 4 | 3 | 4 | 5 | 5 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 4 | 5 | |
| 6 | 5 | 5 | 5 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | |
| 7 | 3 | 3 | 4 | 4 | 3 | 3 | 4 | 4 | 3 | 3 | 2 | 4 | 2 | 3 | 3 | 4 | 5 | 2 | 2 | 2 | 1 | 2 | 2 | 3 | 2 | 2 | 2 | 3 | 2 | 4 | 4 | |
| 8 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 1 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | |
| 9 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 3 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 4 | 3 | |
| 10 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 2 | 3 | 3 | 3 | 4 | 5 | 5 | 4 | 5 | 5 | 5 | 5 | 5 | 3 | 4 | 4 | 5 | 5 | 5 | 4 | 4 | 4 | |
| 11 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | |
| 12 | 5 | 5 | 5 | 5 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 3 | 4 | 3 | 3 | 5 | 3 | |
| 13 | 4 | 4 | 5 | 5 | 4 | 5 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 5 | 4 | 4 | 4 | 5 | 4 | 4 | 4 | 4 | 3 | 3 | 4 | 3 | 5 | 4 | |
| 14 | 5 | 5 | 5 | 4 | 4 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 4 | 5 | 5 | 5 | 5 | 4 | 5 | 4 | 5 | 4 | 5 | 5 | 3 | 4 | 5 | 4 |
| 15 | 5 | 5 | 5 | 5 | 4 | 4 | 5 | 5 | 4 | 5 | 4 | 2 | 2 | 3 | 4 | 4 | 5 | 4 | 4 | 4 | 5 | 5 | 3 | 4 | 4 | 5 | 2 | 2 | 2 | 5 | 5 | |
| 16 | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 4 | 4 | 5 | 4 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 3 | 3 | 3 | 5 | 5 | | |
| 17 | 4 | 4 | 5 | 4 | 4 | 4 | 5 | 3 | 2 | 3 | 2 | 1 | 3 | 3 | 4 | 4 | 4 | 5 | 5 | 3 | 5 | 3 | 3 | 4 | 4 | 3 | 3 | 4 | 3 | 3 | 3 | |
| 18 | 4 | 4 | 4 | 4 | 5 | 5 | 4 | 4 | 4 | 5 | 3 | 4 | 3 | 4 | 5 | 5 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | |
| 19 | 5 | 5 | 5 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | |
| 20 | 3 | 3 | 4 | 4 | 3 | 3 | 4 | 4 | 3 | 3 | 2 | 4 | 2 | 3 | 3 | 4 | 5 | 2 | 2 | 2 | 1 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 3 | 2 | 4 | 4 |
| 21 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 1 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | |
| 22 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 3 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 4 | 3 | |
| 23 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 2 | 3 | 3 | 3 | 4 | 5 | 5 | 4 | 5 | 5 | 5 | 5 | 5 | 3 | 4 | 4 | 5 | 5 | 5 | 4 | 4 | 4 | |
| 24 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | |
| 25 | 5 | 5 | 5 | 5 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 3 | 4 | 3 | 3 | 5 | 3 | |
| 26 | 4 | 4 | 5 | 5 | 4 | 4 | 5 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 5 | 4 | 4 | 4 | 5 | 4 | 4 | 4 | 3 | 3 | 4 | 3 | 5 | 4 | |
| 27 | 5 | 5 | 5 | 4 | 4 | 4 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 5 | 4 | 4 | 5 | 4 | 5 | 5 | 3 | 4 | 5 | 4 | |
| 28 | 4 | 4 | 5 | 4 | 4 | 4 | 5 | 4 | 4 | 3 | 3 | 3 | 3 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 5 | 5 | 5 | 4 | 4 | 5 | 3 | 3 | 5 | 4 | 4 | |
| 29 | 5 | 4 | 3 | 3 | 4 | 4 | 5 | 5 | 4 | 3 | 3 | 4 | 3 | 3 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | |
| 30 | 4 | 5 | 4 | 3 | 4 | 3 | 4 | 4 | 5 | 4 | 5 | 4 | 5 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 4 |
| 31 | 4 | 4 | 5 | 4 | 4 | 4 | 5 | 3 | 2 | 3 | 2 | 1 | 3 | 3 | 4 | 4 | 4 | 5 | 5 | 3 | 5 | 3 | 3 | 4 | 4 | 3 | 3 | 4 | 3 | 3 | 3 | |
| 32 | 4 | 3 | 5 | 5 | 4 | 3 | 3 | 4 | 3 | 4 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 4 | 4 | 4 | 3 | 5 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 3 | 3 | 4 |
| 33 | 4 | 4 | 5 | 4 | 4 | 4 | 5 | 4 | 4 | 3 | 3 | 3 | 3 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 5 | 5 | 5 | 5 | 4 | 4 | 5 | 3 | 3 | 3 | 5 | 4 |
| 34 | 5 | 5 | 5 | 4 | 4 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 5 | 4 | 5 | 4 | 5 | 4 | 5 | 5 | 3 | 4 | 5 | 4 |
| 35 | 4 | 4 | 5 | 4 | 4 | 4 | 5 | 4 | 4 | 3 | 3 | 3 | 3 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 5 | 5 | 5 | 4 | 4 | 5 | 3 | 3 | 3 | 5 | 4 | |
| 36 | 5 | 5 | 5 | 4 | 4 | 4 | 5 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 5 | 4 | 4 | 4 | 5 | 5 | 3 | 4 | 4 | 5 | 3 | 2 | 2 | 5 | 5 | |
| 37 | 4 | 4 | 5 | 4 | 4 | 4 | 5 | 4 | 4 | 3 | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 4 | 5 | 5 | 3 | 3 | 3 | 5 | 4 | |
| 38 | 4 | 4 | 5 | 4 | 4 | 4 | 5 | 4 | 4 | 3 | 4 | 4 | 4 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 4 | 4 | 5 | 4 | 3 | 3 | 5 | 4 | |
| 39 | 5 | 5 | 5 | 4 | 4 | 4 | 5 | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 4 | 4 | 5 | 4 | 4 | 4 | 5 | 4 | 4 |
| 40 | 4 | 4 | 5 | 4 | 4 | 4 | 5 | 4 | 4 | 3 | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 4 | 5 | 3 | 3 | 5 | 4 |
| 41 | 4 | 4 | 5 | 4 | 4 | 4 | 5 | 4 | 4 | 3 | 4 | 4 | 4 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 5 | 5 | 5 | 4 | 4 | 5 | 3 | 3 | 3 | 5 | 4 | |
| 42 | 4 | 4 | 5 | 4 | 4 | 4 | 5 | 4 | 4 | 3 | 3 | 3 | 3 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 5 | 5 | 5 | 5 | 4 | 4 | 5 | 3 | 3 | 3 | 5 | 4 |
| 43 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 3 | 3 | 3 | 3 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 44 | 4 | 4 | 5 | 4 | 4 | 4 | 5 | 4 | 4 | 3 | 4 | 4 | 4 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 4 | 4 | 5 | 4 | 3 | 3 | 5 | 4 | |
| 45 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 |
| 46 | 4 | 4 | 5 | 4 | 4 | 4 | 5 | 3 | 2 | 3 | 2 | 1 | 3 | 3 | 4 | 4 | 4 | 5 | 5 | 3 | 5 | 3 | 3 | 4 | 4 | 3 | 3 | 4 | 3 | 3 | 3 | 3 |

ทำการเฉลี่ยแต่ละปัจจัย ตัวอย่างเช่น การหาค่า PE โดยการใส่สูตร คือ =AVERAGE (ช่องของแถวที่1 : ช่องของแถวสุดท้าย) จากในภาพวิธีการหาคือ =AVERAGE(d2:g2) ก็จะได้ค่าเฉลี่ยของปัจจัย PE ส่วนค่าอื่นๆปัจจัยอื่นๆก็ทำวิธีแบบเดียวกัน

| | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S |
|----|-----|----------|-----|-----|-----|-----|------|-----|-----|-----|-------------|-----|-----|-----|-----|-----|-----|-----|
| 1 | AGE | XPERIENC | PE1 | PE2 | PE3 | PE4 | PE | EE1 | EE2 | EE4 | EE | SI1 | SI2 | SI3 | SI4 | SI5 | SI | FC1 |
| 2 | 1 | 1 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 5 | 4.333333333 | 4 | 5 | 4 | 2 | 2 | 3.4 | 3 |
| 3 | 1 | 0 | 4 | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 4.333333333 | 4 | 4 | 3 | 3 | 3 | 3.4 | 4 |
| 4 | 1 | 0 | 4 | 4 | 5 | 4 | 4.25 | 4 | 4 | 3 | 3.666666667 | 2 | 3 | 2 | 1 | 3 | 2.2 | 3 |
| 5 | 1 | 0 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 4 | 4.666666667 | 4 | 5 | 3 | 4 | 3 | 3.8 | 4 |
| 6 | 1 | 0 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 7 | 1 | 0 | 3 | 3 | 4 | 4 | 3.5 | 3 | 3 | 4 | 3.333333333 | 3 | 3 | 2 | 4 | 2 | 2.8 | 3 |
| 8 | 2 | 0 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 1 | 5 | 5 | 4.2 | 5 |
| 9 | 2 | 0 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 4 |
| 10 | 1 | 1 | 3 | 4 | 4 | 4 | 3.75 | 4 | 4 | 4 | 4 | 3 | 2 | 3 | 3 | 3 | 2.8 | 4 |
| 11 | 1 | 0 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 4 |
| 12 | 1 | 1 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 2 | 2.8 | 3 |
| 13 | 1 | 1 | 4 | 4 | 5 | 5 | 4.5 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 14 | 1 | 0 | 5 | 5 | 5 | 4 | 4.75 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 15 | 1 | 1 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 5 | 4.333333333 | 4 | 5 | 4 | 2 | 2 | 3.4 | 3 |
| 16 | 1 | 0 | 4 | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 4.333333333 | 4 | 4 | 3 | 3 | 3 | 3.4 | 4 |
| 17 | 1 | 0 | 4 | 4 | 5 | 4 | 4.25 | 4 | 4 | 3 | 3.666666667 | 2 | 3 | 2 | 1 | 3 | 2.2 | 3 |
| 18 | 1 | 0 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 4 | 4.666666667 | 4 | 5 | 3 | 4 | 3 | 3.8 | 4 |
| 19 | 1 | 0 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 20 | 1 | 0 | 3 | 3 | 4 | 4 | 3.5 | 3 | 3 | 4 | 3.333333333 | 3 | 3 | 2 | 4 | 2 | 2.8 | 3 |

เราก็จะได้ค่าเฉลี่ยแต่ละปัจจัย ตามรูป

| | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R |
|----|--------|-----|----------|-----|-----|-----|-----|------|-----|-----|-----|-------------|-----|-----|-----|-----|-----|-----|
| 1 | GENDER | AGE | XPERIENC | PE1 | PE2 | PE3 | PE4 | PE | EE1 | EE2 | EE4 | EE | SI1 | SI2 | SI3 | SI4 | SI5 | SI |
| 2 | 0 | 1 | 1 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 5 | 4.333333333 | 4 | 5 | 4 | 2 | 2 | 3.4 |
| 3 | 0 | 1 | 0 | 4 | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 4.333333333 | 4 | 4 | 3 | 3 | 3 | 3.4 |
| 4 | 1 | 1 | 0 | 4 | 4 | 5 | 4 | 4.25 | 4 | 4 | 3 | 3.666666667 | 2 | 3 | 2 | 1 | 3 | 2.2 |
| 5 | 1 | 1 | 0 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 4 | 4.666666667 | 4 | 5 | 3 | 4 | 3 | 3.8 |
| 6 | 0 | 1 | 0 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 7 | 0 | 1 | 0 | 3 | 3 | 4 | 4 | 3.5 | 3 | 3 | 4 | 3.333333333 | 3 | 3 | 2 | 4 | 2 | 2.8 |
| 8 | 1 | 2 | 0 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 1 | 5 | 5 | 4.2 |
| 9 | 0 | 2 | 0 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 3 |
| 10 | 0 | 1 | 1 | 3 | 4 | 4 | 4 | 3.75 | 4 | 4 | 4 | 4 | 3 | 2 | 3 | 3 | 3 | 2.8 |
| 11 | 0 | 1 | 0 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 12 | 1 | 1 | 1 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 2 | 2.8 |
| 13 | 1 | 1 | 1 | 4 | 4 | 5 | 5 | 4.5 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 3 |
| 14 | 1 | 1 | 0 | 5 | 5 | 5 | 4 | 4.75 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 15 | 0 | 1 | 1 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 5 | 4.333333333 | 4 | 5 | 4 | 2 | 2 | 3.4 |
| 16 | 0 | 1 | 0 | 4 | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 4.333333333 | 4 | 4 | 3 | 3 | 3 | 3.4 |
| 17 | 1 | 1 | 0 | 4 | 4 | 5 | 4 | 4.25 | 4 | 4 | 3 | 3.666666667 | 2 | 3 | 2 | 1 | 3 | 2.2 |
| 18 | 1 | 1 | 0 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 4 | 4.666666667 | 4 | 5 | 3 | 4 | 3 | 3.8 |
| 19 | 0 | 1 | 0 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 20 | 0 | 1 | 0 | 3 | 3 | 4 | 4 | 3.5 | 3 | 3 | 4 | 3.333333333 | 3 | 3 | 2 | 4 | 2 | 2.8 |

นำค่า dummy หรือค่า modulator ได้แก่ gender age experience มาใส่ในช่องแรก (เพื่อให้ง่ายต่อการคำนวณ) โดยเรียงดังนี้ gender age experience

| | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R |
|----|--------|-----|-----------|-----|-----|-----|-----|------|-----|-----|-----|------------|-----|-----|-----|-----|-----|-----|
| 1 | GENDER | AGE | EXPERIENC | PE1 | PE2 | PE3 | PE4 | PE | EE1 | EE2 | EE4 | EE | SI1 | SI2 | SI3 | SI4 | SI5 | SI |
| 2 | 0 | 1 | 1 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 5 | 4.33333333 | 4 | 5 | 4 | 2 | 2 | 3.4 |
| 3 | 0 | 1 | 0 | 4 | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 4.33333333 | 4 | 4 | 3 | 3 | 3 | 3.4 |
| 4 | 1 | 1 | 0 | 4 | 4 | 5 | 4 | 4.25 | 4 | 4 | 3 | 3.66666667 | 2 | 3 | 2 | 1 | 3 | 2.2 |
| 5 | 1 | 1 | 0 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 4 | 4.66666667 | 4 | 5 | 3 | 4 | 3 | 3.8 |
| 6 | 0 | 1 | 0 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 7 | 0 | 1 | 0 | 3 | 3 | 4 | 4 | 3.5 | 3 | 3 | 4 | 3.33333333 | 3 | 3 | 2 | 4 | 2 | 2.8 |
| 8 | 1 | 2 | 0 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 1 | 5 | 5 | 4.2 |
| 9 | 0 | 2 | 0 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 3 |
| 10 | 0 | 1 | 1 | 3 | 4 | 4 | 4 | 3.75 | 4 | 4 | 4 | 4 | 3 | 2 | 3 | 3 | 3 | 2.8 |
| 11 | 0 | 1 | 0 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 12 | 1 | 1 | 1 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 2 | 2.8 |
| 13 | 1 | 1 | 1 | 4 | 4 | 5 | 5 | 4.5 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 3 |
| 14 | 1 | 1 | 0 | 5 | 5 | 5 | 4 | 4.75 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 15 | 0 | 1 | 1 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 5 | 4.33333333 | 4 | 5 | 4 | 2 | 2 | 3.4 |
| 16 | 0 | 1 | 0 | 4 | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 4.33333333 | 4 | 4 | 3 | 3 | 3 | 3.4 |
| 17 | 1 | 1 | 0 | 4 | 4 | 5 | 4 | 4.25 | 4 | 4 | 3 | 3.66666667 | 2 | 3 | 2 | 1 | 3 | 2.2 |
| 18 | 1 | 1 | 0 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 4 | 4.66666667 | 4 | 5 | 3 | 4 | 3 | 3.8 |
| 19 | 0 | 1 | 0 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 20 | 0 | 1 | 0 | 3 | 3 | 4 | 4 | 3.5 | 3 | 3 | 4 | 3.33333333 | 3 | 3 | 2 | 4 | 2 | 2.8 |

นำค่าเฉลี่ย average ที่ได้แต่ละปัจจัย มาใส่ต่อจาก dummy ในที่นี้คือ ต่อจาก gender age modulator >>> pe ee si fc ฯลฯเรียงไปตามตัวแปรตามที่ผู้วิจัยได้ตั้งขึ้น

| | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R |
|----|--------|-----|-----------|------|----------|-----|----------|------|------|----------|------|------|------|----------|------|------|----------|------|
| 1 | GENDER | AGE | EXPERIENC | PE | EE | SI | FC | PS | SQ | CO | BI | USE | G*PE | G*EE | G*SI | A*PE | A*EE | A*SI |
| 2 | 0 | 1 | 1 | 5 | 4.333333 | 3.4 | 3.666667 | 4.25 | 4 | 2 | 5 | 5 | 0 | 0 | 0 | 5 | 4.333333 | 0 |
| 3 | 0 | 1 | 0 | 4 | 4.333333 | 3.4 | 4.333333 | 5 | 4.75 | 3 | 5 | 4 | 0 | 0 | 0 | 4 | 4.333333 | 0 |
| 4 | 1 | 1 | 0 | 4.25 | 3.666667 | 2.2 | 3.666667 | 4.5 | 3.5 | 3.333333 | 3 | 3.75 | 4.25 | 3.666667 | 2.2 | 4.25 | 3.666667 | 2.2 |
| 5 | 1 | 1 | 0 | 4 | 4.666667 | 3.8 | 4.666667 | 5 | 4.75 | 5 | 4.25 | 4.75 | 4 | 4.666667 | 3.8 | 4 | 4.666667 | 3.8 |
| 6 | 0 | 1 | 0 | 5 | 4 | 4 | 4 | 4.25 | 4 | 4 | 4 | 4 | 0 | 0 | 0 | 5 | 4 | 0 |
| 7 | 0 | 1 | 0 | 3.5 | 3.333333 | 2.8 | 3.333333 | 1.75 | 2.25 | 2.333333 | 3.75 | 3 | 0 | 0 | 0 | 3.5 | 3.333333 | 0 |
| 8 | 1 | 0 | 0 | 5 | 5 | 4.2 | 5 | 5 | 5 | 1.666667 | 5 | 5 | 5 | 5 | 4.2 | 0 | 0 | 4.2 |
| 9 | 0 | 0 | 0 | 4 | 4 | 3 | 4 | 5 | 4 | 3 | 3.75 | 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10 | 0 | 1 | 1 | 3.75 | 4 | 2.8 | 4.666667 | 5 | 4 | 4.666667 | 3.25 | 3.75 | 0 | 0 | 0 | 3.75 | 4 | 0 |
| 11 | 0 | 1 | 0 | 4 | 3 | 3 | 3.333333 | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 4 | 3 | 0 |
| 12 | 1 | 1 | 1 | 5 | 4 | 2.8 | 3 | 4.25 | 5 | 3.333333 | 3.5 | 4 | 5 | 4 | 2.8 | 5 | 4 | 2.8 |
| 13 | 1 | 1 | 1 | 4.5 | 4 | 3 | 3.666667 | 4.25 | 4.25 | 3.333333 | 4.25 | 4.25 | 4.5 | 4 | 3 | 4.5 | 4 | 3 |
| 14 | 1 | 1 | 0 | 4.75 | 4 | 4 | 4.666667 | 4.75 | 4.25 | 4 | 4.75 | 4.25 | 4.75 | 4 | 4 | 4.75 | 4 | 4 |
| 15 | 0 | 1 | 1 | 5 | 4.333333 | 3.4 | 3.666667 | 4.25 | 4 | 2 | 5 | 5 | 0 | 0 | 0 | 5 | 4.333333 | 0 |
| 16 | 0 | 1 | 0 | 4 | 4.333333 | 3.4 | 4.333333 | 5 | 4.75 | 3 | 5 | 4 | 0 | 0 | 0 | 4 | 4.333333 | 0 |
| 17 | 1 | 1 | 0 | 4.25 | 3.666667 | 2.2 | 3.666667 | 4.5 | 3.5 | 3.333333 | 3 | 3.75 | 4.25 | 3.666667 | 2.2 | 4.25 | 3.666667 | 2.2 |
| 18 | 1 | 1 | 0 | 4 | 4.666667 | 3.8 | 4.666667 | 5 | 4.75 | 5 | 4.25 | 4.75 | 4 | 4.666667 | 3.8 | 4 | 4.666667 | 3.8 |
| 19 | 0 | 1 | 0 | 5 | 4 | 4 | 4 | 4.25 | 4 | 4 | 4 | 4 | 0 | 0 | 0 | 5 | 4 | 0 |
| 20 | 0 | 1 | 0 | 3.5 | 3.333333 | 2.8 | 3.333333 | 1.75 | 2.25 | 2.333333 | 3.75 | 3 | 0 | 0 | 0 | 3.5 | 3.333333 | 0 |
| 21 | 1 | 0 | 0 | 5 | 5 | 4.2 | 5 | 5 | 5 | 1.666667 | 5 | 5 | 5 | 5 | 4.2 | 0 | 0 | 4.2 |
| 22 | 0 | 0 | 0 | 4 | 4 | 3 | 4 | 5 | 4 | 3 | 3.75 | 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| 23 | 0 | 1 | 1 | 3.75 | 4 | 2.8 | 4.666667 | 5 | 4 | 4.666667 | 3.25 | 3.75 | 0 | 0 | 0 | 3.75 | 4 | 0 |
| 24 | 0 | 1 | 0 | 4 | 3 | 3 | 3.333333 | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 4 | 3 | 0 |
| 25 | 1 | 1 | 1 | 5 | 4 | 2.8 | 3 | 4.25 | 5 | 3.333333 | 3.5 | 4 | 5 | 4 | 2.8 | 5 | 4 | 2.8 |
| 26 | 1 | 1 | 1 | 4.5 | 4 | 3 | 3.666667 | 4.25 | 4.25 | 3.333333 | 4.25 | 4.25 | 4.5 | 4 | 3 | 4.5 | 4 | 3 |

จากนั้นนำ dummy (gender age experience) มาคูณกับค่าเฉลี่ย(average)แต่ละปัจจัย เพื่อทำ dummy ที่สมบูรณ์ ตัวอย่างเช่น

การหาค่า gender*pe สูตรคือ =a2*d2

การหาค่า gender*ee สูตรคือ =a2*e2

การหาค่า age*ee สูตรคือ =b2*c2

การหาค่า experience*si สูตรคือ =c2*f2

ก็จะได้ค่าผลลัพธ์ตามรูป

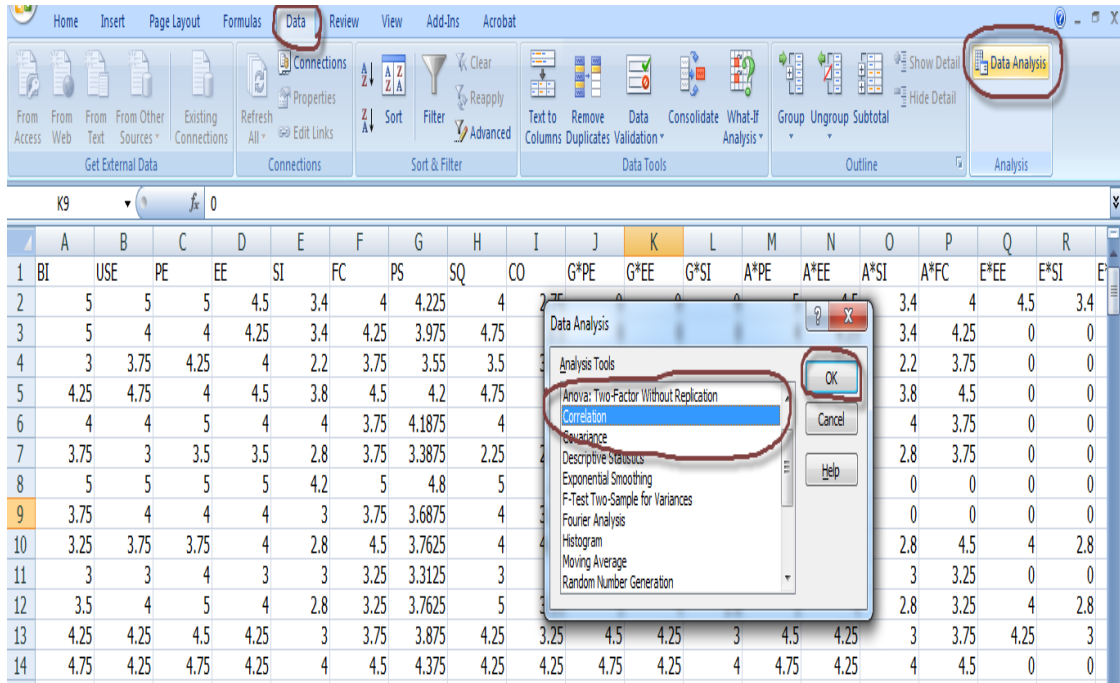
| | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T |
|---|--------|-----|------------|------|----------|-----|----------|------|------|----------|------|------|------|----------|------|------|----------|------|----------|----------|
| 1 | GENDER | AGE | EXPERIENCE | PE | EE | SI | FC | PS | SQ | CO | BI | USE | G*PE | G*EE | G*SI | A*PE | A*EE | A*SI | A*FC | E*EE |
| 2 | 0 | 1 | 1 | 5 | 4.333333 | 3.4 | 3.666667 | 4.25 | 4 | 2 | 5 | 5 | 0 | 0 | 0 | 5 | 4.333333 | 0 | 3.000007 | 4.333333 |
| 3 | 0 | 1 | 0 | 4 | 4.333333 | 3.4 | 4.333333 | 5 | 4.75 | 3 | 5 | 4 | 0 | 0 | 0 | 4 | 4.333333 | 0 | 4.333333 | 0 |
| 4 | 1 | 1 | 0 | 4.25 | 3.666667 | 2.2 | 3.666667 | 4.5 | 3.5 | 3.333333 | 3 | 3.75 | 4.25 | 3.666667 | 2.2 | 4.25 | 3.666667 | 2.2 | 3.666667 | 0 |
| 5 | 1 | 1 | 0 | 4 | 4.666667 | 3.8 | 4.666667 | 5 | 4.75 | 5 | 4.25 | 4.75 | 4 | 4.666667 | 3.8 | 4 | 4.666667 | 3.8 | 4.666667 | 0 |

จะได้ผมรวมเฉลี่ยทั้งหมด แต่ละตัวแปร แล้วนำมาจัดเรียงปัจจัยตามผู้วิจัยได้ตั้งตาม
สมมติฐานหรือตามโมเดล

จะได้ดังนี้ $bi\ use\ pe\ ee\ si\ fc\ ps\ sq\ co\ g*pe\ g*ee\ g*si\ a*pe\ a*ee\ a*si\ a*fc\ e*ee\ e*si\ e*fc$

| | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | E |
|----|----|------|------|------|------|-----|------|--------|------|------|------|------|------|------|------|------|------|------|------|
| 1 | BI | USE | PE | EE | SI | FC | PS | SQ | CO | G*PE | G*EE | G*SI | A*PE | A*EE | A*SI | A*FC | E*EE | E*SI | E*FC |
| 2 | | 5 | 5 | 5 | 4.5 | 3.4 | 4 | 4.225 | 4 | 2.75 | 0 | 0 | 0 | 5 | 4.5 | 3.4 | 4 | 4.5 | 3.4 |
| 3 | | 5 | 4 | 4 | 4.25 | 3.4 | 4.25 | 3.975 | 4.75 | 3.5 | 0 | 0 | 0 | 4 | 4.25 | 3.4 | 4.25 | 4.5 | 0 |
| 4 | | 3 | 3.75 | 4.25 | 4 | 2.2 | 3.75 | 3.55 | 3.5 | 3.25 | 4.25 | 4 | 2.2 | 4.25 | 4 | 2.2 | 3.75 | 0 | 0 |
| 5 | | 4.25 | 4.75 | 4 | 4.5 | 3.8 | 4.5 | 4.2 | 4.75 | 5 | 4 | 4.5 | 3.8 | 4 | 4.5 | 3.8 | 4.5 | 0 | 0 |
| 6 | | 4 | 4 | 5 | 4 | 4 | 3.75 | 4.1875 | 4 | 4 | 0 | 0 | 0 | 5 | 4 | 4 | 3.75 | 0 | 0 |
| 7 | | 3.75 | 3 | 3.5 | 3.5 | 2.8 | 3.75 | 3.3875 | 2.25 | 2.25 | 0 | 0 | 0 | 3.5 | 3.5 | 2.8 | 3.75 | 0 | 0 |
| 8 | | 5 | 5 | 5 | 5 | 4.2 | 5 | 4.8 | 5 | 2.5 | 5 | 5 | 4.2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9 | | 3.75 | 4 | 4 | 4 | 3 | 3.75 | 3.6875 | 4 | 3.25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10 | | 3.25 | 3.75 | 3.75 | 4 | 2.8 | 4.5 | 3.7625 | 4 | 4.75 | 0 | 0 | 0 | 3.75 | 4 | 2.8 | 4.5 | 4 | 2.8 |
| 11 | | 3 | 3 | 4 | 3 | 3 | 3.25 | 3.3125 | 3 | 3 | 0 | 0 | 0 | 4 | 3 | 3 | 3.25 | 0 | 0 |
| 12 | | 3.5 | 4 | 5 | 4 | 2.8 | 3.25 | 3.7625 | 5 | 3.25 | 5 | 4 | 2.8 | 5 | 4 | 2.8 | 3.25 | 4 | 2.8 |
| 13 | | 4.25 | 4.25 | 4.5 | 4.25 | 3 | 3.75 | 3.875 | 4.25 | 3.25 | 4.5 | 4.25 | 3 | 4.5 | 4.25 | 3 | 3.75 | 4.25 | 3 |
| 14 | | 4.75 | 4.25 | 4.75 | 4.25 | 4 | 4.5 | 4.375 | 4.25 | 4.25 | 4.75 | 4.25 | 4 | 4.75 | 4.25 | 4 | 4.5 | 0 | 0 |
| 15 | | 5 | 5 | 5 | 4.5 | 3.4 | 4 | 4.225 | 4 | 2.75 | 0 | 0 | 0 | 5 | 4.5 | 3.4 | 4 | 4.5 | 3.4 |
| 16 | | 5 | 4 | 4 | 4.25 | 3.4 | 4.25 | 3.975 | 4.75 | 3.5 | 0 | 0 | 0 | 4 | 4.25 | 3.4 | 4.25 | 0 | 0 |
| 17 | | 3 | 3.75 | 4.25 | 4 | 2.2 | 3.75 | 3.55 | 3.5 | 3.25 | 4.25 | 4 | 2.2 | 4.25 | 4 | 2.2 | 3.75 | 0 | 0 |
| 18 | | 4.25 | 4.75 | 4 | 4.5 | 3.8 | 4.5 | 4.2 | 4.75 | 5 | 4 | 4.5 | 3.8 | 4 | 4.5 | 3.8 | 4.5 | 0 | 0 |
| 19 | | 4 | 4 | 5 | 4 | 4 | 3.75 | 4.1875 | 4 | 4 | 0 | 0 | 0 | 5 | 4 | 4 | 3.75 | 0 | 0 |
| 20 | | 3.75 | 3 | 3.5 | 3.5 | 2.8 | 3.75 | 3.3875 | 2.25 | 2.25 | 0 | 0 | 0 | 3.5 | 3.5 | 2.8 | 3.75 | 0 | 0 |
| 21 | | 5 | 5 | 5 | 5 | 4.2 | 5 | 4.8 | 5 | 2.5 | 5 | 5 | 4.2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 22 | | 3.75 | 4 | 4 | 4 | 3 | 3.75 | 3.6875 | 4 | 3.25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 23 | | 3.25 | 3.75 | 3.75 | 4 | 2.8 | 4.5 | 3.7625 | 4 | 4.75 | 0 | 0 | 0 | 3.75 | 4 | 2.8 | 4.5 | 4 | 2.8 |
| 24 | | 3 | 3 | 4 | 3 | 3 | 3.25 | 3.3125 | 3 | 3 | 0 | 0 | 0 | 4 | 3 | 3 | 3.25 | 0 | 0 |
| 25 | | 3.5 | 4 | 5 | 4 | 2.8 | 3.25 | 3.7625 | 5 | 3.25 | 5 | 4 | 2.8 | 5 | 4 | 2.8 | 3.25 | 4 | 2.8 |
| 26 | | 4.25 | 4.25 | 4.5 | 4.25 | 3 | 3.75 | 3.875 | 4.25 | 3.25 | 4.5 | 4.25 | 3 | 4.5 | 4.25 | 3 | 3.75 | 4.25 | 3 |
| 27 | | 4.75 | 4.25 | 4.75 | 4.25 | 4 | 4.5 | 4.375 | 4.25 | 4.25 | 4.75 | 4.25 | 4 | 4.75 | 4.25 | 4 | 4.5 | 0 | 0 |

จากนั้น หาค่า km ด้วย data analysis โดยใช้ microsoft office
โดยเลือกที่ data >> data analysis >> correlation >> ok (กรณีที่ไม่มี data analysis ให้
ผู้วิจัยไปโหลดโปรแกรมมาก่อน)



ในช่อง input rang เลือกจาก a1 ถึง s401 (เลือกข้อมูลที่มีอยู่ทั้งหมดในโปรแกรม
Microsoft excel โดยเลือกทั้ง 400 คน ตั้งแต่ 1-400) ผู้วิจัยต้องเลือกหัวข้อปัจจัยเข้าไปด้วย คือ bi ถึง
e*fc เพื่อให้ง่ายต่อการตรวจสอบปัจจัยแต่ละปัจจัย

ในช่อง grouped by ให้เลือกเป็น columns

ในช่อง labels in first row ให้กดเครื่องหมายถูกตรงช่องสี่เหลี่ยม(เพื่อแสดงหัวข้อ
บรรทัด เพื่อให้ง่ายต่อการตรวจสอบปัจจัยแต่ละปัจจัย)

ในส่วนของ outputoption เลือกได้ 3 แบบคือ

Output rage คือ เลือกแสดงภายในหน้า sheet เดิมนั้น เพียงเลือกช่องตำแหน่งเดียวที่
ต้องการ

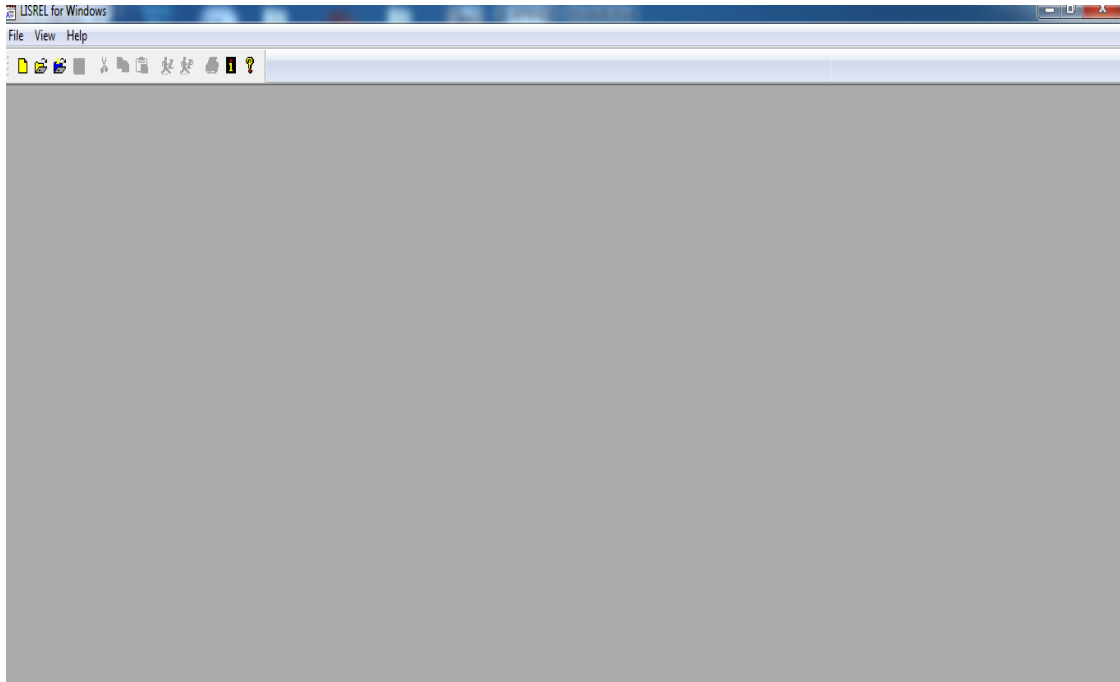
New worksheet plyคือ กำหนดให้สร้างผลที่ได้ในหน้า sheet ใหม่ และสามารถกำหนด
ชื่อ sheet เองได้

New workbook เป็นการสร้างขึ้นมาอีกหนึ่งไฟล์

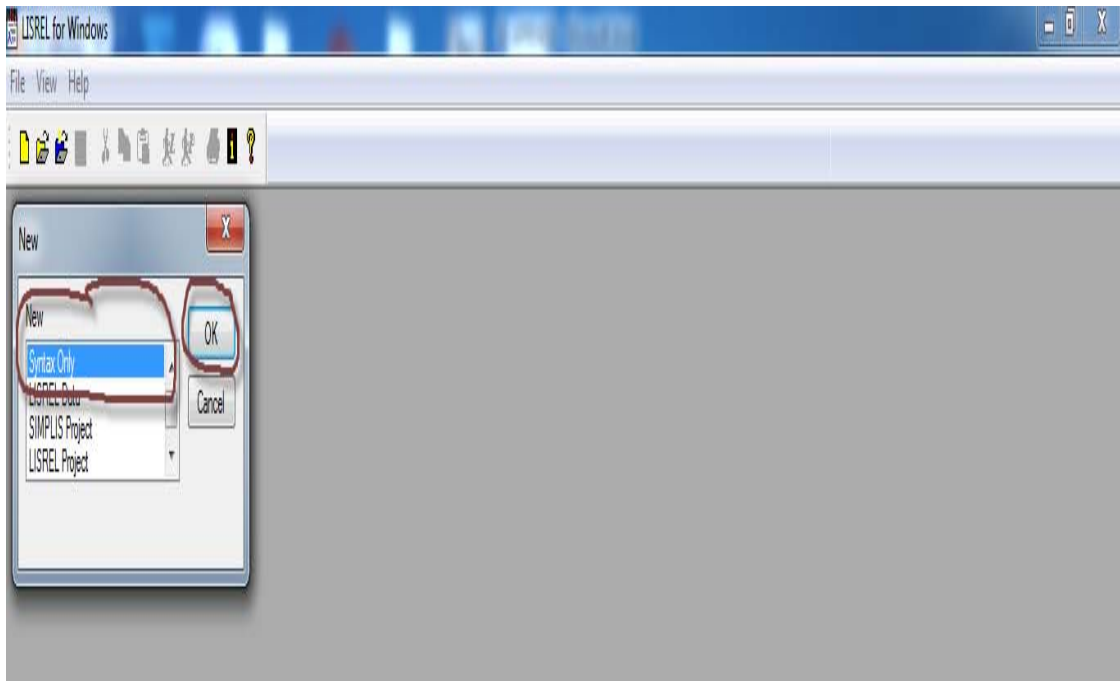
จะได้ค่า km ค้างรูป

| | BI | USE | PE | EE | SI | FC | PS | SQ | CO | G*PE | G*EE | G*SI | A*PE | A*EE | A*SI | A*FC | E*EE | E*SI | E*FC | |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|------|--|
| BI | 1 | | | | | | | | | | | | | | | | | | | |
| USE | 0.72662 | 1 | | | | | | | | | | | | | | | | | | |
| PE | 0.427973 | 0.563319 | 1 | | | | | | | | | | | | | | | | | |
| EE | 0.69022 | 0.774863 | 0.460246 | 1 | | | | | | | | | | | | | | | | |
| SI | 0.521598 | 0.415582 | 0.301657 | 0.370321 | 1 | | | | | | | | | | | | | | | |
| FC | 0.505242 | 0.431057 | 0.11753 | 0.623979 | 0.417744 | 1 | | | | | | | | | | | | | | |
| PS | 0.724105 | 0.718023 | 0.611195 | 0.794208 | 0.774024 | 0.735768 | 1 | | | | | | | | | | | | | |
| SQ | 0.475328 | 0.599945 | 0.399592 | 0.741857 | 0.351685 | 0.504619 | 0.655399 | 1 | | | | | | | | | | | | |
| CO | -0.12345 | 0.030135 | -0.14165 | 0.117593 | 0.380079 | 0.287324 | 0.25184 | 0.294407 | 1 | | | | | | | | | | | |
| G*PE | 0.122054 | 0.180999 | 0.244909 | 0.362985 | 0.149694 | 0.42783 | 0.389689 | 0.441363 | 0.148696 | 1 | | | | | | | | | | |
| G*EE | 0.14455 | 0.201104 | 0.200032 | 0.386965 | 0.166855 | 0.470106 | 0.404192 | 0.445267 | 0.161383 | 0.994188 | 1 | | | | | | | | | |
| G*SI | 0.213031 | 0.220848 | 0.198184 | 0.39061 | 0.30534 | 0.513142 | 0.479533 | 0.435607 | 0.224372 | 0.972503 | 0.97964 | 1 | | | | | | | | |
| A*PE | 0.156104 | 0.010319 | 0.292897 | 0.01717 | -0.01489 | 0.102581 | 0.12645 | 0.065351 | 0.077044 | 0.275874 | 0.259434 | 0.243701 | 1 | | | | | | | |
| A*EE | 0.194676 | 0.033763 | 0.184138 | 0.085045 | -0.00685 | 0.213286 | 0.152601 | 0.111768 | 0.133149 | 0.30262 | 0.299068 | 0.28407 | 0.981624 | 1 | | | | | | |
| A*SI | 0.241981 | 0.015144 | 0.197538 | 0.054123 | 0.203991 | 0.231603 | 0.246076 | 0.1002 | 0.21726 | 0.275748 | 0.274118 | 0.306873 | 0.950387 | 0.958385 | 1 | | | | | |
| A*FC | 0.177536 | -0.01068 | 0.09921 | 0.063565 | 0.014889 | 0.292316 | 0.156941 | 0.092149 | 0.180292 | 0.310501 | 0.31346 | 0.308576 | 0.955903 | 0.988028 | 0.95864 | 1 | | | | |
| E*EE | 0.110801 | 0.108486 | 0.111225 | 0.215726 | 0.055511 | 0.343952 | 0.237564 | 0.348937 | 0.131165 | 0.406822 | 0.397619 | 0.389625 | 0.446933 | 0.486015 | 0.453901 | 0.499069 | 1 | | | |
| E*SI | 0.141071 | 0.110508 | 0.104208 | 0.210482 | 0.158207 | 0.364358 | 0.285484 | 0.331002 | 0.158985 | 0.403888 | 0.396019 | 0.411081 | 0.43625 | 0.475945 | 0.480405 | 0.495343 | 0.98408 | 1 | | |
| E*FC | 0.103654 | 0.092743 | 0.060999 | 0.209151 | 0.070333 | 0.404108 | 0.247321 | 0.337196 | 0.17067 | 0.406111 | 0.402231 | 0.400409 | 0.43073 | 0.479458 | 0.454025 | 0.507722 | 0.993403 | 0.982991 | 1 | |

จากนั้นเปิด โปรแกรม lisrel



เลือกที่ new >> syntax only >> ok



ผู้วิจัยจึงเขียนโปรแกรมหรือโค้ดเข้าไปในโปรแกรม

หมายเลข 1 คือ ชื่อเรื่อง ต้องมีเครื่องหมาย ! นำหน้าชื่อเรื่องเสมอ เช่น !GG !electronic payment !run lisrel final

หมายเลข 2 คือ การประกาศตัวแปร da ni = 15 คือจำนวนตัวแปรที่ผู้วิจัยมีอยู่ในการวิจัย

No=400 คือ จำนวนข้อมูลที่เก็บข้อมูล

หมายเลข 3 คือ การประกาศตัวแปร ซึ่งการประกาศตัวแปรต้องเรียงตามโมเดลการวิจัยของงานวิจัย เพื่อให้โปรแกรมสามารถวิเคราะห์ได้

หมายเลข 4 คือ ค่า km ซึ่งก่อนใส่ใน lisrelจะต้องนำผลที่ได้มาใส่ในโปรแกรม notepad ก่อนเสมอ

หมายเลข 5 คือ ค่า sdซึ่งก่อนใส่ใน lisrelจะต้องนำผลที่ได้มาใส่ในโปรแกรม notepad ก่อนเสมอ

หมายเลข 6 คือ การกำหนดค่าและทิศทางของโปรแกรม mony=จำนวนตัวแปรภายในในที่นี้คือ bi กับ use

$nx = 13$ คือ ประกาศตัวแปรแกน x ในที่นี้คือปัจจัยทั้งหมด ยกเว้น bi กับ use ซึ่งจะต้องน้อยกว่า ni เสมอ

ni ประกาศตัวแปรทั้งหมด 15 ตัวแปร ny ประกาศ 2 ตัวแปร nx ก็จะเหลือ 13 ตัวแปร

frga คือ เส้นทางการสัมพันธ์ของแต่ละปัจจัยในแกน x ตัวอย่าง เช่น frga(1,1) คือ bi >pe fr be

fr be คือ เส้นทางการสัมพันธ์ของแต่ละปัจจัยในแกน x(2,1)คือ use > bi

หมายเลข 7 คือ การปรับโมเดล เพื่อให้โมเดลมีความถูกต้องและสมบูรณ์

```

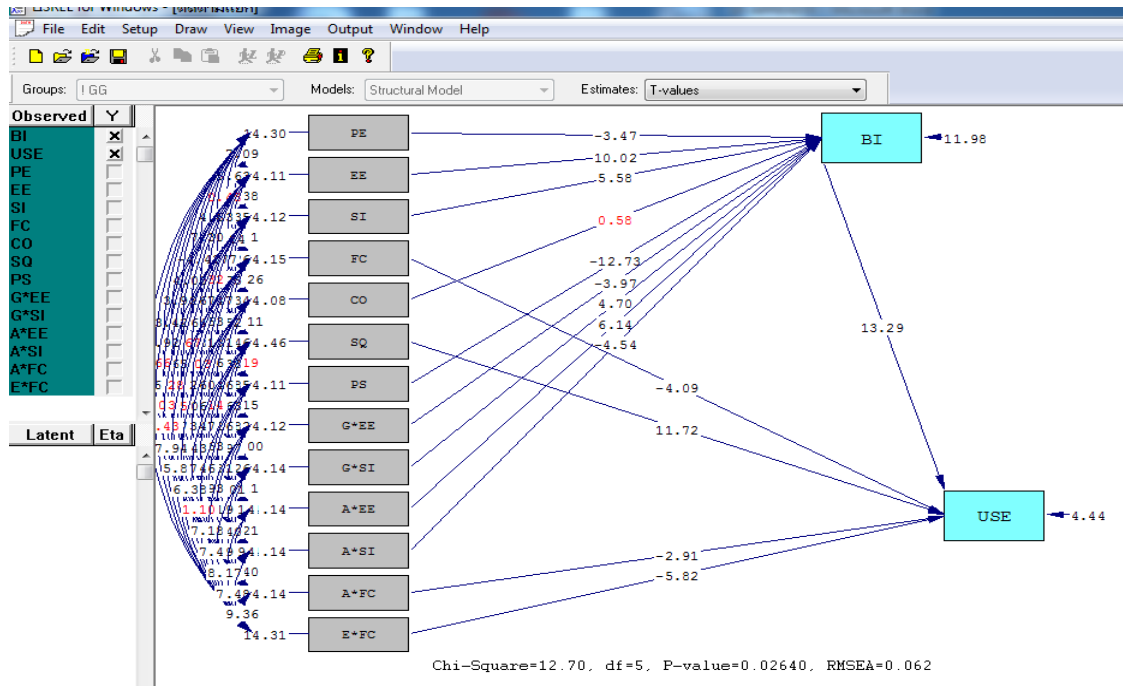
LISREL for Windows - [ชื่อตามแบบ]
File Edit Options Window Help
! GG 1
DA NI=15 NO=400 2
LA
BI USE PE EE SI FC CO SQ PS G*EE G*SI A*EE A*SI A*FC E*FC 3
KM
1.000
0.727 1.000
0.428 0.561 1.000
0.609 0.713 0.387 1.000
0.521 0.416 0.302 0.398 1.000
0.367 0.307 0.021 0.459 0.425 1.000
0.296 0.490 0.244 0.592 0.218 0.681 1.000
0.475 0.600 0.400 0.728 0.352 0.531 0.774 1.000
-0.363 -0.199 -0.238 0.016 0.228 0.178 0.177 0.072 1.000
0.148 0.212 0.202 0.296 0.180 0.456 0.341 0.454 0.107 1.000
0.213 0.221 0.198 0.294 0.305 0.507 0.345 0.436 0.141 0.981 1.000
0.185 0.025 0.176 -0.033 -0.001 0.131 0.058 0.118 0.099 0.273 0.270 1.000
0.213 0.221 0.198 0.294 0.305 0.507 0.345 0.436 0.141 0.981 1.000 0.270 1.000
0.167 -0.017 0.083 -0.064 0.048 0.299 0.123 0.128 0.148 0.326 0.338 0.971 0.338 1.000
0.100 0.086 0.040 0.014 0.078 0.432 0.314 0.335 0.052 0.391 0.409 0.452 0.409 0.532 1.000
SD
0.549 0.454 0.387 0.336 0.531 0.531 0.652 0.535 0.757 2.044 1.790 1.646 1.790 1.788 2.213 5
MO NY=2 NX=13 TD=SY BE=FU,FI GA=FU,FI
FR GA(1,1) GA(1,2) GA(1,3) GA(2,4) GA(1,5) GA(2,6) GA(1,7) GA(1,8) GA(1,9) GA(1,10) GA(1,11) GA(2,12) GA(2,13) 4
FR BE(2,1)
FR TH(6,2) TH(1,2) TH(13,1) TH(11,1) TH(5,2) TH(8,2) TH(4,2) TD(13,1) 7
    
```

เมื่อเขียน โปรแกรมหรือ โค้ดเสร็จแล้ว ก็ run โปรแกรมปุ่ม ดังภาพ

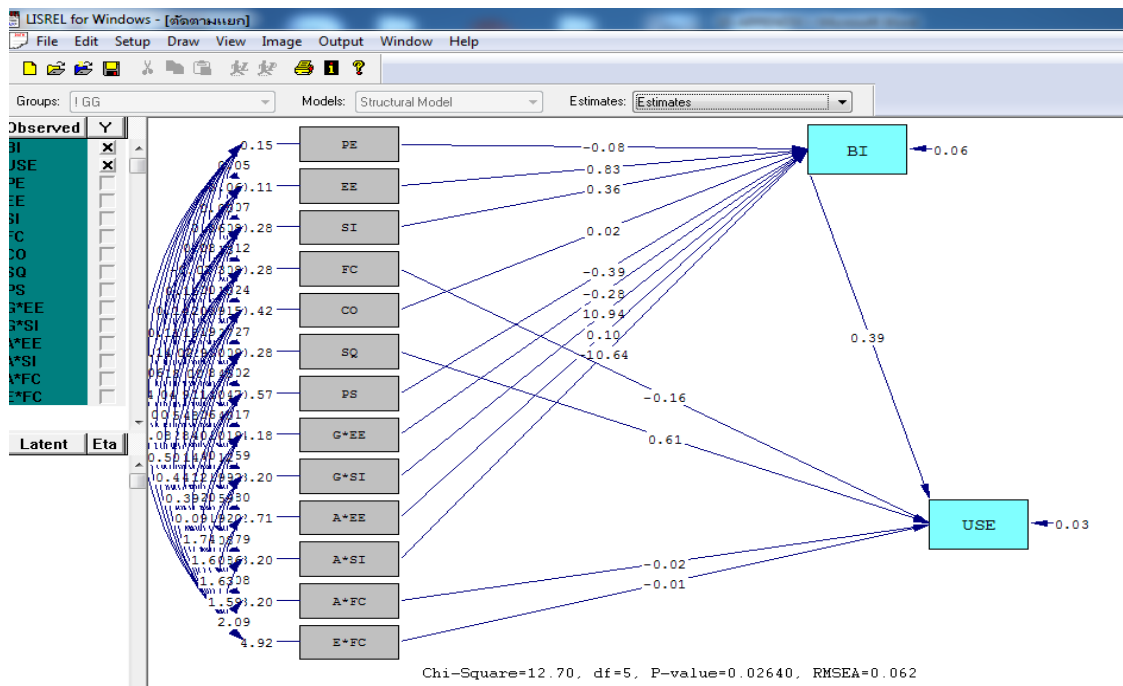
```

LISREL for Windows - [ชื่อตามแบบ]
File Edit Options Window Help
! GG
DA NI=15 NO=400
LA
BI USE PE EE SI FC CO SQ PS G*EE G*SI A*EE A*SI A*FC E*FC
KM
1.000
0.727 1.000
0.428 0.561 1.000
0.609 0.713 0.387 1.000
0.521 0.416 0.302 0.398 1.000
0.367 0.307 0.021 0.459 0.425 1.000
0.296 0.490 0.244 0.592 0.218 0.681 1.000
0.475 0.600 0.400 0.728 0.352 0.531 0.774 1.000
-0.363 -0.199 -0.238 0.016 0.228 0.178 0.177 0.072 1.000
0.148 0.212 0.202 0.296 0.180 0.456 0.341 0.454 0.107 1.000
0.213 0.221 0.198 0.294 0.305 0.507 0.345 0.436 0.141 0.981 1.000
0.185 0.025 0.176 -0.033 -0.001 0.131 0.058 0.118 0.099 0.273 0.270 1.000
0.213 0.221 0.198 0.294 0.305 0.507 0.345 0.436 0.141 0.981 1.000 0.270 1.000
0.167 -0.017 0.083 -0.064 0.048 0.299 0.123 0.128 0.148 0.326 0.338 0.971 0.338 1.000
0.100 0.086 0.040 0.014 0.078 0.432 0.314 0.335 0.052 0.391 0.409 0.452 0.409 0.532 1.000
SD
0.549 0.454 0.387 0.336 0.531 0.531 0.652 0.535 0.757 2.044 1.790 1.646 1.790 1.788 2.213
MO NY=2 NX=13 TD=SY BE=FU,FI GA=FU,FI
FR GA(1,1) GA(1,2) GA(1,3) GA(2,4) GA(1,5) GA(2,6) GA(1,7) GA(1,8) GA(1,9) GA(1,10) GA(1,11) GA(2,12) GA(2,13)
FR BE(2,1)
FR TH(6,2) TH(1,2) TH(13,1) TH(11,1) TH(5,2) TH(8,2) TH(4,2) TD(13,1)
    
```

สามารถดูผลลัพธ์ ที่ t-value การจะดูว่าค่าที่ได้ significant หรือไม่นั้น ค่านั้นต้องมากกว่า 1.96 และในโปรแกรมต้องมีตัวอักษรสีดำ



สามารถดูผลลัพธ์ ที่ estimates เพื่อดูว่าความสัมพันธ์ระหว่างตัวแปรตัว



การปรับโมเดลสามารถปรับได้ 3 เส้นคือ theta-esp (te), theta-delta-eps(th) และ theta-delta (td) ยกตัวอย่างจากภาพคือต้องปรับที่เส้น td โค้ดคือ FR TH(7,2)

```

LISREL for Windows - [สถิติทางเมทริกซ์.OUT]
File Edit Options Window Help
A*SI 0.000 -0.007 -0.005 0.001 -0.002 0.002
A*FC -- -- -- -- -- --
E*FC -- -- -- -- -- --

Expected Change for THETA-DELTA
      PS  G*EE  G*SI  A*EE  A*SI  A*FC
-----
PS      --
G*EE    -- --
G*SI    -0.046  0.002  0.000
A*EE    -- --  0.000  --
A*SI    -- -0.013  0.000  0.000  0.000
A*FC    -- --  0.000  --  0.000  --
E*FC    -- -- -0.002  --  0.001  --

Expected Change for THETA-DELTA
      E*FC
-----
E*FC  --

Maximum Modification Index is 171.68 for Element ( 7, 2) of THETA DELTA-EPSILON
Time used 0.140 seconds

```

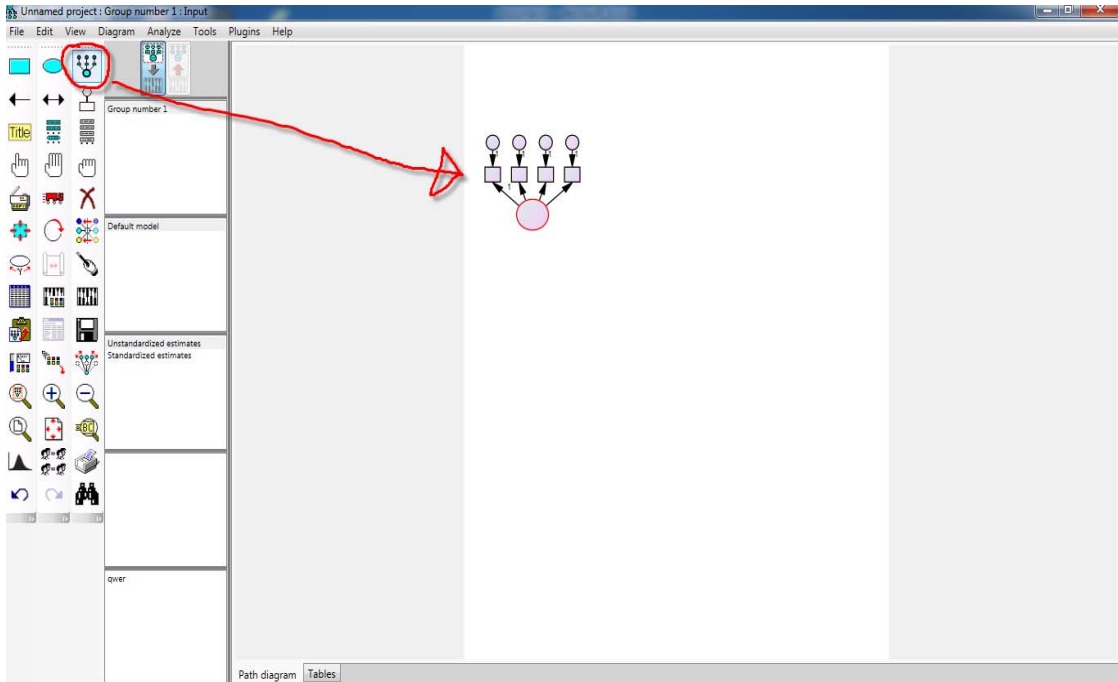
ตัวอย่างการหาค่า ด้วยโปรแกรม Amos (ไม่ได้ปรับเส้นและค่าต่างๆ)

นำข้อมูลจาก microsoft excel มาจัดเรียงใน spss โดยไม่จำเป็นต้องเรียงตามตัวแปร
เรียงอย่างไรก็ได้

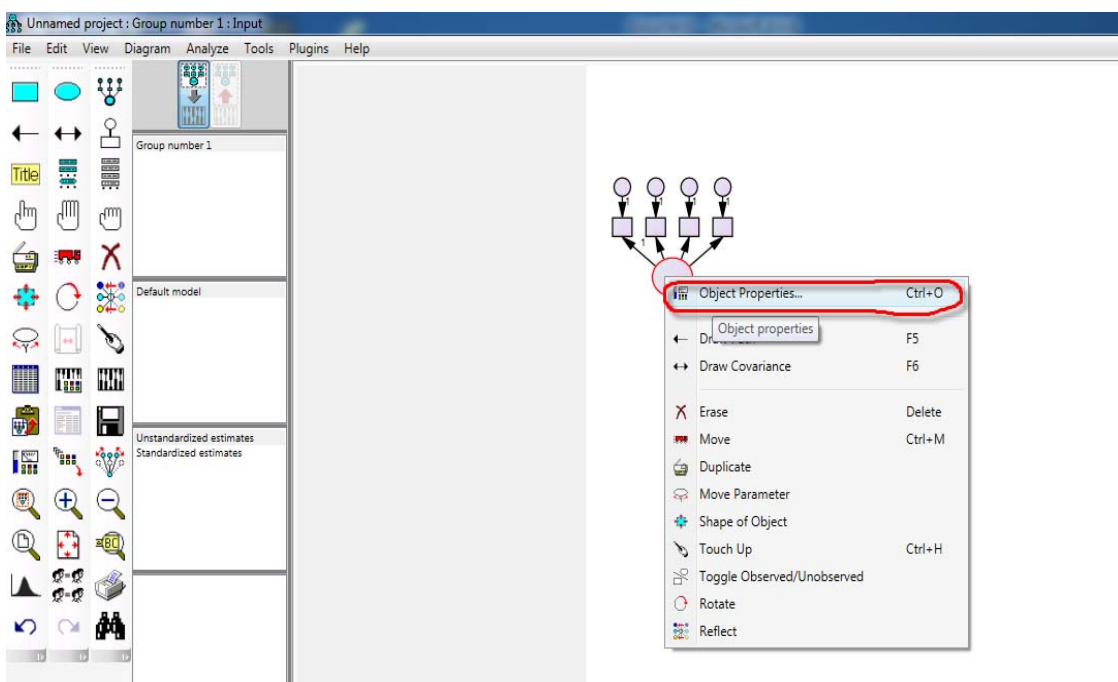
The screenshot shows the IBM SPSS Statistics Data Editor window. The title bar reads 'ค่าคะแนนนักศึกษา.sav [DataSet1] - IBM SPSS Statistics Data Editor'. The menu bar includes File, Edit, View, Data, Transform, Analyze, Direct Marketing, Graphs, Utilities, Add-ons, Window, and Help. The toolbar contains various icons for file operations and data manipulation. The main window displays a data grid with 25 rows and 16 columns. The columns are labeled PE1, PE2, PE3, PE4, EE1, EE2, EE3, SI1, SI2, SI3, SI4, SI5, FC1, FC2, and FC3. The data values are numerical, ranging from 2.00 to 5.00. The status bar at the bottom indicates 'Visible: 34 of 34 Variables' and 'IBM SPSS Statistics Processor is ready'.

| | PE1 | PE2 | PE3 | PE4 | EE1 | EE2 | EE3 | SI1 | SI2 | SI3 | SI4 | SI5 | FC1 | FC2 | FC3 |
|----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 1 | 5.00 | 5.00 | 5.00 | 5.00 | 4.00 | 4.00 | 5.00 | 4.00 | 5.00 | 4.00 | 2.00 | 2.00 | 3.00 | 4.00 | 4.00 |
| 2 | 4.00 | 4.00 | 4.00 | 4.00 | 5.00 | 4.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 | 4.00 | 4.00 | 5.00 |
| 3 | 4.00 | 4.00 | 5.00 | 4.00 | 4.00 | 4.00 | 3.00 | 2.00 | 3.00 | 2.00 | 1.00 | 3.00 | 3.00 | 4.00 | 4.00 |
| 4 | 4.00 | 4.00 | 4.00 | 4.00 | 5.00 | 5.00 | 4.00 | 4.00 | 5.00 | 3.00 | 4.00 | 3.00 | 4.00 | 5.00 | 5.00 |
| 5 | 5.00 | 5.00 | 5.00 | 5.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| 6 | 3.00 | 3.00 | 4.00 | 4.00 | 3.00 | 3.00 | 4.00 | 3.00 | 3.00 | 2.00 | 4.00 | 2.00 | 3.00 | 3.00 | 4.00 |
| 7 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 1.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 |
| 8 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 4.00 | 4.00 | 4.00 |
| 9 | 3.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 3.00 | 2.00 | 3.00 | 3.00 | 3.00 | 4.00 | 5.00 | 5.00 |
| 10 | 4.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 4.00 | 3.00 | 3.00 |
| 11 | 5.00 | 5.00 | 5.00 | 5.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 | 3.00 | 2.00 | 3.00 | 3.00 | 3.00 |
| 12 | 4.00 | 4.00 | 5.00 | 5.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 4.00 | 4.00 |
| 13 | 5.00 | 5.00 | 5.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 5.00 | 5.00 |
| 14 | 5.00 | 5.00 | 5.00 | 5.00 | 4.00 | 4.00 | 5.00 | 4.00 | 5.00 | 4.00 | 2.00 | 2.00 | 3.00 | 4.00 | 4.00 |
| 15 | 4.00 | 4.00 | 4.00 | 4.00 | 5.00 | 4.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 | 4.00 | 4.00 | 5.00 |
| 16 | 4.00 | 4.00 | 5.00 | 4.00 | 4.00 | 4.00 | 3.00 | 2.00 | 3.00 | 2.00 | 1.00 | 3.00 | 3.00 | 4.00 | 4.00 |
| 17 | 4.00 | 4.00 | 4.00 | 4.00 | 5.00 | 5.00 | 4.00 | 4.00 | 5.00 | 3.00 | 4.00 | 3.00 | 4.00 | 5.00 | 5.00 |
| 18 | 5.00 | 5.00 | 5.00 | 5.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| 19 | 3.00 | 3.00 | 4.00 | 4.00 | 3.00 | 3.00 | 4.00 | 3.00 | 3.00 | 2.00 | 4.00 | 2.00 | 3.00 | 3.00 | 4.00 |
| 20 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 1.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 |
| 21 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 4.00 | 4.00 | 4.00 |
| 22 | 3.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 3.00 | 2.00 | 3.00 | 3.00 | 3.00 | 4.00 | 5.00 | 5.00 |
| 23 | 4.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 4.00 | 3.00 | 3.00 |
| 24 | 5.00 | 5.00 | 5.00 | 5.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 | 3.00 | 2.00 | 3.00 | 3.00 | 3.00 |
| 25 | 4.00 | 4.00 | 5.00 | 5.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 4.00 | 4.00 |

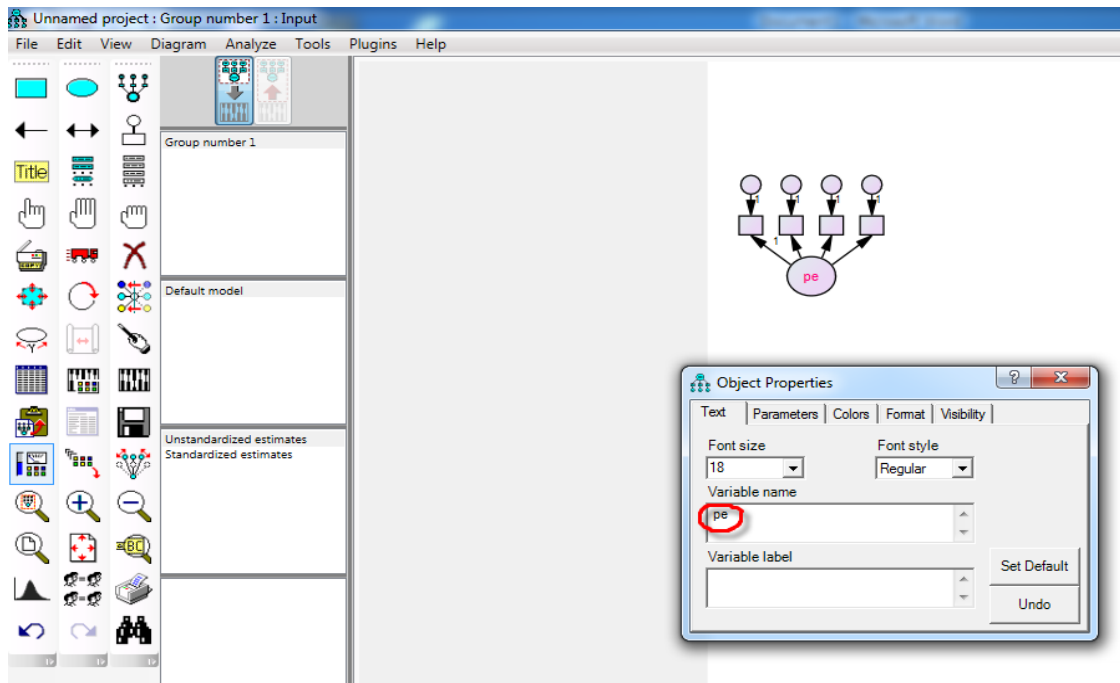
คลิกที่ รูปไอคอนทางซ้ายมือดังรูป ก็จะมีโครงสร้างมาอยู่ที่หน้าจอหลักโดยโหนดเริ่มต้นจะมีเพียงแค่ว่า 1 โหนดให้ผู้วิจัยคลิกซ้ายเพื่อเพิ่มจำนวนโหนด (จำนวนโหนดเท่าไรขึ้นอยู่กับงานวิจัย) ในรูปผู้วิจัยมี 4 ตัวแปร



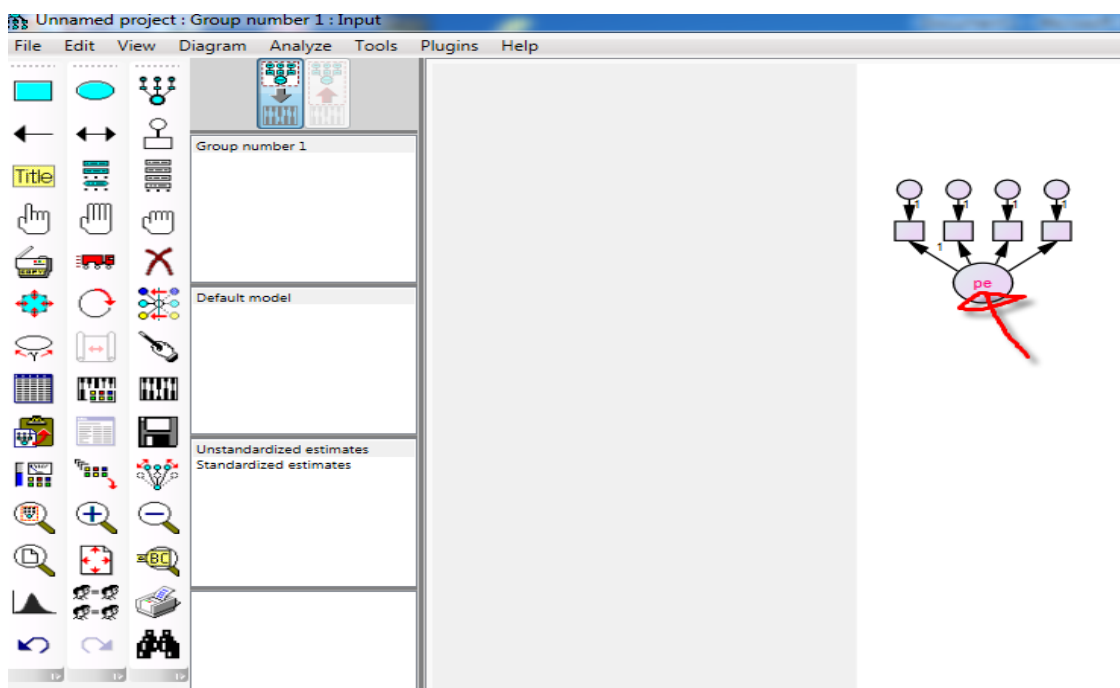
จากนั้นคลิกขวาที่ วงกลมเพื่อตั้งชื่อปัจจัยหลัก แล้วเลือกที่ object properties



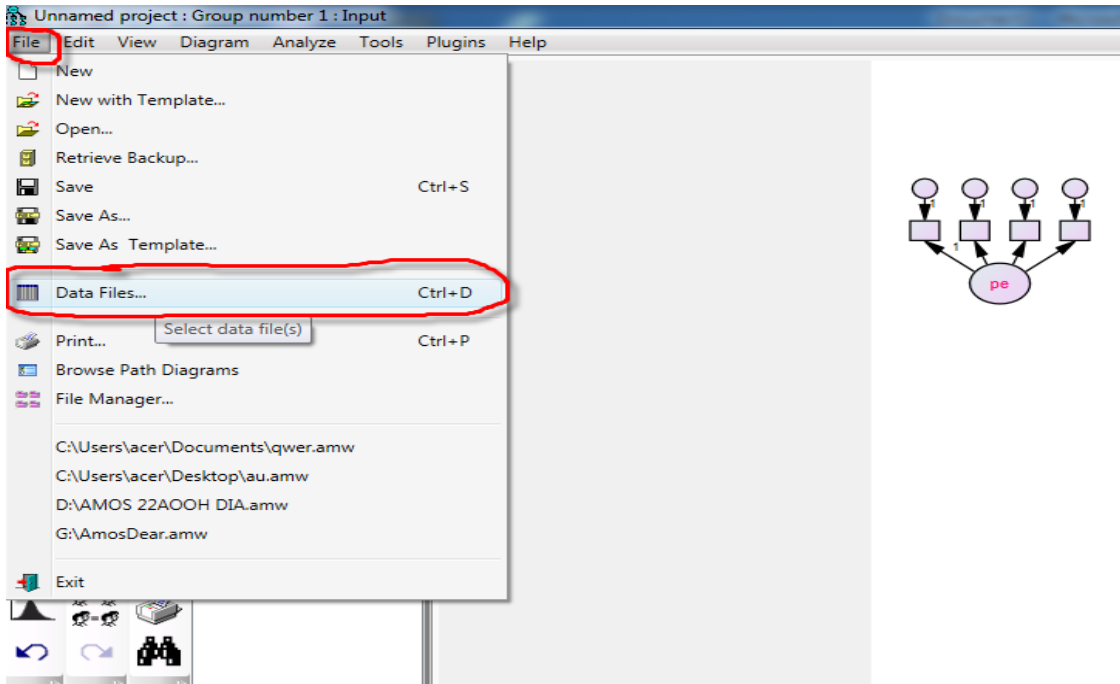
ที่ช่อง variable name ก็ตั้งชื่อปัจจัยตามงานวิจัย และสามารถเลือกปรับ อักษร สี ต่างๆ ได้โดยเลือกที่ format , colour, text, parameters



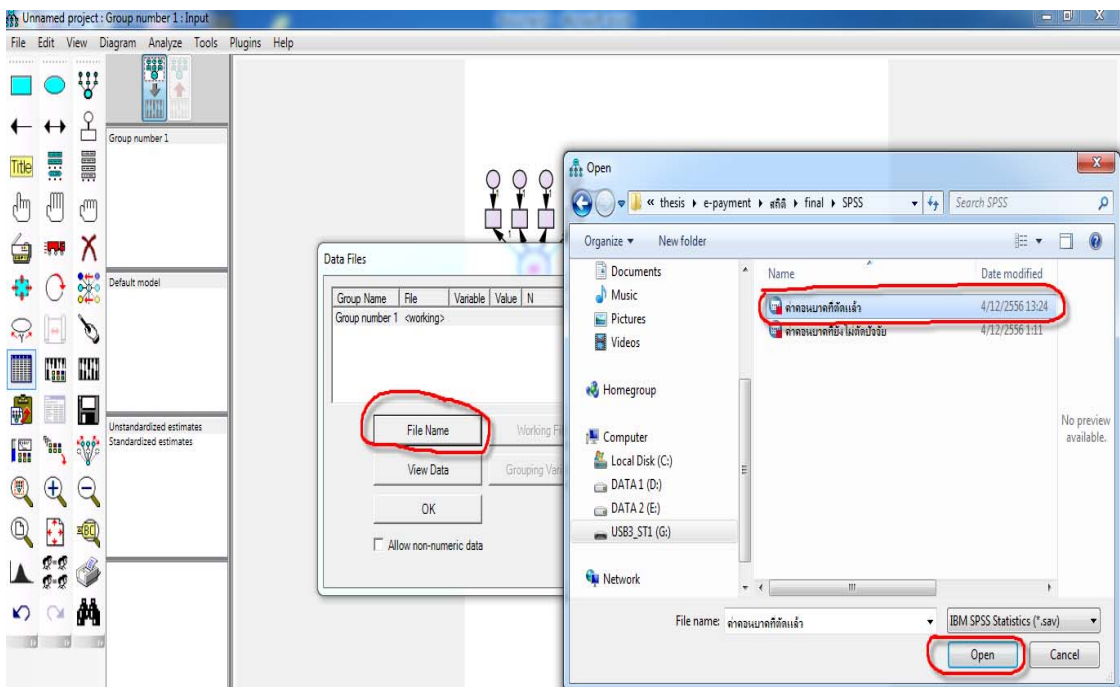
ก็จะได้ผลลัพธ์ตามรูป



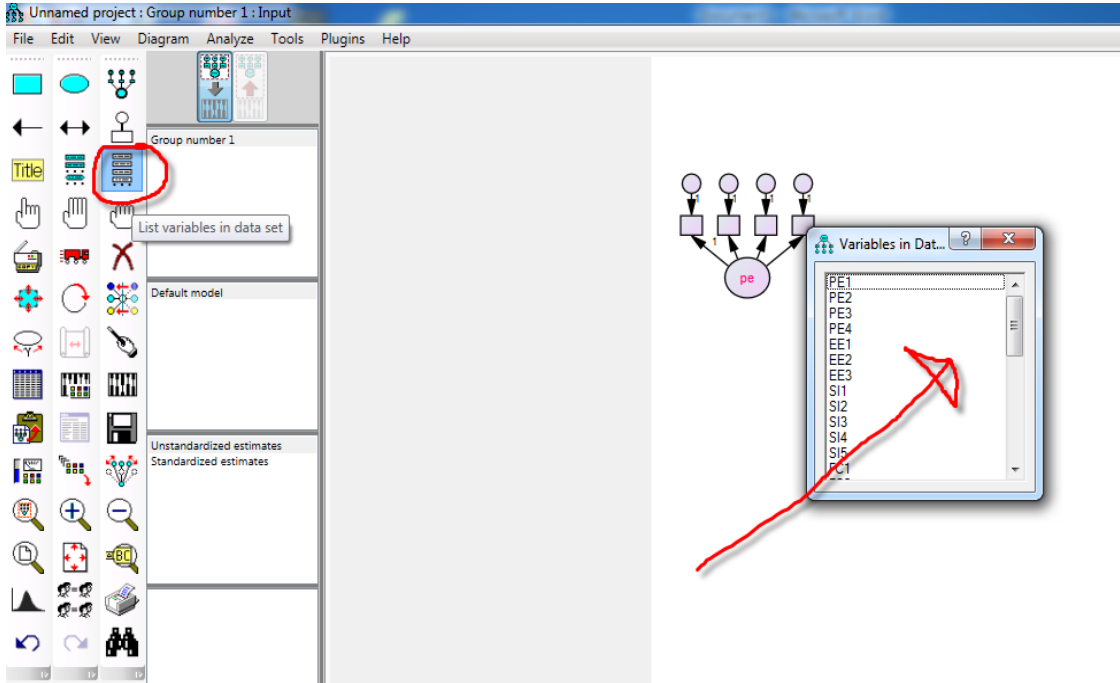
จากนั้น ใ้ ตัวแปรแฝงหรือจำนวนข้อคำถามในช่องสี่เหลี่ยม โดยการดึงข้อมูลจาก spss โดยการ คลิกที่ file > data files



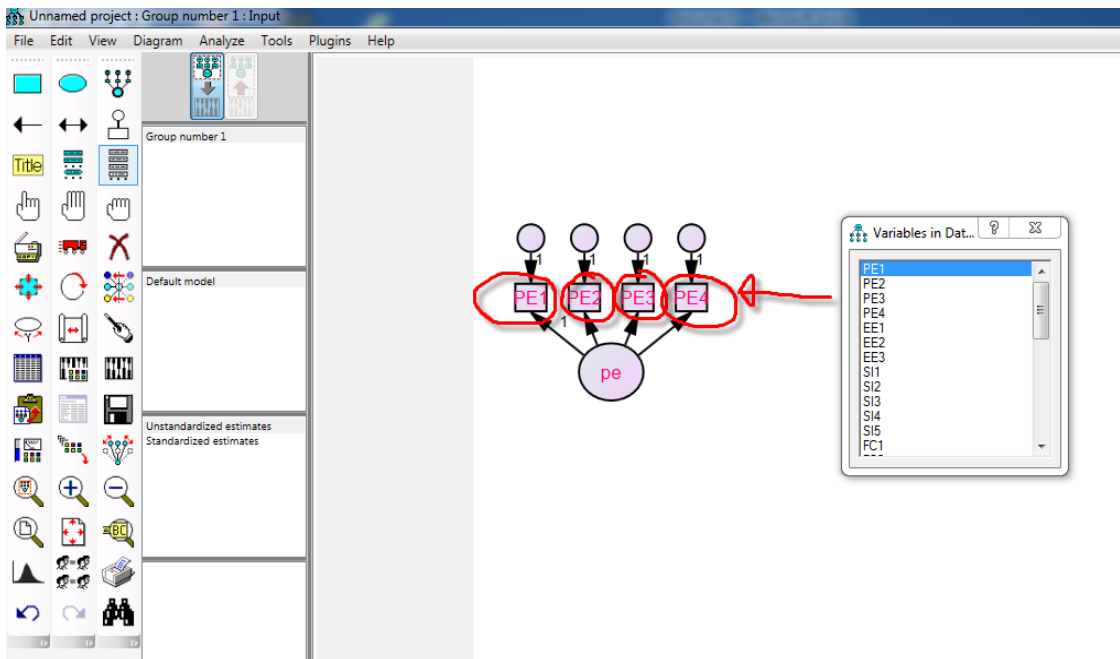
เลือกที่ file name >เลือกข้อมูลจาก โปรแกรมspssที่เราพร้อมจะนำมาประมวลผล >open > ok



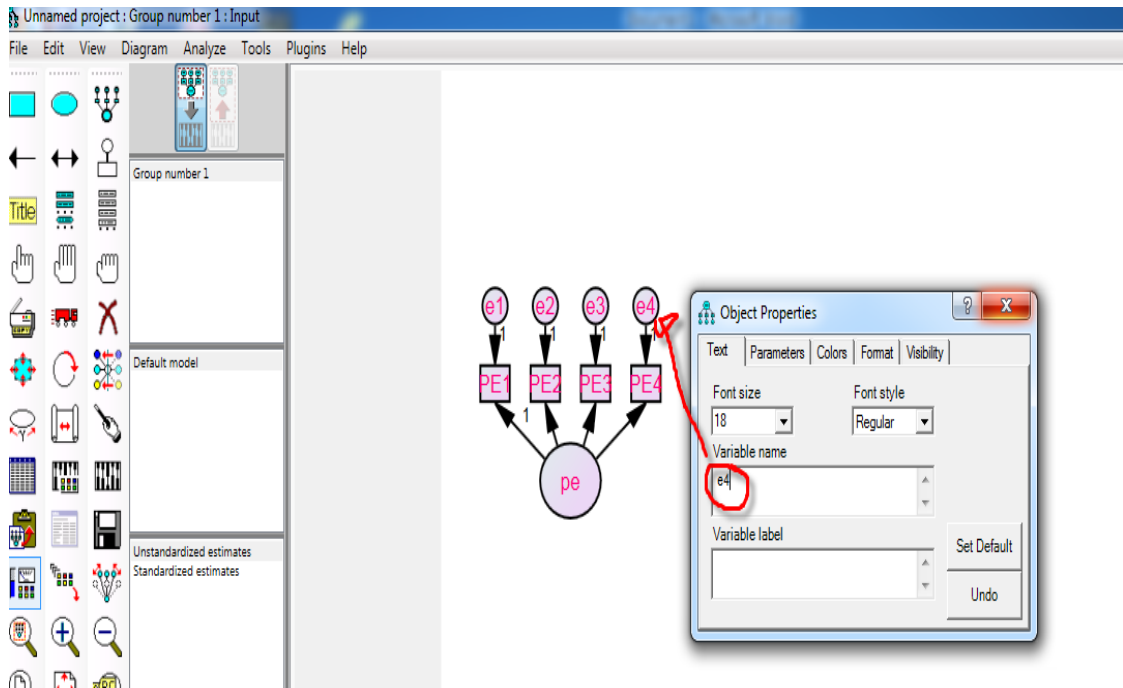
จากนั้นเลือกที่ไอคอนดังรูป ก็จะได้ตัวแปรแฝง ในที่นี้คือ pe1 pe2 pe3 pe4



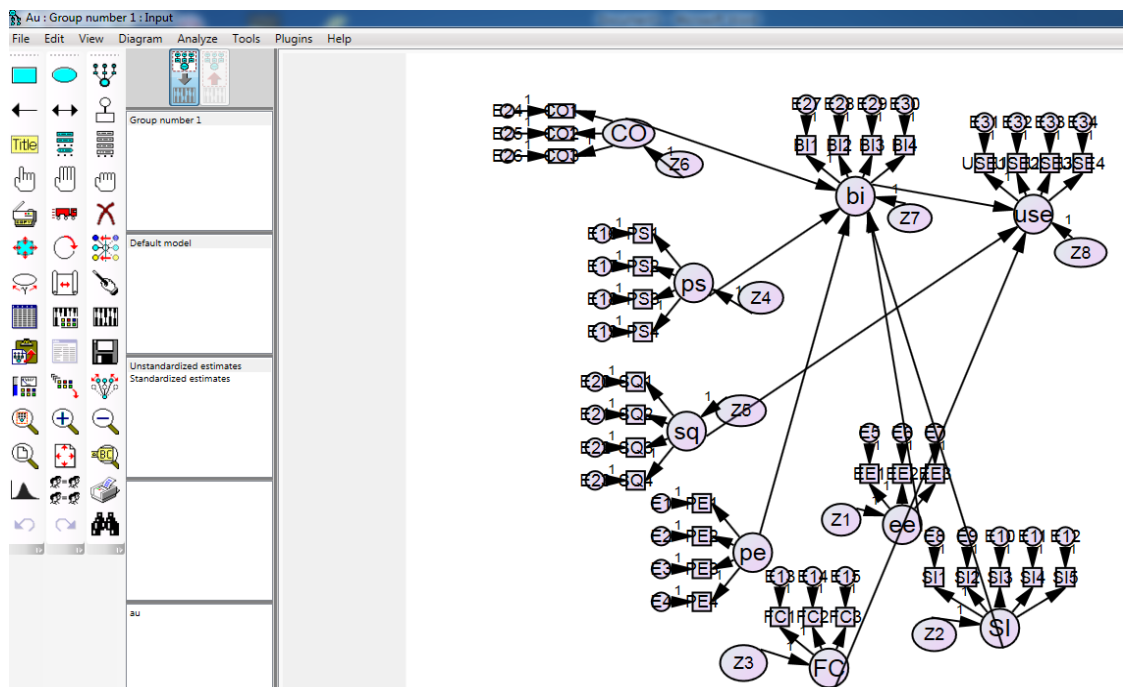
ทำการเลือก ตัวแปร pe1 pe2 pe3 pe4 มาใส่ในช่องสี่เหลี่ยม โดยวางให้ถูกลำดับตามตัวแปร ดังรูป



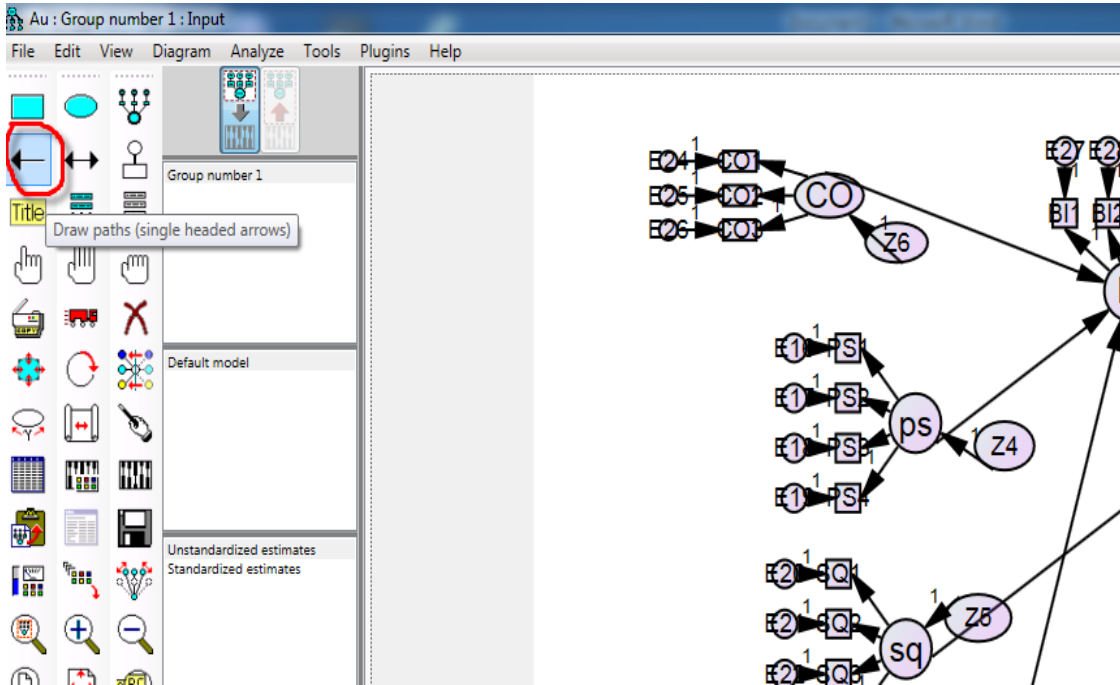
แล้วทำการ กำหนดตัวแปรที่ช่องวงกลม โดยใส่ตัวแปรของของมูลทั้งหมด โดยการคลิก 2 ครั้งที่วงกลมเล็ก จากนั้นจึงได้ e1 e2 e3 e4 ดังรูป



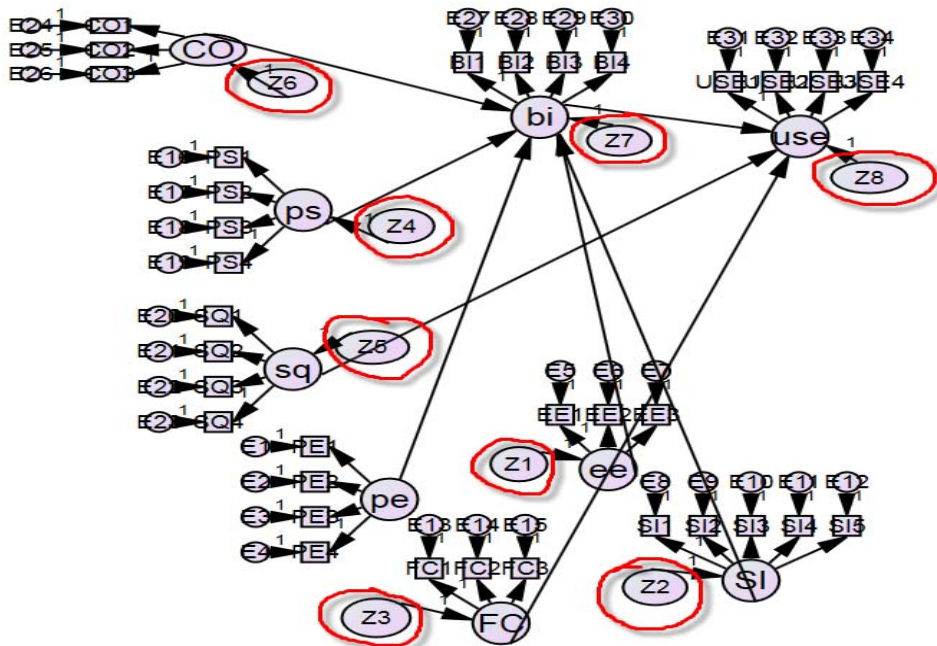
จากนั้นเราก็ทำทุกๆตัวแปร โดยใช้วิธีที่กล่าวมาโดยเพิ่มรูปและตัวแปร ee si fc sq ps co



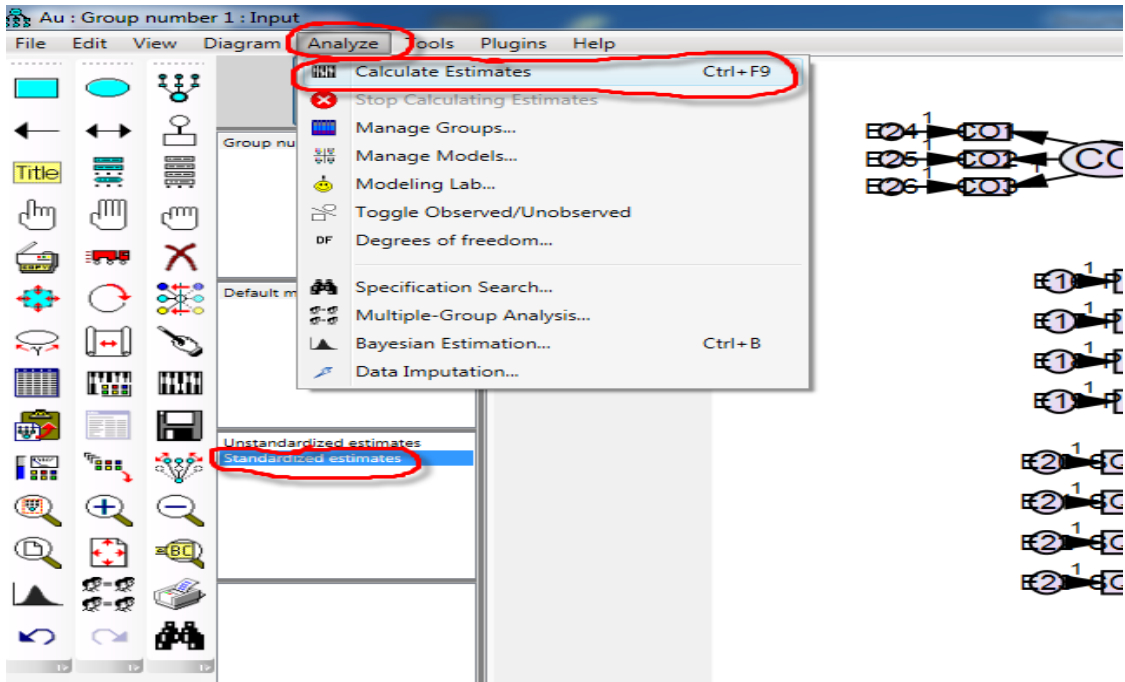
จากนั้นลากเส้นความสัมพันธ์โดยคลิกที่ไอคอน ดังรูป



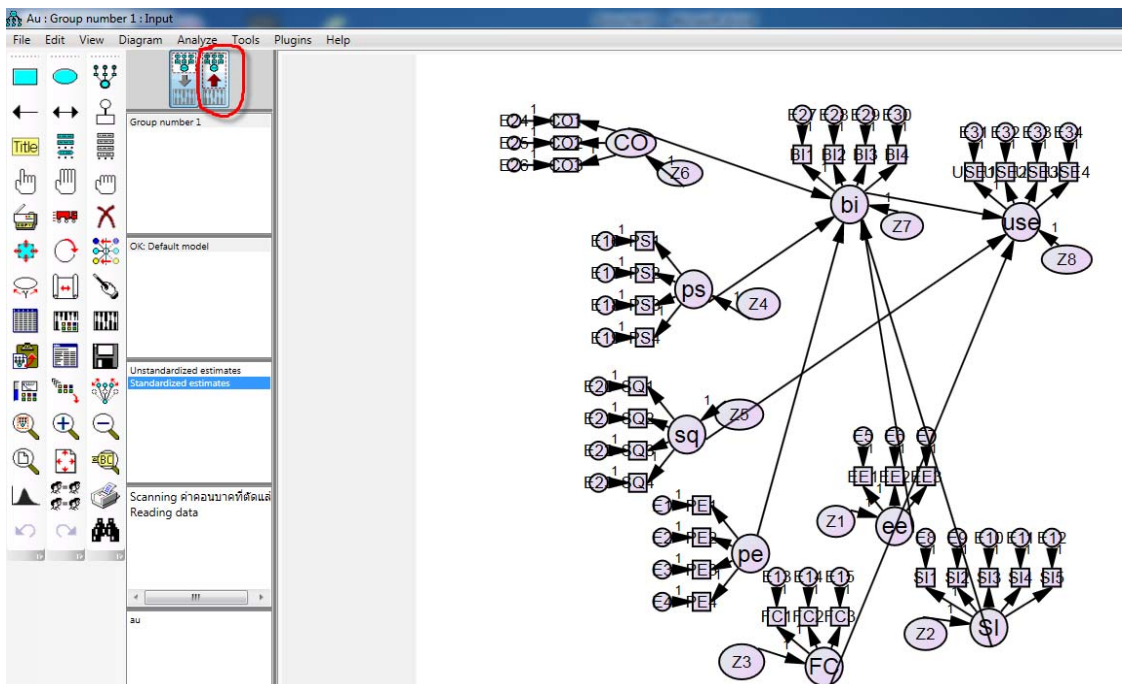
จากนั้นเราสร้างการกำหนดความคลาดเคลื่อน (z) แต่ละตัวแปรแฝงทุกตัว ยกเว้นตัวแปรแฝงเริ่มต้น (ยกเว้น pe)



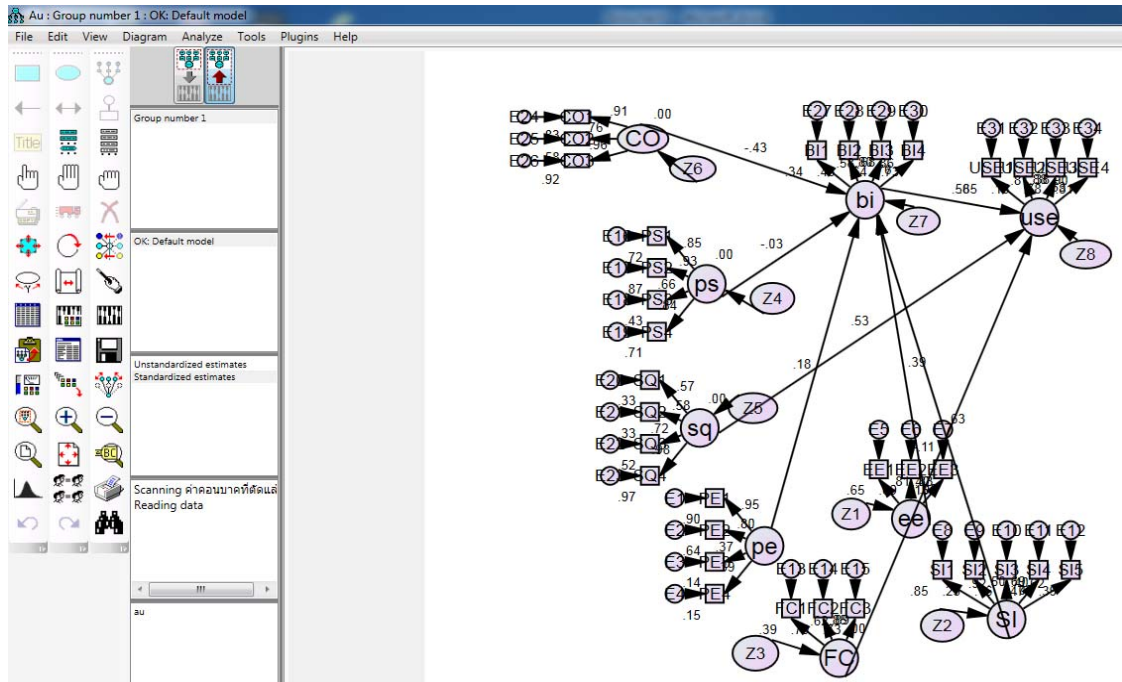
เลือก analysis > calculate estimates (ให้ผู้วิจัยคลิกที่ standardized estimates ด้วย)



คลิกที่ไอคอนดังรูป



จะได้ผลลัพธ์ของโมเดล



BIOGRAPHY

| | |
|------------------------------|--|
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