

# **A STUDY ON FACTORS INFLUENCING EMAIL WORKFLOW**

by

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## ***DEDICATION***

*I dedicate this research to my dear wife, Irene.*

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## ABSTRAK

Kajian ini bertujuan untuk meninjau faktor-faktor yang mempengaruhi aliran kerja 'email'. Seiringan untuk lebih memahami kehendak pengguna untuk mencipta satu sistem yang lebih berkesan, kesan langsung faktor-faktor komponen aktiviti yang berkaitan dengan penggunaan 'email' dan tanggapan kegunaan sistem 'email' sekarang ke atas niat seseorang untuk menggunakan sistem 'email' sekarang; dengan fungsi pembaharuan atau tanpa fungsi pembaharuan telah diuji. Tambahan pula, faktor tanggapan kegunaan sistem 'email' sekarang juga diuji untuk mengetahui kesan perantaraanya dalam hubungan di antara faktor-faktor komponen aktiviti yang berkaitan dengan penggunaan 'email' dan niat seseorang untuk menggunakan sistem 'email' sekarang; dengan fungsi pembaharuan atau tanpa fungsi pembaharuan. Kajian ini adalah berdasarkan kombinasi dua model iaitu; model yang menunjukkan komponen aktiviti yang berkaitan dengan penggunaan 'email' dan model penerimaan teknologi. Sampel kajian ini terdiri daripada 102 orang pekerja dewasa yang berwarganegara Malaysia di negeri Pulau Pinang; yang tidak mengendalikan perniagaan sendiri. Hasil regresi menunjukkan bahawa faktor 'Archive' (yang bermaksud kegiatan menyimpan 'email') mempunyai hubungan positif dengan niat seseorang untuk menggunakan sistem 'email' sekarang; dengan fungsi pembaharuan atau tanpa fungsi pembaharuan. Faktor 'Retrieval' (yang bermaksud kegiatan mengeluarkan 'email') pula menunjukkan hubungan negatif dengan niat seseorang untuk menggunakan sistem 'email' sekarang; dengan fungsi pembaharuan atau tanpa fungsi pembaharuan. Implikasi kajian ini mencadangkan bahawa pembangun 'email' patut lebih menumpu terhadap faktor-faktor 'Archive' dan 'Retrieval' apabila mencipta satu pembaharuan sistem 'email' untuk memenuhi keperluan pengguna.

## **ABSTRACT**

The purpose of this research was to investigate the factors that may influence the email workflow. In order to better understand the users' requirements and needs to design a better system, both the users' activities surrounding email (UASE) factors and the perceived usefulness of current email system (MED\_PU) factors were tested for their direct effect on one's behavioral intention to use current email system; with or without upgraded features (DEP\_BI). In addition, perceived usefulness of current email system factor was tested for its mediating effect on the relationship between users' activities surrounding email factors and one's behavioral intention to use current email system; with or without upgraded features. This research is based on the combination of two models; Users' Activities Surrounding Email Model (UASE) and the Technology Acceptance Model (TAM). The respondents for this study were all 102 Malaysian working adults in Penang Island; who were not self-employed at the time of the survey. The regression results showed that Archive factor had a positive relationship with the behavioral intention to use current email system; with or without upgraded features. The Retrieve factor had a negative relationship with the behavioral intention to use current email system; with or without upgraded features. The implications of this study suggest that the email client developer should focus more into the Archive and Retrieve factors when developing an upgraded email client in order to fulfill their user's needs.

## Chapter 1

### INTRODUCTION

#### 1.1 Background of the study

Email (Electronic mail) is the most popular application on the internet and almost everyone uses email and generally people use it all of the time. The way organizations operate and the way people work has been changed by the invention of email and to work without it would be unthinkable (Sproull & Kiesler, 1991). It has also found to become a necessary and embedded channel in modern organizations (Markus, 1994).

Based on statistical data, ASIA region dominates about 36% usage throughout the world and Malaysia is ranked at No. 9 in ASIA region. The statistical data clearly indicates that the tremendous usage of internet in this country has been overwhelming (Internet World Stats, 2000-2005).

Azbir Abu Bakar (2006) says:

*Undeniably, email has become a standard business practice. But whether massive email archiving is a necessary evil dictated by regulatory requirements as those of the US still remains to be seen in Malaysia. Nevertheless, email storage requirements have been going up, fuelled by various attachments to ordinary text messages that can go to megabytes in size. The discussion centered on what to keep and what to throw out (Computerworld Publication, 2006).*

The overwhelming volume of mail is causing the users in spending increasing amount of time simply managing their email. Several studies have touched on the growing problems faced by email users pertaining to the large volume of mail

(Ducheneaut & Bellotti, 2001; Whittaker & Sidner, 1996; Venolia et al., 2001). Email is an endless cycle of catching-up and falling behind. New messages arrive regardless of the activity the recipient is engaged in, therefore causing a built up of messages in the mailbox.

In addition, email has been considered to be one of the most effective and widely used platforms for business communications (Bowes, 2000). Today, email is not simply used for communications but also for managing task, delegating task, managing time, and archiving information for future use. Email is an extremely effective form of communication that can be used to transmit all kinds of electronic data. Email is affordable and inexpensive, almost instantaneous, and has the advantage of guaranteed delivery provided given the correct email address.

Yet, as email becoming more popular and as more people are using it, many are experiencing and encountering the pain of email (Denning, 1982). Users are faced with the pressure to respond quickly, fear of losing track of messages, dealing with high volume of mails, and archiving them. Email has also become our “habitat”, a place where many of us live now (Ducheneaut & Bellotti, 2001). This “habitat” poorly supports the work which we need to achieve and accomplish (Whittaker & Sidner, 1996).

## **1.2 Problem Statement**

This study focuses on investigating the significant factors of email users’ activities surrounding email that lead to the intention to use improved email client. The user experience has changed very little despite the extensive use of email. Up to today, the basic email client still made up of an inbox, folders, and an address book. As such we

need to understand how users currently use email and the problems they experienced to further recommend to the developers for future email client improvement.

In addition, other problems faced by users today are the needs to respond quickly. Pressure is mounting as users need to respond quickly and to be more responsive to their email. Messages arrive continuously throughout the day thus contributing to the sense of urgency to respond quickly. When a user is away, messages will still accumulate throughout that period thus causing more pressure and the need to respond more quickly when user is back to work.

As the flow of message is steadily increasing and arrives continuously, the fear of losing track of email is also increasing. There is a higher chance of losing important messages as high volume of email can cause important items to quickly move out of view and thus accidentally missed out. The mailbox becomes an assortment consisting of various items requiring action, informational and non value items like spam mail.

Archiving or filing addresses the issue of organizing and categorizing messages which can be referred to later on and retrieved. Problems faced in archiving are generating appropriate folder labels for long term filing and also the re-labeling of these labels when users engage in later retrieval. Users may want to postpone their filing in order to determine the value of information as they do now want to create archives which later on turn out to be irrelevant. Successful filing highly depends on being able to imagine future retrieval requirements.

In many ways, email can be seen as a victim of its own success as users increasingly suffer from all these problems.

### **1.3 Research Objectives**

The objectives of this research are:

- 1) To find out if the users' activities surrounding email factors directly affect a person's intention to use an email system with or without upgraded features.
- 2) To examine if the users' activities surrounding email factors directly affect a person's perceived usefulness of current email system.
- 3) To find out if a person's perceived usefulness of current email system factors directly affect a person's intention to use an email system with or without upgraded features.
- 4) To find out if perceived usefulness of current email system plays a mediating role, in influencing the relationship between users' activities surrounding email factors and a person's intention to use an email system with or without upgraded features.

### **1.4 Research Questions**

This research attempts to answer the following questions:

- 1) Do users' activities surrounding email factors directly affect a person's intention to use an email system with or without upgraded features?
- 2) Do users' activities surrounding email factors directly affect a person's perceived usefulness of current email system?
- 3) Does a person's perceived usefulness of current email system factors directly affect a person's intention to use an email system with or without upgraded features?
- 4) Would perceived usefulness of current email system factors have any mediating effect on the relationship between users' activities surrounding email factors and a person's intention to use an email system with or without upgraded features?

## **1.5 Significance of the Study**

Based on the concern over the numbers of email users in the world which has been growing at a significant rate and the interfaces of email clients have not kept in pace, the researcher sees an important need to attempt to study the significant factors of email users' activities surrounding email that lead to the intention to use improved email client. Additionally, the results of this study could reveal the core focus area for developers to really look into as to further improve the existing email client.

## **1.6 Definition of Key Terms**

### ***1.6.1 Email***

Short for electronic mail, email is the transmission of messages sent in electronic form across the internet or any other electronic communications network. It is a system of world-wide electronic communication in which a computer user can compose a message at one terminal that is generated at the recipient's terminal when he logs in (Katie, 1996).

### ***1.6.2 Flow***

Flow is the continuously incoming email messages. As people are working on other tasks, they want to keep up with the flow of incoming messages as they arrive (Venolia et al., 2001).

### ***1.6.3 Triage***

Triage is deciding what to do with incoming messages (Bellotti, 2003). After people are away from their email for a period of time, they need to catch up and deal with all the accumulative email while there were away (Venolia et al., 2001).

#### ***1.6.4 Task Management***

People often use email to remind them what they need to do and to help them get the tasks done (Venolia et al., 2001).

#### ***1.6.5 Archive***

Archive is an activity of keeping messages for future use. Archive is where people store their email so they can refer to it later (Venolia et al., 2001).

#### ***1.6.6 Retrieve***

Retrieve is about getting the messages out from the filing. After archiving messages, people need a method of retrieving messages (Venolia et al., 2001).

#### ***1.6.7 Perceived Usefulness***

Perceived usefulness was defined by Fred Davis as ‘the degree to which a person believes that using a particular system would enhance his or her job performance (Davis, 1989).

### **1.7 Organization of Chapters**

This study comprises of five chapters. Chapter 1 presents an overview background of this research which discusses the problem statement, objectives and significance of the study. Previous researches were reviewed and studied in Chapter 2. Based on these literature reviews, theoretical framework and hypotheses are developed. Chapter 3 describes the research methodology used in the study. Questionnaires were developed based on the methodology discussed. Discussion emphasizes on research design, variables and measurements, data collection technique, and methods of



analysis. Chapter 4 presents the results of the studies and finally Chapter 5 give a summary on the research findings, implications of the study as well as limitations and suggestions for future research.

## **Chapter 2**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This chapter presents the reviews of various literatures concerning the variables affecting email workflow namely Flow, Triage, Task management, Archive, and Retrieve using the Technology Acceptance Model (TAM) which was presented by Davis (1989). Based on the literature review, theoretical framework and hypotheses are developed at the end of this chapter.

#### **2.2 Research on Email Workflow**

Email has evolved from a basic communication tools to a more complex tool to support many activities like task management, task delegation, time management, archiving information for future use (Denning, 1982). For the past three decades till today, many researches have been done to actually understand the basic requirements of email users in order to further propose an upgraded email client to fulfill their needs. In the previous email researches, many theoretical gaps existed which could not be combined, thus, it does provide an opportunity for this study to be conducted by combining several high-level concern of past email researches to further investigate the significant factors of email users' activities surrounding email that lead to the intention to use an improved email client.

Early research has looked into the email users' problems like filing (Segal, 1999), where users faced difficulty in handling the classification of their incoming messages in their inbox. Studies on the issues faced by message classification by

users' perceived importance (Horvitz, 2003) have further added on to the list of identified filing issues.

Flow and triage activities which included the immediate or later respond of action to be taken on the ever flowing of incoming email have also been identified as key problems in email. (Whittaker & Sidner, 1996).

As email is vastly used as a collaboration tool rather than just a communication tool, previous studies has also shown that users are also facing difficulty when it comes to reminding themselves about their outstanding task (Whittaker et al., 1997).

To further understand the needs and problems in email, this study will focus on investigating the significant factors of email users' activities surrounding email that lead to the intention to use an improved email client. This model suggested that there are a total of five different activities influencing email workflow which are Flow, Triage, Task Management, Archive and, Retrieve (Venolia et al., 2001).

Email workflow itself resembles the email system or email client which constitute of design pattern of sequence, parallel split, synchronization, exclusive choice, simple merge, multi choice, synchronizing merge, multi merge, arbitrary cycles, implicit termination, multiple instances without synchronization, multiple instances with a priori design time knowledge and cancel case.

### **2.3 Technology Acceptance Model (TAM)**

The Technology Acceptance Model (TAM) introduced by Davis and associates (Davis, 1989; Davis et al., 1989), is one of the most used theory which describes how users adopt to the use of technology. TAM is adapted from the Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975). The popularity of

TAM model is basically due to its parsimony and the wealth of recent empirical support for it (Agarwal & Prasad, 1999).

The effectiveness and the acceptance of the usage of independent variables are tested with the TAM model. TAM basically covers two technology acceptance measures namely Perceived usefulness (PU) and Perceived ease-of-use (PEOU). Perceived usefulness was defined by Fred Davis as ‘the degree to which a person believes that using a particular system would enhance his or her job performance’ (Davis, 1989). Perceived usefulness (PU) is the main determinant and also the function of task fit to be considered in the measurement of acceptance and use of a system. Perceived ease-of-use (PEOU) was defined by Fred Davis as ‘the degree to which a person believes that using a particular system would be free from effort’ (Davis, 1989). Perceived ease-of-use is viewed as a task-independent measurement of acceptance and use of a system. Refer Figure 2.1.

The key benefit of TAM is that it provides a framework to find out the effects of external variables on system usage (Hong et al., 2001). There are also other studies done using different types of computer scenarios which have provided extensive support for TAM model (Benedetto, Calantone & Chun Zhang, 2003; Liaw & Huang, 2003; Mathieson, 1991; Taylor & Todd, 1995). Furthermore, TAM stated that users will use technology if they believe it will generate positive results (Liaw & Huang, 2003).

Although TAM has been investigated and replicated by information systems researchers, and agreed with its validity in predicting user’s acceptance of various corporate IT (Adams et al., 1992; Chin & Todd, 1995; Doll et al., 1998; Segars & Grover, 1993), TAM’s fundamental constructs do not fully reflect specific influences of technological and usage-context factors that may change the users’ acceptance

(Moon & Kim, 2001). Davis (1989), himself argues that future technology acceptance research needs to address on how other variables affect usefulness, ease of use, and user acceptance.

Of the two TAM variables, perceived usefulness and perceived ease of use, studies have found perceived usefulness to have the strongest influence (Davis et al., 1989; Keil et al., 1995; Satzinger & Olfman, 1995; Taylor & Todd, 1995; Igbaria et al., 1996) and some of the studies were done in Malaysian context (Dahlan, Ramayah, & Looi, 2003; Dahlan, Kalthum, Ellitan, & Dahlan, 2003; Ramayah, Dahlan, & Adni, 2003; Wong, 2003). In earlier research, it is found that the improvement of a new system based on the measurement of perceived ease-of-usefulness alone will not have much significant impact on the acceptance and use of a system (Keil et al., 1995).

Bagozzi, Davis & Warshaw (1992) say:

*Because new technologies such as personal computers are complex and an element of uncertainty exists in the minds of decision makers with respect to the successful adoption of them, people form attitudes and intentions toward trying to learn to use the new technology prior to initiating efforts directed at using. Attitudes towards usage and intentions to use may be ill-formed or lacking in conviction or else may occur only after preliminary strivings to learn to use the technology evolve. Thus, actual usage may not be a direct or immediate consequence of such attitudes and intentions (Bagozzi, Davis & Warshaw, 1992).*

In summary, this study adopts the measurement of perceived usefulness as the main determinant towards the behavioral intention to use a system, based on the two separate research findings by Davis and Keil.

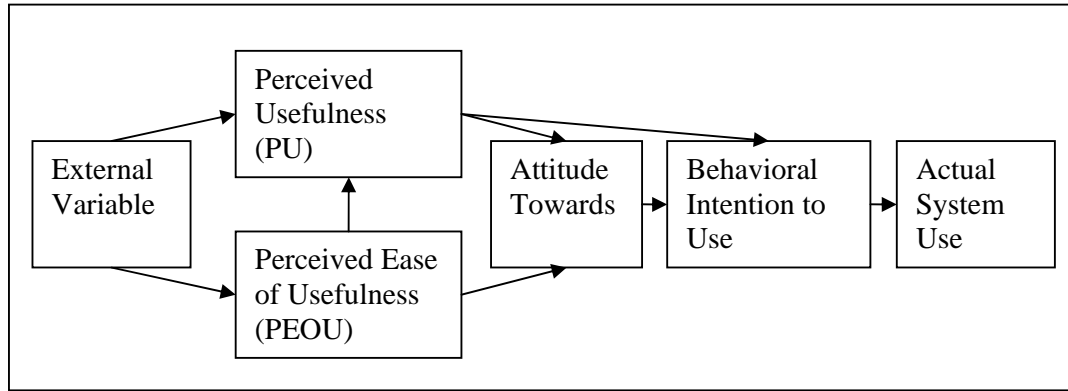


Figure 2.1. The Original Technology Acceptance Model (TAM).

## 2.4 Theoretical Framework

Based on the literature review, a theoretical framework is developed for the study. The main objective of this research was to use the users' activities surrounding email model and fuse it with the original Technology Acceptance Model. As shown in Figure 2.2., the independent variables are categorized into five groups (Flow, Triage, Task Management, Archive and Retrieve) and taken as the external variable that leads to the mediating variable (perceived usefulness variable). The mediating variable (perceived usefulness variable) will then lead to the dependent variable (behavioral intention to use). Refer Figure 2.2.

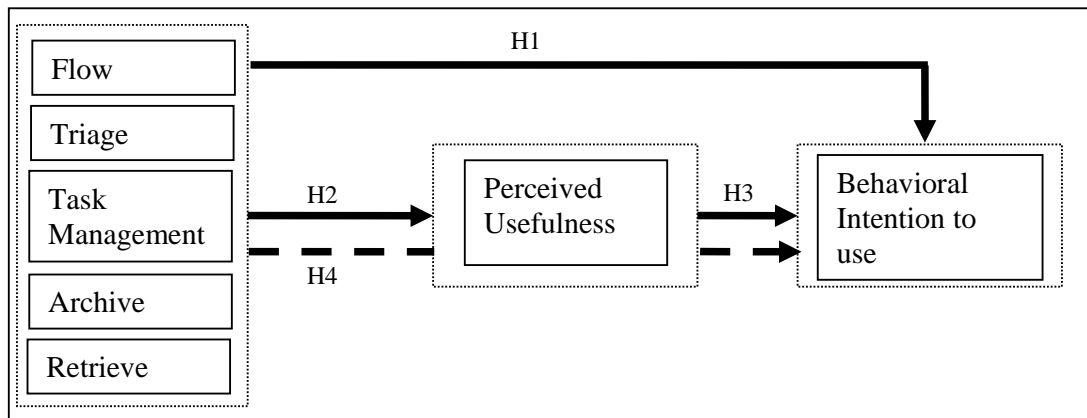


Figure 2.2. Theoretical Framework.

Initial Hypotheses (Based on the email workflow & TAM):

- H1: The users' activities surrounding email influences one's intention to use current email system; with or without upgraded features.
- H1a: Flow factor is positively related to the behavioral intention to use current email system; with or without upgraded features.
- H1b: Triage factor is positively related to the behavioral intention to use current email system; with or without upgraded features.
- H1c: Task Management factor is positively related to the behavioral intention to use current email system; with or without upgraded features.
- H1d: Archive factor is positively related to the behavioral intention to use current email system; with or without upgraded features.
- H1e: Retrieve factor is positively related to the behavioral intention to use current email system; with or without upgraded features.
- H2: The users' activities surrounding email will affect user's perceived usefulness of current email system.
- H2a: Flow factor positively influence user's perceived usefulness of current email system.
- H2b: Triage factor positively influence user's perceived usefulness of current email system.
- H2c: Task Management factor positively user's influence the perceived usefulness of current email system.
- H2d: Archive factor positively influence user's perceived usefulness of current email system.

- H2e: Retrieve factor positively influence user's perceived usefulness of current email system.
- H3: User's perceived usefulness of current email system positively impacts one's intention to use current email system; with or without upgraded features.
- H4: Perceived usefulness of current email system mediates the relationship between users' activities surrounding email with one's intention to use current email system; with or without upgraded features.
- H4a: Perceived usefulness of current email system mediates the positive relationship between flow factor and the behavioral intention to use current email system; with or without upgraded features.
- H4b: Perceived usefulness of current email system mediates the positive relationship between triage factor and the behavioral intention to use current email system; with or without upgraded features.
- H4c: Perceived usefulness of current email system mediate the positive relationship between Task Management factor and the behavioral intention to use current email system; with or without upgraded features.
- H4d: Perceived usefulness of current email system mediates the positive relationship between retrieve factor and the behavioral intention to use current email system; with or without upgraded features.
- H4e: Perceived usefulness of current email system mediates the positive relationship between archive factor and the behavioral intention to use current email system; with or without upgraded features.



**Table 2.1*****Summary of Hypotheses Formulated***

	<b>Statement of Hypothesis</b>
<b>H1</b>	<b>The users' activities surrounding email influences one's intention to use current email system; with or without upgraded features.</b>
H1a	Flow factor is positively related to the behavioral intention to use current email system; with or without upgraded features.
H1b	Triage factor is positively related to the behavioral intention to use current email system; with or without upgraded features.
H1c	Task Management factor is positively related to the behavioral intention to use current email system; with or without upgraded features.
H1d	Archive factor is positively related to the behavioral intention to use current email system; with or without upgraded features.
H1e	Retrieve factor is positively related to the behavioral intention to use current email system; with or without upgraded features.
<b>H2</b>	<b>The users' activities surrounding email will affect user's perceived usefulness of current email system.</b>
H2a	Flow factor positively influence the perceived usefulness of current email system.
H2b	Triage factor positively influence the perceived usefulness of current email system.
H2c	Task Management factor positively influence the perceived usefulness of current email system.
H2d	Archive factor positively influence the perceived usefulness of current email system.
H2e	Retrieve factor positively influence the perceived usefulness of current email system.
<b>H3</b>	<b>Perceived usefulness of current email system positively impacts one's intention to use current email system; with or without upgraded features.</b>
<b>H4</b>	<b>Perceived usefulness of current email system mediates the relationship between users' activities surrounding email with one's intention to use current email system; with or without upgraded features.</b>
H4a	Perceived usefulness of current email system mediates the positive relationship between flow factor and the behavioral intention to use current email system; with or without upgraded features.
H4b	Perceived usefulness of current email system mediates the positive relationship between triage factor and the behavioral intention to use current email system; with or without upgraded features.
H4c	Perceived usefulness of current email system mediates the impartial relationship between Task Management factor and the behavioral intention to use current email system; with or without upgraded features.

**Table 2.1** (*Continued*)

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H4d	Perceived usefulness of current email system mediates the positive relationship between retrieve factor and the behavioral intention to use current email system; with or without upgraded features.
H4e	Perceived usefulness of current email system mediates the positive relationship between archive factor and the behavioral intention to use current email system; with or without upgraded features.

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## **Chapter 3**

### **METHODOLOGY**

#### **3.1 Introduction**

This chapter indicates the methodology used in the study. It includes discussions on the research design, variables, data preparation done prior to running the statistical tests and the statistical analysis techniques selected.

#### **3.2 Research Design**

This part outlines the population of the study and the method used in the sampling.

##### ***3.2.1 Population and Study Site***

The population consists of working people in Penang Island who are Malaysians, and who are not self-employed at the time of the survey.

##### ***3.2.2 Sampling Method***

The sampling method chosen for the study was convenience sampling. The respondents were either asked to complete the questionnaire on the spot, or asked to return the completed questionnaire at a later agreed date, which was by 15<sup>th</sup> May 2006.

#### **3.3 Variables and Measurements**

This section will discuss on the variables used in this study, and the respective measures for these variables. All questions utilized the 5-point Likert response format, except for those covering the questions on demographic in the last section

(Section D). The layout of the items used in the questionnaire is as depicted in Table 3.1.

**Table 3.1**

*Layout of Items in the Questionnaires*

Section	Construct	Variable Type	# of items	Question #	Measurement references
A	Flow	Independent	5	1-4	Venolia et al., 2001
A	Triage	Independent	5	6-10	Venolia et al., 2001
A	Task Management	Independent	3	11-13	Venolia et al., 2001
A	Archive	Independent	6	14-19	Venolia et al., 2001
A	Retrieve	Independent	5	20-24	Venolia et al., 2001
B	Perceived Usefulness	Mediator	5	25-29	Davis, 1989
C	Behavioral Intention to Use	Dependent	6	30-35	Davis, 1989
D	Age, gender, race, position level, total work tenure, email usage experience, frequency of email usage	Demographic	8	36-43	n/a

### ***3.3.1 Independent Variables***

Based on the theoretical framework shown in Figure 2.2 of Chapter 2, the independent variables in this study were Flow, Triage, Task Management, Archive and Retrieve.

Questions on independent variables were grouped under Section A of the questionnaire, with a total of 24 questions. Five items were used to measure the Flow variable, five items to measure the Triage variable, three items to measure Task Management, six items to measure Archive and five items to measure the Retrieve variable. All items were measured on a 5-point Likert scale ranging from (1) strongly disagree to (5) strongly agree.

### ***3.3.2 Mediating Variable***

The mediating variable in this study is Perceived Usefulness of the current email system. There are a total of five questions on the mediator under Section B of the questionnaire. All items were measured on a 5-point Likert scale ranging from (1) strongly disagree to (5) strongly agree.

### ***3.3.3 Dependent Variable***

The dependent variable in this study refers to “Behavioral Intention to Use” the current email system, with or without upgraded features. There are a total of five questions on the dependent variable under Section C of the questionnaire. All items were measured on a 5-point Likert scale ranging from (1) strongly disagree to (5) strongly agree.

### **3.4 Data Collection Technique**

Data was collected fully via questionnaires. Prior to the actual distribution of the questionnaires, a pilot test was conducted.

#### **3.4.1 Questionnaire Design**

All questionnaires distributed consisted of a cover letter, indicating the purpose of the research and identity of the researcher. The questionnaires distributed consisted of four sections and 43 items. Refer to Appendix A for a sample of the questionnaire used and Table 3.1 for the summary of the questionnaire design.

#### **3.4.2 Pilot Test**

A simple pilot test was carried out by using six working adults. The feedback was quite positive with regards to the clarity of words and instructions. The respondents were able to understand all the questions given. The respondents took 11 to 15 minutes to complete the questionnaires.

### **3.5 Methods of Analysis**

The Statistical Package for Social Sciences (SPSS version 11 for Windows) was used to execute the relevant statistical analyses for this study. For data processing, five statistical techniques were used for different purposes. These included factor analysis, reliability test, descriptive statistics, correlation analysis and hierarchical analysis.

#### **3.5.1 Factor Analysis**

The instruments used in this study were adopted from previous researches undertaken in western countries, thus there was a need to perform factor analyses to establish the

goodness of measure. Three sets of factor analyses were performed separately. The factor analyses were conducted on the independent variables, mediating variable and dependent variable. The underlying assumptions of factor analysis were verified prior to carrying out the test.

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy, Bartlett's test of sphericity and anti-image correlation were used to verify the assumptions underlying the factor analysis. The minimum acceptable value for KMO was set at 0.60, Bartlett's test of sphericity should be significant and anti-image correlation must meet a minimal acceptable value of 0.50 and above (Hair et al., 1998).

Furthermore, the Eigenvalue had to be equal or greater than 1.00 (Hair et al., 1998) and the total cumulative percentage variance explained should be greater than 50%. To determine the meaningful factors for the scales, the factors were then subjected to Varimax rotated component. For each item, the item's loadings should be at least 0.50 on one factor and less than 0.35 on another factor (Igbaria, Iivari, & Maragahh, 1995). Once all the factors were extracted, the items were regrouped and renamed accordingly.

### ***3.5.2 Reliability Testing***

The reliability test was conducted to examine the internal consistency of the instruments. Reliability relates to the consistency of the measure (Hair et al., 1998). The Cronbach alpha values test was used to analyze the reliability of the instruments. Values less than 0.60 were considered poor, those in the 0.70 range were considered acceptable, and those above 0.80 were considered as good (Sekaran, 2003).

### ***3.5.3 Descriptive Statistics***

Frequencies and percentages were computed for respondent's profile (age, gender, race, position level, education level, work tenure, total experience in using email and frequency of email usage per day). Means, standard deviation, minimum and maximum values were obtained for the rest of the study variables such as the independent variables, mediating variable and dependent variable.

### ***3.5.4 Correlation Analysis***

Bivariate correlation analysis was conducted to determine the inter-correlation among all the independent variables, mediating variable, and dependent variable. Pearson correlation coefficients were computed.

### ***3.5.5 Tests for the Underlying Assumptions***

The four assumptions (normality, linearity, the absence of correlated errors, and outliers) were tested prior to conducting the hierarchical regression analysis (Hair et al., 1998). This was done to avoid the risk of getting biased results.

#### ***3.5.5.1 Normality***

The normal probability plot (p-p plot) was used to assess the normality assumption, which is claimed to be a more reliable method than the histogram (Hair et al., 1998). The residuals in the p-p plot that fell closely along the diagonal line indicated the normality of the data (Hair et al., 1998).



#### *3.5.5.2 Linearity*

Visualization of partial regression plot was done to examine the relationship between each predictor variable, individually to the criterion variable. The randomized pattern of the scatter plot indicated the linearity assumption is met (Hair et al., 1998).

#### *3.5.5.3 Absence of Correlated Errors*

The Durbin-Watson statistics was employed to assess the independence of error term assumption. Durbin-Watson value between 1.50 and 2.50 indicated the absence of correlated errors.

#### *3.5.5.4 Homoscedasticity*

Homoscedasticity is a desirable condition (Hair et al., 1998). Levene test could be used to check this assumption. Variables with p value  $> 0.05$  were assumed to have equal variance or homoscedasticity which meant that each of the tested variables had equal variance across the range of the grouping variable. For this study, a simple approach of casewise diagnostics was also used to identify the existence of outliers. Any outlier cases would be removed from the multiple regression analysis.

#### **3.5.6 Descriptive Analysis**

Descriptive analysis was used to check on the variations in each of the study variables. Descriptive statistics such as means, standard deviation, maximum and minimum values for each variable were computed for this purpose.

### ***3.5.7 Hierarchical Multiple Regression Analysis***

2-Step hierarchical multiple regressions were carried out separately to test the four groups of hypotheses for this study (H1, H2, H3, and H4). H1 tested for the direct effect of the independent variables on the dependent variable; H2 tested for the direct effect of the independent variables on the mediator; and H3 tested for the effect of the mediator on the dependent variable. Finally, H4 was conducted to test the mediating effect of the mediator (Perceived Usefulness) on the relationship between the independent variables and the dependent variable. For all four groups of hypotheses testing, demographic variables were entered in the first step of the 2-Step hierarchical multiple regression analyses. However, different variables had to be entered for the SPSS system defined “dependent variable” and the SPSS system defined “independent variable” in the second step of the 2-Step regression testing.

For H1, which tested for the direct effect of the independent variables on the dependent variable, DEP\_BI was entered as the SPSS system defined “dependent variable”, and Flow, Triage Task Management, Archive and Retrieve were inputted as the SPSS system defined “independent variable” in the second step of the 2-Step regression testing.

H2 tested for the direct effect of the independent variables on the mediator. H2 testing was almost similar to H1 as it still entered as Flow, Triage Task Management, Archive and Retrieve as the SPSS system defined “independent variable” in the second step of the 2-Step regression testing. However, MED\_PU (the study mediator) was entered as the SPSS system defined “dependent variable”.

H3 tested for the effect of the mediator on the dependent variable. The study mediator was entered as the SPSS system defined “independent variable” and