

FEATURE ANALYSIS OF AN INFORMATION SYSTEMS PRODUCT
DEVELOPMENT:
THE CASE OF E-MAIL SYSTEMS

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ABSTRACT

Feature Analysis of an Information Systems Product Development

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Improving the product development processes is gaining importance as the competitive business environment creates this need. “Customer” becomes the main focus in the new product development area and customer desires take the first place in this matter.

To coordinate product development processes, companies increase collaboration, and support decision making between the customers and the firm.

This study aims to understand & characterize potential users of a software product- which is e-mail systems- through idea sharing of users and to create a new product concept through developing the common features that users prefer most. During this product conceptualization stage, the customer ideas are included through a questionnaire study.

The questionnaire has been prepared after some pre-studies; a focus study and pre-tests. The sample has been selected especially through innovative customers with lead-user characteristics. With this questionnaire, the target users and which functions and features they give priority are investigated. The existing e-mail systems they use and their “ideal” e-mail system are compared.

During this study, a new theory of TACVAS is generated from TAM, TRA, TPB and Mean-end Chain models. Also hypotheses were created in order to understand the relationships between the characteristics of e-mails and they were tested by regression analyses. According to the results, the effect of TAM variables of Ease of Use and Usefulness on the values of mean-end chain theory have been verified. Moreover, the effect of some characteristics like user interface, security, speed, flexibility and reachability on the values have also been proved.

KISA ÖZET

Bilgi Sistemleri Ürün Geliştirmesinde Özellik Analizi

Ecehan Sofuoğlu

Günümüzdeki rekabetçi piyasa, ürün geliştirme proseslerini iyileştirme işlemlerini daha önemli kılmaktadır. Yeni ürün geliştirme konusunda “müşteri” temel odak noktası haline gelmekte ve müşteri istekleri ilk sırayı almaktadır.

Ürün geliştirme süreçlerini koordine edebilmek için şirketler müşteri ve firma arasında işbirliğini artırmakta ve karar verme aşamalarını desteklemektedir.

Bu çalışma, bir yazılım ürünü olan e-mail sistemlerinin potansiyel kullanıcılarını anlama ve özelliklerini incelemeyi amaçlamaktadır. Kullanıcılarla fikir paylaşımı ve kullanıcıların en çok tercih ettikleri ortak ürün özellikleri oluşturularak e-mail sistemleri incelenecektir. Bu ürün kavramı geliştirme aşamasında, müşteri fikirleri bir anket çalışması ile alınmaktadır. Bu anket, odak grup çalışması ve pilot anketler gibi bazı ön çalışmalar sonucunda hazırlanmıştır.

Anketin uygulandığı denekler özellikle önder kullanıcı karakteristiklerine sahip yenilikçi müşteriler arasından seçilmiştir. Bu anket ile hedef kullanıcılar ve hangi fonksiyon ve özelliklere öncelik verdikleri sorgulanmaktadır. Şu anda kullandıkları e-mail sistemleri ve ideallerindeki e-mail sistemi karşılaştırılmaktadır.

Bu çalışma içinde TAM, TRA, TPB ve Araç-sonuç zinciri modelleri kullanılarak TACVAS isimli yeni bir model oluşturulmuştur. Ayrıca e-mail özellikleri arasındaki ilişkileri anlamak için hipotezler oluşturulmuş ve bu hipotezler regresyon analizleri ile ölçülmüştür. Bunların sonucunda TAM değişkenlerinden kolaylık ve kullanışlılığın Araç-sonuç zinciri değerleri üstündeki etkileri de kanıtlanmıştır. Ayrıca arayüz, güvenlik, hız, esneklik ve erişilebilirlik gibi özelliklerin de bu değerlere etkileri gösterilmiştir.

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CHAPTER I

INTRODUCTION

In recent years, new product development processes have been gaining more and more importance because the profitability and the success of the firms are determined by the new product performance. As the business environment becomes more competitive, customer attention becomes the main focus, and various ways to attract customer attention is sought. This trend of customer focus also affects the new product development processes. Products are developed by taking customer desires into consideration. Companies increase collaboration between the customers and the firm.

Cooper (1996) defines the product development process as a disciplined and set of tasks and steps which a company converts ideas into products or services. According to Globerson (1997), a new product development project typically proceeds through the following stages; product conceptualizations, preliminary design, detailed design, production or execution and termination. In this study, the main part is the product conceptualization stage. In order to create a new optimum product concept through customer idea sharing, the requirements and current situation of the customers are compared. The product is 'e-mail systems' in general. As e-mail systems is a kind of 'Information Systems' (IS) product, the methods and theories of IS product development is searched in the literature. Then these theories and strategies are merged with general marketing strategies, which are applicable to all kinds of products.

In this study, the main tool for measuring the customer attitude is the survey method through questionnaires. In order to prepare this questionnaire study, some pre-studies were needed. After some literature review and research studies (like catalog search, Internet search, etc), some information about current e-mail systems have been collected. With this information in hand, a focus study has been prepared. This focus study was held in order to understand the customers, their desires, ideas and tendencies about the product at a first look. The respondents for the focus study were selected from among people who have a high computer and e-mail usage experience and knowledge in order to meet the requirements of some specific customer characteristics. Questions about e-mail systems were asked to the respondents to create a brainstorming environment and take their ideas and knowledge about the product. A list of characteristics and functions of e-mail systems (that has been prepared after the Internet and catalog search) was given to the respondents and they have been requested to rank the most important characteristics and functions in their minds. According to the preliminary information taken from this focus study, a pre-test questionnaire was prepared and applied to forty-two respondents as a pilot study.

In this pilot pre-test, the reliabilities of the variables have been tested. In addition, feedback about the questions was taken from all respondents.

Finally, with the information of all of these pre-studies, the main questionnaire has been prepared and applied to 169 respondents.

The respondents have specific user group characteristics which is lead user type. This type of lead user customer profile was chosen according to the innovation theory. As a result, e-mail systems characteristics have been compared in this study.

CHAPTER II

LITERATURE REVIEW

New product development and introduction are activities of vital importance to the growth and performance of firms. Despite considerable research into factors leading to successful new product activity (Henard & Szymanski, 2001; Montoya-Weiss & Calantone, 1994) as well as the consequences of such activity, very few studies have examined how business strategy influences the degree to which new product development and introduction is undertaken within the firm. Some research suggest that the degree to which a firm is involved in new product activity depends on the extent and nature of its market orientation (Athuene- Gima, 1995, 1996; Han, Kim, & Srivastava, 1998; Narver, Slater, & MacLachlan, 2000). Here, two behavioral components of market orientation are considered: customer and competitor orientation (Frambach, Prabhu, & Verhallen, 2003). For example, a firm that mainly follows a differentiation strategy could pursue new product activity in different ways depending on whether its focus is on customers (pro-active) or competitors (reactive). While a proactive firm will identify and respond to long-term customer needs and thus will be more customer-oriented, a reactive firm will identify and respond to competitors' actions and thus will be more competitor-oriented.

On the other hand, some studies state that beyond the relationship marketing (which states the interaction with the customers or competitors), innovation is another important topic (Gruner & Homburg 2000).

With this point of view, apart from understanding the desires and characteristics of the customers, their innovativeness also gain a very big importance.

While trying to include the customers in the new product development processes, the impact of customer characteristics on new product success should also be investigated.

Literature in marketing suggests that a key success factor of new product introduction is identification and influence of those people who are the first to buy-in any given product market, i.e. innovators and early adopters in the well-known diffusion framework that categorizes individuals into five groups: innovators; early adopters; early majority; late majority; and laggards (Flynn & Goldsmith, 1993). Opinion leadership and consumer innovativeness are two important concepts that have been proposed and developed by researchers in marketing to investigate their respective relationships with early adoption of a new product. The process can be viewed as one in which early adopters influence other potential adopters to try a new product. This may be direct through dialogues between the two groups or indirect via role models from early to late adopters (Chau & Hui, 1997).

The research studies that explain the types of customers and product adopting styles have been best explained by Rogers (1962, 1983). As Rogers (1983) suggests, there are different types of adopters of the products and they have to be identified in order to determine the target segments. There are early adopters and late adopters who display different preference patterns for a product's features. Innovators and early adopters may prefer different new product profiles. In the context of new product diffusion, the possible emergence of differences between adopter groups in terms of preferences for given product features has been suggested in earlier studies (Cestre & Darmon, 1998). As a result, before applying a study of a product to the customers, the adopter type should be determined first.

These kinds of new product development strategies have been applied in so many different kinds of industries for many years. However information systems (IS), which is a new and fast developing area, is one of the industries that really need new methods to increase the success rate of its new products.

Since IS implementation is costly and has a relatively low success rate, IS research has contributed to a better understanding of this process and its outcomes. There is a growing body of academic research examining the determinants of information technology acceptance and utilization among users (Chau & Hu, 2002; Taylor & Todd, 1995).

Especially while investigating an IS product, the methods that identify the conditions and factors that facilitate the integration of IS into the business should be examined and system use and users should be predicted.

“The early efforts concentrated on the identification of factors that facilitated IS use. This produced a long list of items that proved to be of little practical value. It became obvious that, for practical reasons, the factors had to be grouped into a model in a way that would facilitate analysis of IS use” (Legris, Ingham & Colletette, 2001).

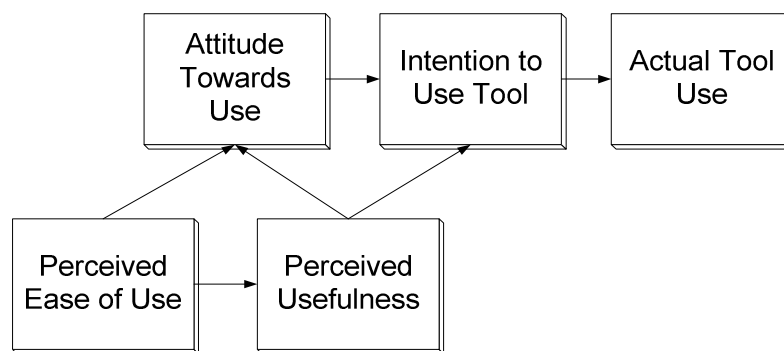


Fig. 2.1 Technology Acceptance Model (TAM)

In 1985, Fred Davis suggested the ‘Technology Acceptance Model’ (TAM) which examines the mediating role of perceived ease of use and perceived usefulness

in their relation between system characteristics (external variables) and the probability of system use (an indicator of system success).

TAM is in fact a specific adaptation of the ‘Theory of Reasoned Action’ (TRA). The TRA and its successor, the ‘Theory of Planned Behavior’ (TPB) (Ajzen, 1985, 1991) are well known and have been widely employed in the study of specific behaviors (Ajzen & Fishbein, 1980).

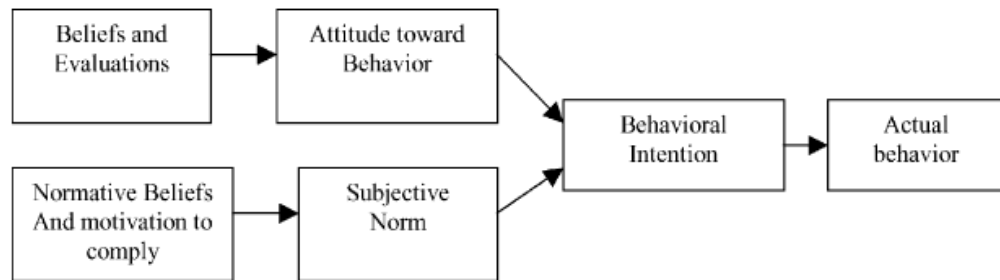


Fig. 2.2 Theory of Reasoned Action (TRA)

Later Davis (1989, 1993) proposed a new version of his model: TAM2 which includes subjective norms and was tested with longitudinal research designs. Overall, the two explain about 40% of system’s use.

Davis (1985) examines the external variables which determine or influence attitude toward IT use. TAM identifies perceived ease of use and perceived usefulness as the key independent variables. TRA includes the subjective norms construct whereas TAM does not. TPB, which is an extension of TRA, includes behavioral control as a construct to measure if users have complete control over their behaviors.

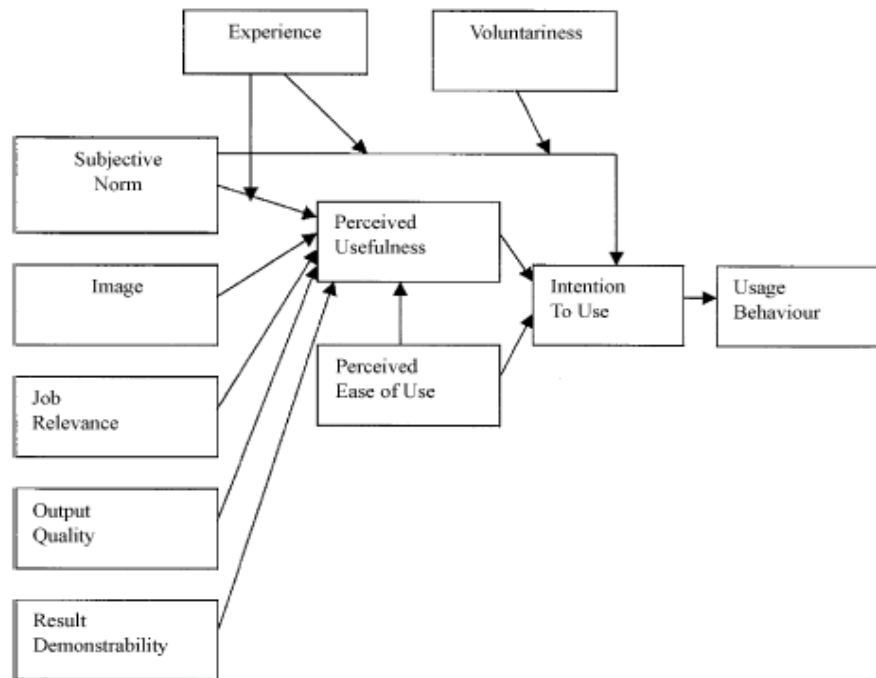


Fig. 2.3 Technology Acceptance Model 2 (TAM2)

There is one more model trying to explain user needs & requirements; ‘Means-end Chain Theory’ or may be named as ‘Attribute-Consequence-Value’ (A-C-V) model (Reynolds & Gutman, 1988). In the requirements analysis part before the development of a product begins, system analysts interact with end users to identify and specify materials needed, so that a more accurate and complete definition of the information requirements is created (Robey & Farrow, 1982; Byrd, Cossick & Zmud, 1992).

In the means-end chain theory, the linkages between the attributes that exist in products, the consequences to the consumers provided by the attributes and the personal values that the consequences reinforce are attempted to be identified.

The means-end chain theory involves people’s cognitive structures of purchasing behavior. It has been successfully applied to new product development, brand positioning and advertising strategy development (Vriens & Hofstede, 2000). Attributes are features or aspects of products or services. They can be physical such

as color and speed or abstract like quality. Consequences (functional or psychosocial) accrue to people from consuming products or services. Functional consequences accrue directly from consuming the product. Psychological consequences reflect the personal and social outcomes of product use. In Rokeach's (1973) definition, value is; 'an enduring belief that a specific mode of conduct or endstate of existence is personally or socially preferable to an opposite or converse mode of conduct'. Values can be classified as terminal and instrumental. Terminal ones are concerned with preferred end-states (goals), for example feeling comfortable while instrumental ones are ways of behaving to obtain goals like ambitiousness. Values can also be listed as self-fulfillment, excitement, being well-respected, sense of accomplishment, self-respect, sense of belonging, security, fun and enjoyment and warm relationships with others. This is a list of value (LOV) stated by Kahle (1983).

In order to apply "Means-end Chain theory" to "New Product Development", firstly a laddering interview technique can be used to develop a A-C-V linkage. The interview is made to the customers or the focus group that uses the new product or its demo version.

In Chiu's (2004) study, they start laddering by asking the respondents some questions that identify the perceived and meaningful bipolar differences between brands of products. The respondent's preference about the distinction pole is taken. Then the preference is taken as the base. According to Reynolds et al (2001), there are several methods for laddering like grouping similar products, top of mind image, preference, usage, and preference-usage differences, usage trends, product or brand substitution, etc.

With these questions, interviewer tries to constitute the ladder and move the respondent up the ladder. The attributes, consequences and values are attempted to be determined in a hierarchical way through the responses. For each question, the reason of importance is queried.

There are three steps in the analysis methodology; analyzing contents, constructing and implication matrix and constructing an aggregate hierarchical value map (HVM). This A-C-V model is widely applied to nutrition & food sector (Leppard, Russell & Cox, 2004; Russell, Flight, Leppard, van Lawick van Pabst, Syrette & Cox, 2004). It is also applied to IS products to understand the product's features, their consequences and values for the customers. (Heitman, Prykop & Aschmoneit, 2004; Chiu, 2004).

In addition to the A-C-V model, Chiu (2004) has adapted the cognitive model to the domain of behavioral intention to use an IS resulting in the A-C-V-I-U model which is an extension of TAM. With this model, Chiu (2004) can focus on behavioral intention to use the system rather than actual system use.

Normally one of the key measures of implementation success is achieving the intended level of usage of the IT. System usage is a reflection of the acceptance of the technology by users (Venkatesh, 1999) and system developers need to achieve a better understanding of factors that lead to system usage (Jackson, Chow & Leitch, 1997).

TAM has served as a basis for past research in IS dealing with behavioral intentions and usage of IT (Adams, Nelson & Todd, 1992; Davis, Bagozzi & Warshaw, 1989; Gefen & Straub, 1997; Jackson, Chow & Leitch, 1997; Mathieson, 1991).

Later, in mean-end chain theory, values are believed to be centrally held cognitive elements that stimulate motivation for behavioral response (e.g. brand choice and product usage) (Kahle, Poulos & Sukhdial, 1988; Laverie, Kleine & Kleine, 1993; Olson & Reynolds, 1983; Pitts & Woodside, 1983; Vinson, Scott & Lamont, 1977). Based on this, the proposed model integrates the A-C-V model and TAM, into an A-C-V-I-U model. TAM assumes that perceived usefulness and perceived ease of use are the key determinants of user acceptance of information technology (Davis, 1989) as stated before in the literature review part. However, the A-C-V-I-U model posits that factors at the consequence level lead to factors at the value level, which in turn lead to behavioral intention to use the system (Chiu, 2004).

The origins of e-mail

“E-mail as a mode of communication can be said to have derived from telephone communication and as such it resembles the features of spoken rather than written language” (Gimenez, 2000).

Bachman and Palmer (1996) suggest that “engaging in an electronic discussion probably has more in common with an oral conversation than with reading”. As The Economist (1996) summarizes it: “Electronic mail has created another novelty: the written conversation”. The fact that e-mails have to be written to be transmitted is a feature that reflects their mode of representation rather than their nature. In other words, e-mails combine features of spoken discourse (its nature) with those of written discourse (its representation) to be transmitted or received by a computer.

An e-mail message can be sent to a wide audience and its reply can reach many people. Loughlin (N. D.) quoted in Cumming (1995) suggests that one of the positive side effects that computer-mediated communications has had on people is the feeling a person gets upon realizing that while sitting alone in front of a computer screen, one is literally connected to thousands of people at once. This also points to the fact that e-mail messages are generally considered less confidential than business letters and advice given to e-mail users usually makes it clear that e-mail messages should not be considered private. Confidential information should not be sent by e-mail.

Recently, e-mail systems has become a very important communication tool between people. IDC reported that in the year 2000 there were 452 million email mailboxes and approximately 9.7 billion messages exchanged on an average day. For 2005, the numbers were predicted to jump to 983 million mailboxes and 35 billion messages (Levitt, 2000).

E-mail systems is not only important for daily activities, but also for the business environment. Users in the business environment, taking into account their individual communication styles and requirements as well as the situational demands of their tasks and organizational environments, use communication technologies like e-mail in ways that best fit these styles, requirements, and demands.

Many businesses are now more geographically dispersed than ever before as a consequence of globalization and changes in the business environment. These changes have started to create an impact on the way businesses communicate. Situations which were easy to handle in face-to-face meetings or over the telephone before have become more complex as they have to be managed by geographically distributed teams (Hinds & Bailey, 2003). Thus, the new dynamic nature of the

global markets requires business communications to be more flexible and more collaborative in nature.

Therefore, business e-mail communication needs to grow more dependent upon features such as flexibility, informality and efficiency.

As a result of these kinds of needs from both business e-mail communication and individual communication, e-mails seem to be changing and evolving to keep pace with the changes in the communities of practice where they are used.

After an extensive study of e-mail, Mackay (1988) suggests that people use e-mail in incredibly diverse ways, and people use e-mail for much more than just basic communication (e.g. task management, task delegation, time management, archiving information for future use).

In order to satisfy the customers' requirements, the functionality of e-mail systems increase. As the functionalities increase and become more complex, the need for an ideal and optimum e-mail system also increases (Gimenez, 2006).

CHAPTER III

METHODOLOGY

Instrument Development and Pretest

In order to prepare the main questionnaire, some pre-studies were applied first. After the literature review, the Internet and catalog searches, a pilot questionnaire has been prepared and applied to respondents. The questionnaires were sent to fifty respondents and forty-two of them answered without error. According to the results of this first questionnaire, a 'Focus Group Study' has been prepared to collect opinions, beliefs and attitudes about e-mail systems and also to encourage a discussion about it. Two sessions were held with two different groups of people.

Fifteen people have been invited to the focus study and eleven of them have responded and participated. The first group, five respondents, was composed of the research assistants of a university. They are in a master's degree program in the field of Information Systems and also working as research assistants in the same department.

The second group, six respondents, was composed of the employees working in the private sector. They are mostly from the Information Systems departments of the companies.

Firstly, a purpose statement has been written and sent one week before the focus study to the people who will participate in the focus study.

A list of characteristics and functions of e-mail systems that were prepared according to the Internet and catalog searches were also sent to the respondents with the purpose statement.

The focus studies were held in separate days in the university. Each of them took 1.5 hours. Three main questions were asked and the list of characteristics and functions of the e-mail systems has been given to the respondents. They have been required to rank the five most frequently used functions between thirty-five functions and they have been required to rank the four most important characteristics between fourteen characteristics. The list of these functions and characteristics were later updated according to this focus study feedback and the new list has been used in the second pilot questionnaire.

The questions that were asked to the respondents were;

- 1) For which purpose and how are you using e-mail systems? Are you using different e-mail systems? If you are, why and for which purposes?
- 2) Which functions of the e-mail systems you are currently using are the most important for you? Which ones do you think are the 'must have' ones? What are the functions that you are glad and not glad about?
- 3) If you are asked to create an ideal e-mail system of your own, which features would you want in it and which features wouldn't you want?

Respondents were required to state their opinions about the list of the functions and they were encouraged to create their own functions. Both of the focus studies were recorded. After these focus studies were held, the answers given for the ranking list have been collected and analyzed.

There had been separate expert interviews with three people from the focus study group after focus study work. They were asked about the technical attributes of

the e-mail systems and the consequences they have from these technical attributes. These attributes were queried in order to create the mean-end chain model that will be stated in the framework part.

Finally, with the result of this focus study feedback, a second pilot questionnaire was prepared. The questionnaires were firstly sent to the focus study respondents to check and state their ideas about the questionnaire.

Later the questionnaires were sent to twenty-five respondents by e-mail. Sixteen of them responded without error.

The questionnaire starts with demographic questions like gender, age, education and profession. The questions for the information of the existing and required products were asked using four-point Likert scale.

The information for the existing and required products were being categorized as ;

- Existing Characteristics
- Existing Functions
- Required Characteristics
- Required Functions

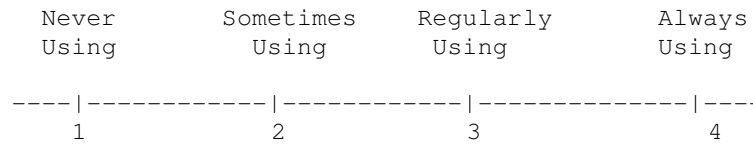
The list of characteristics and functions of e-mail systems were stated in Table

3.1. For the ‘Existing Characteristics’, the Likert scale is;

Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly
----- -----	-----	-----	-----
1	2	3	4

The variables for the existing characteristics are like ‘is secure’, ‘is comfortable’ etc. The respondents’ opinions about the characteristics of the existing products were measured by this scale.

For the ‘Existing Functions’, the Likert scale is;

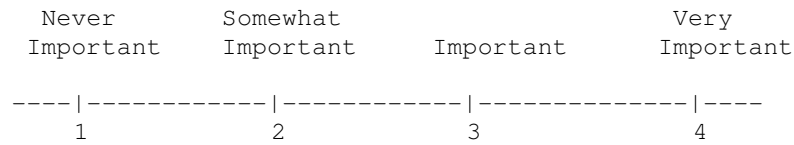


The usage rate of the functions of the existing e-mail systems by the respondents were queried at this part with the scale above for each function.

Table 3.1 Characteristics and Functions of e-mail Systems

Characteristics	Functions
Comfort	Address Blocking
Compatibility	Address Book
Control	Archiving
Ease of Use	Auto-Reply
Flexibility	Calendaring & Scheduling
Reachability	Dictionary
Scope	Diverting Mails
Security	Filtering
Sociability	Flagging
Speed	Foldering
Usefulness	Note Taking
User Interface	Personal Mailgroups
Feeling Secure	Reminder
Satisfaction	Rule
Integration(of Mail services in one Tool)	Search
Message Tool	Spam Filtering
	Spell Check
	Task & Contact Management
	Trash
	Additional Functions
	Separate Attachment Folders
	Advanced Search
	Antivirus Systems
	Auto Complete
	Chat Option
	Color Coding
	Formatting
	High Quota
	Mobile Warning
	Photograph Storing
	Task&Communication
	Text Searching
	Trash Folder
	Voice Mail
	Workflow Integration

For the ‘ideal (required) e-mail system characteristics and functions’, the Likert scale below was used:



Here, the list of probable functions and characteristics of an e-mail system was given to the respondent and the importance level of each characteristic and function was measured by the Likert scale stated above.

The variables like satisfaction, usefulness, ease of use, etc of each category were measured in these questions at the characteristics part.

The variables were measured in two separate parts -existing and required-in the same interview. Firstly the existing functions and characteristics have been queried and later the required (ideal) characteristics and functions have been asked to respondents.

SPSS has been used as the statistical analysis tool in the questionnaires. Reliability analyses were made as a first step in order to decide which variables would be used to reflect the summary characteristics.

These characteristics variables were determined by using the models TAM, TRA and TPB of the literature review results.

The variables ‘Ease of Use’ (EoU) and ‘Usefulness’ were adopted from Davis’ (1985) TAM model whereas ‘Control’ has been adopted from the model TPB. ‘Comfort’ and other subjective norms have been adopted from TRA.

After the sub-variables were determined by the reliability analyses, descriptive and frequency analyses were applied to the demographic variables.

Then, paired-t-test was applied in order to compare the existing and required functions and characteristics of the e-mail systems.

Independent samples t-test was applied in order to compare the differences between females and males.

In order to compare the differences according to age, education, and job category, ANOVA was used.

Finally, regression analyses were made in order to check for the hypotheses that measure the relationships between the summary variables.

After this second pilot study, the results were reviewed and the main questionnaire has been prepared according to these results.

The main update for the main questionnaire after the pilot questionnaire results is the questions asked for measuring the summary variables like ‘Ease of Use’, ‘Usefulness’, ‘Satisfaction’ etc were increased. They were measured by only one question for each variable in the pilot questionnaire. However in the main questionnaire, the number of the questions increased to more than one for each variable. The questions were developed through scanning the previous studies and adopting them to this case.

After the questionnaire was updated, it was sent to 10 respondents for pre-check. According to the pre-check results, the respondents required a change to the question that ask the usage and knowledge of the functions of the current e-mail systems. The Likert scale was;

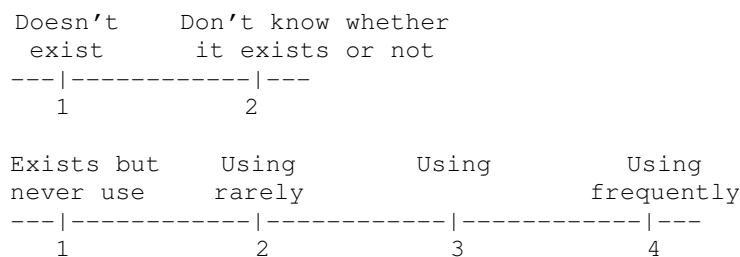
Doesn't exist	Exists but never use it	Using rarely	Using	Using frequently
-----	-----	-----	-----	
1	2	3	4	5

This scale was turned to five options after the pilot questionnaires. In the first pilot questionnaire, it had four scales, the first option of ‘Doesn’t exist’ was not in the question.

In the second questionnaire, it was the same but according to the feedback of the respondents in the questionnaire studies and focus study, they stated that there are some functions that don’t exist in the main e-mail system they state so they had to tell ‘Never using’ even if they wanted to use this function.

So ‘Doesn’t exist’ option was added to the question in the main questionnaire. Yet, after the pre-check study to ten respondents, the respondents complained that there are some functions that they don’t know about. So, they need one more option like ‘don’t know whether it exists or not’.

Then, the likert scale of this questionnaire was changed. The question was separated into two parts like below;



The first part is to measure the knowledge of the functions by the respondents. The first option of the second part also measures the knowledge of the functions.

If one of these three options were chosen, that means respondents don’t use this function. So, these first three options can be taken as one option as ‘Not using’.

Then the other three options in the second part show the usage level of these functions.

To measure which functions are well known and which functions are not, a frequency analysis has been made to the first part. The number of options of 'Doesn't exist' and 'Don't know whether it exists or not' were compared in order to understand the knowledge of the respondents. The results of this analysis is stated in the findings and results part later.

Data Collection, Sample Representativeness and Statistical Analysis

The feedback of the analyses of the pilot questionnaire was used as an input for the main questionnaire.

Finally, the main questionnaire was sent to 302 people through e-mails. 102 of them were students and 200 were people who work in the private sector.

Forty-eight students have responded without error out of 102 and 121 working people have responded out of two hundred. So, the response rate was approximately 56% as a whole.

The collected data from the real questionnaire was transferred to SPSS for analysis.

Reliability Analyses

In the reliability analyses, the variables that will represent the characteristics were determined. There are fifteen characteristics in existing e-mail systems and

twelve characteristics in required e-mail systems. Feeling Secure, Attitude and Satisfaction variables were not included in the required e-mail systems because these three variables are for measuring the current situation of the respondents. The list of these characteristics can be viewed in Table 3.2. The number of questions asked for each were also stated in the table. Some of them were asked by only one question but some of them were asked by more than one question. The characteristics that have more than one variable were taken into reliability analyses.

Table 3.2 Characteristics and the Number of Variables Asked for Each of them

Existing Characteristics	# of items	Required Characteristics	# of items
Security	2	Security	1
Flexibility	2	Flexibility	2
Scope	2	Scope	1
User Interface	5	User Interface	5
Reachability	1	Reachability	1
Compatibility	1	Compatibility	1
Speed	2	Speed	2
Sociability	2	Sociability	2
Ease of Use	3	Ease of Use	3
Usefulness	5	Usefulness	5
Comfort	1	Comfort	1
Control	1	Control	1
Feeling Secure	1		
Attitude	2		
Satisfaction	2		

According to the reliability analyses, the numbers of the variables decreased by examining the Cronbach's alpha. The Cronbach's alpha values greater than 0.60 were taken as valid. The results of the reliability analyses can be viewed in Table 3.3.

Table 3.3 Reliability Analyses Results

Existing Construct	# of Items	Cronbach's Alpha
Attitude	1	-
Ease of Use	3	0.64
Flexibility	1	-
Satisfaction	2	0.65
Scope	1	-
Security	2	0.64
Sociability	2	0.72
Speed	2	0.62
Usefulness	4	0.88
User Interface	4	0.68

Required Construct	# of Items	Cronbach's Alpha
Ease of Use	3	0.76
Flexibility	2	0.61
Sociability	2	0.68
Speed	2	0.79
Usefulness	4	0.90
User Interface	4	0.79

It can be observed that, after the reliability analyses, attitude, flexibility and scope variables have been decreased to only one variable from two. Usefulness and user interface variables have been decreased to four from five variables.

After determining these final variables, the average of the variables for each characteristic was taken and summary characteristics were created as a result. These summary characteristics are later used for the regression analyses.

CHAPTER IV

RESEARCH MODEL AND HYPOTHESES

The research model is composed of two parts. Firstly a mean-end chain model was created according to focus group and expert interview results and then a multiple linear regression model is created for measuring the relationships between the characteristics of the e-mail systems.

As stated in the literature review, the mean end-chain model is composed of three levels; attributes, consequences and values. And an A-C-V linkage is created by developing their relationships.

Chiu (2004) has developed this model as A-C-V-I-U. In addition to attributes, consequences and values, he integrated TAM model with the mean-end chain and added intention to use (I) and use (U) to the end of the model.

In this study, A-C-V-I-U is being changed according to some specific differences of the product. There is one more level of 'Technology' added at the beginning of Chiu's model. Moreover, instead of using intention to use (I) and use (U); attitude (A) and satisfaction (S) are used similar to TAM.

So the model becomes T-A-C-V-A-S. (Technology, attributes, consequences, values, attitude and satisfaction). The model can be viewed in Figure 4.1.

This mean-end chain model was developed according to focus study and expert interview results. After giving the attributes (functions of e-mail systems) list, respondents in the focus study were asked to state what consequences these attributes

have for them. After taking their responses as the consequences, they have been asked which values these consequences provide them with.

So, according to their answers, an A-C-V chain has been created. They also grouped the functions according to their usage aims.

The functions have been grouped in six parts by the respondents; folder & contact management, organizing functions, task & support functions, assistance tools, security functions and data entry.

The details of which functions were grouped in which part can be observed in the figure. For example, the functions like foldering, archiving, address book have been grouped in folder & contact management because these functions have the functionality for folders. On the other hand, the functions like task & contact management, flagging and auto-reply have been grouped in task & support functions as they are supporting the task activities at job.

After grouping these functions, the respondents stated which consequences these functions have. The consequences have been grouped in two parts; 'Ease of Use' and 'Usefulness'.

Ease of use group has the consequences that makes works easier whereas usefulness group has the consequences that seem to be useful for the job and activities.

As a last step, the respondents stated which values they have for these consequences. There were three values they stated; 'Feeling in Control', 'Feeling Secure' and 'Feeling Comfort'

The chain is just created by connecting these attributes, consequences and values. For example, when the respondents were asked for the consequences of the function 'Task & Contact Management', the response is it has the consequences of

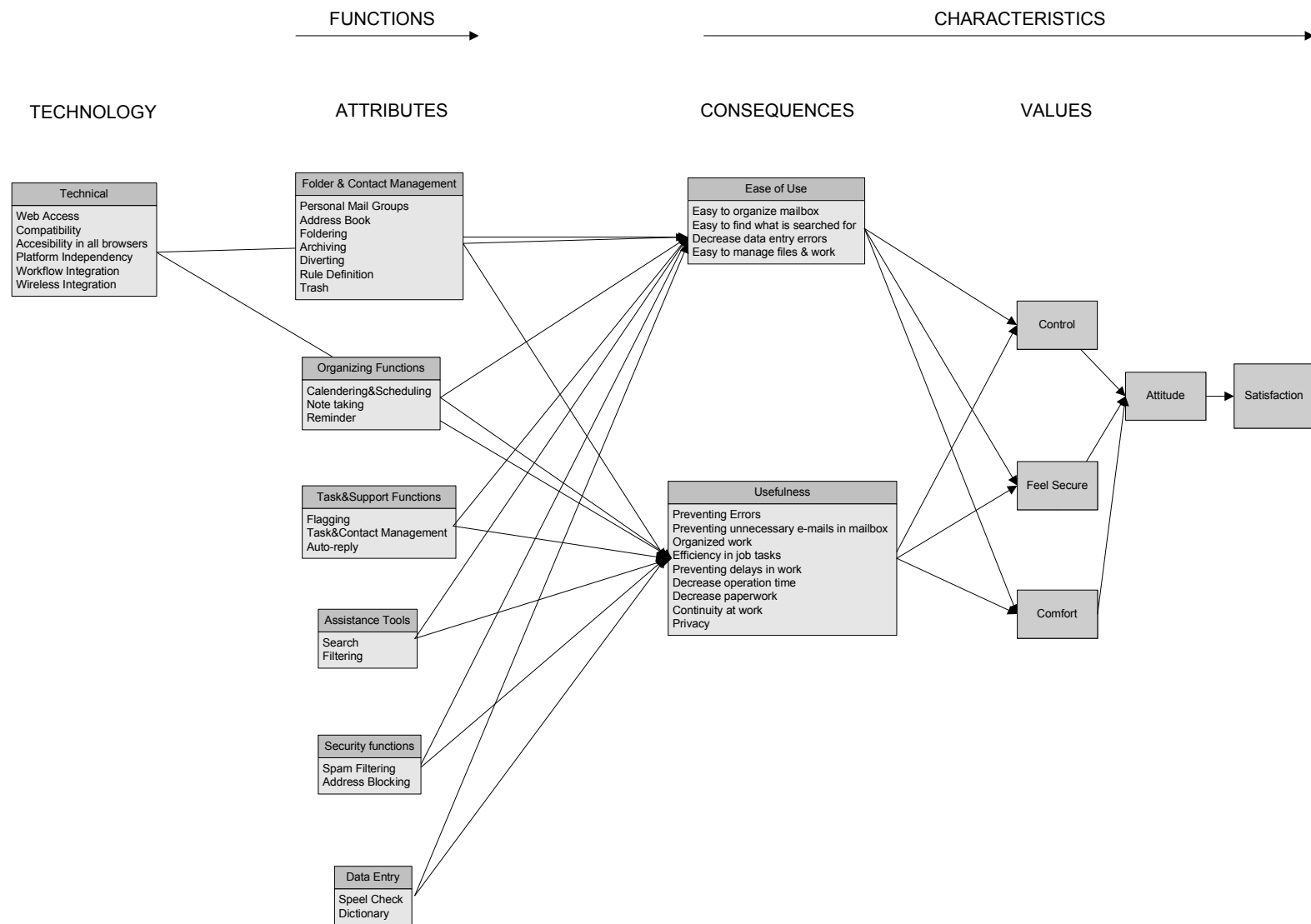


Fig. 4.1 Means-end chain model

‘Efficiency in job tasks’, ‘Organized work’, ‘Decrease paperwork’ and ‘Decrease operation time’.

For the ‘Flagging’ they stated, ‘Easy to manage files and work’, ‘Decrease paperwork’, ‘Efficiency in job tasks’ and ‘Organized work’

As a final step, they stated which values they gain from these functions. For “Task & Contact Management” the gain is they feel in control and feel comfort. For ‘Flagging’ they stated that they feel comfort and feel secure.

So, all these linkages have been created and the groups have been linked according to these answers.

Technology level was created according to expert interviews that were applied to three respondents from the focus study separately. There had been open ended interviews with three information systems experts who have also joined the focus group. Their opinions about the technological side of e-mails were taken.

The technological attributes they have stated were web access from everywhere (also having an online interface), compatibility, accessibility in all browsers and platform independency, workflow integration and wireless integration.

Having an online interface is really important as everybody can reach his/her e-mails from everywhere, this is directly linked to decrease operation time and increase efficiency which are under usefulness characteristic. Compatibility which means the mail client could work well with all major e-mail clients and platforms like Windows, Mac OS X, and Linux is also directed to usefulness consequences. Accessibility in all browsers like MS Internet Explorer, Mozilla Firefox, Netscape, etc and platform independency which provides e-mail systems to work on multiple system platforms are also very important for e-mail system efficiency. Some e-mail programs like Hotmail are not efficiently available in all browsers. Hotmail’s full

features are only available to users accessing the site via Microsoft's own Internet Explorer browser. Also MS Outlook doesn't work in Linux.

So with this availability, people would have ease of use and usefulness again.

Workflow integration is just an attribute for work that increases the efficiency at work and decreases the paperwork. The last one, wireless integration, also makes the usage of e-mails easier and useful.

After this model creation, the next step is creating one more model to link these values of control, comfort and feel secure with attitude and satisfaction variables.

By using the variables that are included in the questionnaire, the second research model was created. This model was constructed mostly based on TAM, TRA, TPB and also Mean-end Chain. Fig. 4.2 illustrates this model which reflects e-mail usage.

In TAM alone, the use of the product is measured as the final variable but in this study instead of the 'Use' of the product, the variables that affect 'Satisfaction' of the product is measured. The reason is e-mail systems is a kind of product which is used very frequently and in this study, the satisfaction with the product and creating a more efficient product is important. So the difference from Chiu's (2004) model is that instead of using 'Intention' and 'Use', 'Attitude' and 'Satisfaction' are being used.

The subjective norms (Feel Secure and Comfort) and control variables of TRA and TPB are measured to affect the 'Attitude' variable. Normally, in TAM, 'Attitude' is directly affected by 'Ease of Use' and 'Usefulness', but in this model these TRA and TPB variables are added as one more level to affect 'Attitude' directly. And 'Ease of Use' and 'Usefulness' are measured to affect these variables directly.

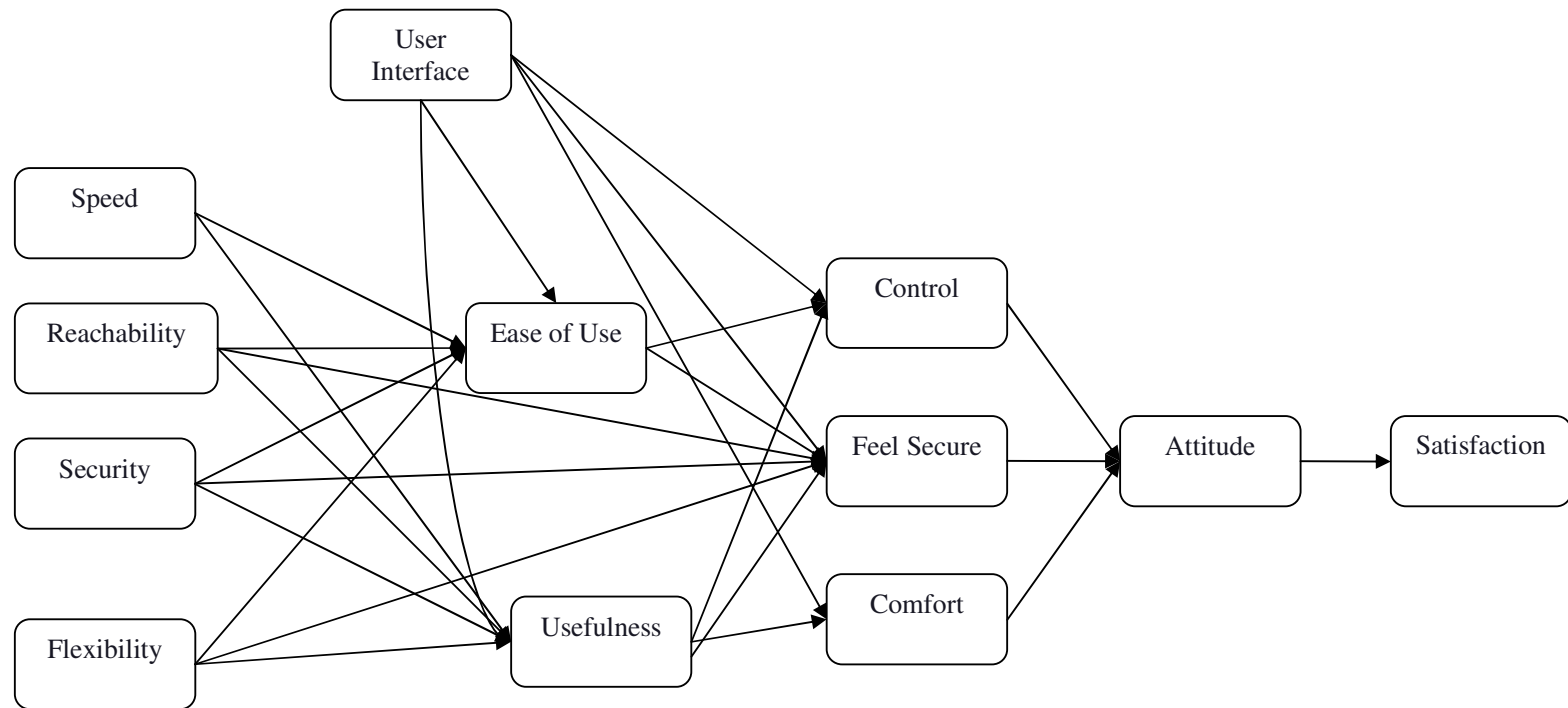


Fig. 4.2 Model framework

Then comes the characteristics of the product as affecting the ‘Ease of Use’(EoU) and ‘Usefulness’. This part of the model is created according to the ‘Mean-end chain’ model theory. The characteristics which are measured in this model are user interface (UI), speed, reachability, security, and flexibility.

In this model existing variables are used because existing system characteristics and current situation are measured in these hypotheses.

In the model, ‘Satisfaction’ variable is the first one that is measured. The success of the existing product is best measured with the satisfaction of the customer. So firstly the effect of ‘Attitude’ on ‘Satisfaction’ is measured based on Jackson et al’s (1997) studies where they mention attitude seems to play a mediating role.

H₁: *Attitude towards the product affects satisfaction with the product.*

Later comes measuring the variables that affect ‘Attitude’. In TPB model (Ajzen, 1985), ‘Control’, ‘Subjective Norms’ and ‘Attitude’ were the variables that affect ‘Intention to use the product’. In this study, ‘Attitude’ is used similar to ‘Intention to use’ and the effect of control and subjective norms are measured by using the models TRA and TPB. So, the second hypothesis comes as;

H_{2a}: *Control affects attitude for the product.*

H_{2b}: *Feeling secure affects attitude for the product.*

H_{2c}: *Comfort affects attitude for the product.*

Then, measuring the effectiveness of EoU and usefulness on the subjective norms and control comes. Normally as Davis (1989) suggests, they are the key independent factors affecting use, but here, mean-end chain model is used and values were taken as the key independent variables (Kahle, Poulos & Sukhdial, 1988; Laverie, Kleine & Kleine, 1993). So the values of control, feel secure and comfort are supposed to be effected by EoU and usefulness.

While measuring the effectiveness of EoU and usefulness, the effectiveness of other characteristics' at the lower levels on subjective norms are also measured. For example, for the 'Control' variable, EoU and usefulness seem to be affecting it but for e-mail systems, UI is very important for users to feel in control. So, in the hypotheses, the effectiveness of UI on 'Control' is also measured. The hypotheses for the 'Control' variable are;

H_{3a}: *User Interface affects control of the product.*

H_{3b}: *EoU affects control of the product.*

H_{3c}: *Usefulness affects control of the product.*

For the feeling secure variable, the characteristics which affect it are searched for. In order to find it out, all the lower level characteristics of feeling secure were measured in the hypotheses. So the hypotheses for the feeling secure variable are;

H_{4a}: *User Interface affects feeling secure.*

H_{4b}: *EoU affects feeling secure .*

H_{4c}: *Usefulness affects feeling secure.*

H_{4d}: *Speed affects feeling secure.*

H_{4e}: *Reachability affects comfort*

H_{4f}: *Security affects feeling secure.*

H_{4g}: *Flexibility affects feeling secure.*

For the comfort variable, like feeling comfort, all the lower levels' effectiveness has been measured. So the users' perceptions for comfort could be viewed. The hypotheses are;

H_{5a}: *User Interface affects comfort.*

H_{5b}: *EoU affects comfort*

H_{5c}: *Usefulness affects comfort*

H_{5d}: *Speed affects comfort*

H_{5e}: *Reachability affects comfort*

H_{5f}: *Security affects comfort*

H_{5g}: *Flexibility affects comfort*

For measuring EOU the lower level characteristics were used. The hypotheses for EoU are;

H_{6a}: *User Interface of the product affects EoU of the product.*

H_{6b}: *Speed affects EoU of the product.*

H_{6c}: *Reachability affects EoU of the product.*

H_{6d}: *Security affects EoU of the product.*

H_{6e}: *Flexibility affects EoU of the product.*

Finally, the effects on usefulness are measured like EoU. The hypotheses are;

H_{7a}: *User Interface of the product affects Usefulness of the product.*

H_{7b}: *Speed affects usefulness of the product.*

H_{7c}: *Reachability affects usefulness of the product.*

H_{7d}: *Security affects usefulness of the product.*

H_{7e}: *Flexibility affects usefulness of the product.*

CHAPTER V

FINDINGS AND RESULTS

This section reports the analysis results. After making the reliability analyses for determining the variables, descriptive statistics for the sample characteristics have been applied for the ratio and interval variables. Secondly, frequency analyses of the variables were made for the nominal and ordinal variables.

To see the differences according to gender, independent samples t-test; for the differences according to age and job category, ANOVA; and to compare the differences between existing and required e-mail characteristics, paired samples t-test were applied. While applying the paired t-test all the characteristics and functions were paired for the existing ones and the required ones.

Finally, the model fit results of the hypothesized model stated in the framework section were examined by using multiple regression.

Profile of Respondents

The sample of this study was selected from highly educated industry employees and some university students (especially 'Management Information Systems' (MIS) department students). The total number of the respondents was 169 as stated in the methodology part with the following characteristics stated in Table-5.1.

As observed in the table, gender is dispersed equally. (50%-50%) Out of 169 respondents, eighty-four of them are females and eighty-five of them are males.

The education level of the sample is really high compared to the whole population. This situation represents the target segment for the study as stated before. As the aim of this study is to create a detailed and need-based e-mail system profile for working people in the industry or the potential employees for the industry (university students), the adopter type is stated as the early-adopter because of their consciousness about the product and their innovativeness.

Respondents mostly graduated from a reputable university and most of them have made or have been studying for their Master's or PhD degrees and working in the industry as white-collar workers. (25% university students, 51% university graduates and 20% Master and Phd graduates) They use computer tools and e-mail during their working time and need the e-mail system characteristics not only for message sending but also for the additional e-mail system characteristics like task & contact management, flagging, reminder, etc. Because of their product experience, they can state their most frequently used existing characteristics and required characteristics for the product.

The percentage of the e-mail usage is pretty high as a characteristic of early adopters with a mean of 30.2%. When looked at the age level, the sample constitutes mostly young respondents. 37% of the respondents are in the "less than 25" interval and 44% are in the "25-30" interval. This is also another characteristic of the target customers for this study. When the age level is younger, the ease of adoptability of the product also increases (especially for IS products) and their innovativeness are also higher for technological products.

When looked at the job category, there are five kinds of main job categories; Engineer, Sales & Marketing, Finance & Accounting, Academic & Education and Students. Nine people have been categorized as other; the people that are retired and also one dentist and one lawyer.

Table 5.1 Sample Profile According to Frequency Analysis

Gender	Frequency	Percent
Female	84	50
Male	85	50
Total	169	100
Age	Frequency	Percent
Less than 25	62	37
25-30	75	44
31-40	22	13
41-50	5	3
More than 50	5	3
Total	169	100
Education	Frequency	Percent
No education	0	0
Primary School Graduate	0	0
Secondary School Graduate	0	0
High School Graduate	7	4
University Student	42	25
University Graduate	87	51
Master and Phd	33	20
Total	169	100
Job Recoded	Frequency	Percent
Engineer	61	36
Student	48	28
Finance and accounting	21	12
Sales and Marketing	19	11
Academic and education sector	11	7
Other	9	5
Total	169	100

Engineers comprise the biggest part of the respondents with 36% of the sample. Then students come with 28%, Finance & Accounting with 12% and Sales & Marketing are 11% of the sample. Academic & Education Sector is only 7% because it was applied only to the research assistants of one department.

These job categories and their differences are compared in ANOVA analysis that will be explained later in the chapter.

E-mail Usage Frequencies

In this questionnaire; respondents have been required to state all the e-mail programs they use. Later they were required to choose one of them (that is especially for job purposes or for students; education purposes). The main reason to ask them especially to state the e-mail system for their job purposes is to measure the support characteristics of the e-mail systems like Task & Contact management, Scheduling, etc. As the e-mail systems are not only used for messaging but also for workflow management and work processes, these characteristics gain importance in this study.

The summary of the e-mail usage frequencies can be observed in Table 5.2. In this table, respondents can state more than one e-mail system. They state all the e-mail systems they use. So the total percentage is not equal to 100%. The respondents were given a list of the e-mail systems to choose but they also had the opportunity to state an e-mail system not included in the list. In the table, the latter e-mail systems that are marked with a star are the ones that are stated by the respondents not on the list. Webmail was stated as the university webmail of the university students.

It can be observed clearly that the most frequently used e-mail systems are the main webmail systems of Yahoo, Hotmail, and Gmail (with percentages 69%, 64% and 60%).

Only then, in fourth place, MS Outlook is being used by 44% of the respondents.

Table 5.2 E-mail Usage Frequencies

E-mail System	Using	Not Using	Total	Usage Percentage
Yahoo	117	52	169	69%
Hotmail	109	60	169	64%
Gmail	101	68	169	60%
MS Outlook	75	94	169	44%
Outlook Express	32	137	169	19%
Lotus Notes	23	146	169	14%
Webmail*	17	152	169	10%
Mynet*	11	158	169	7%
Netscape	3	166	169	2%
Mozilla Thunderbird*	3	166	169	2%
Lycos*	1	168	169	1%

The main e-mail system that is required from the respondents is stated in Table 5.3 as the main e-mail system frequencies. Here, the most frequent used e-mail system is MS Outlook.

Then comes Yahoo with 20%, Gmail and Lotus Notes with 12%.

Table 5.3 Main E-mail Usage Frequencies

Main E-mail System	Frequency	Percentage
MS Outlook	66	39%
Yahoo	33	20%
Lotus Notes	21	12%
Gmail	20	12%
Outlook Express	14	8%
Webmail	7	4%
Hotmail	5	3%
Mozilla Thunderbird	3	2%
Total	169	100%

As the main e-mail system is required for business use working people mostly stated MS Outlook, Outlook Express and Lotus Notes as the main e-mail system.

From the sample, it could be observed that MS Outlook is the most frequent used e-mail system in private sector.

The usage percentage of Yahoo, Gmail and webmail (of the university) are increased by the students. As students are not working in the private sector companies, they don't use MS Outlook or Lotus Notes but they use webmail. The most frequently used webmails are Yahoo and Gmail in this case. This can be observed in the frequency table of main e-mail systems stated separately for each job category in Table 5.14 later in the chapter.

From the focus study results, it is clear that Hotmail has a high frequency because it has been one of the first webmails in the world (founded by Bhatia & Smith on 1995). However now people mostly think it is not efficient enough (especially quota problems and inefficient characteristics) and so they use it mostly for unnecessary things like shopping on the Internet or joining to forums. The main reason that Hotmail is still being used is for its instant messaging service of "msn". This has recently made Hotmail popular.

This situation can be clearly observed in the main e-mail usage frequencies. Hotmail has a usage frequency of 64% for the all systems, but its frequency for the main e-mail is only 3%. Although the percentage of all webmail usage frequencies decreases for the main e-mail system as they are for business use, Yahoo and Gmail usage frequencies are still quite high because of the students' use.

Descriptive Analysis Results

Descriptive Analyses have been applied to all variables in the questionnaire.

Firstly the descriptives of communication and usage variables were analyzed. The results are in Table 5.4, 5.5 and 5.6.

Table 5.4 Descriptive Statistics for Usage

	N	Mean	Std. Deviation	Minimum	Maximum
Usage Percentage	169	30.22	22.03	3	85
Personal Usage	169	2.60	0.94	1	4
Usage for Work/Education	169	3.47	0.69	1	4

Table 5.5 Descriptive Statistics for Communication Tool Effectiveness

	N	Mean	Std. Deviation	Minimum	Maximum
Face-to-face	169	3.97	0.17	3	4
By telephone	169	2.92	0.42	1	4
By chatting	169	2.07	0.70	1	4
By e-mail	169	2.53	0.62	1	4
By SMS	169	2.02	0.55	1	3

Table 5.6 Descriptive Statistics for Attributes of Communication

	N	Mean	Std. Deviation	Minimum	Maximum
Speed	169	3.70	0.50	2	4
Continuity	169	3.72	0.46	2	4
Security	169	3.66	0.57	2	4
7*24 / everytime	169	3.51	0.67	1	4
Everywhere	169	3.51	0.66	1	4

The means, standard deviations, minimum and maximum values of all variables can be viewed in the table. N is the number of respondents who replied each question of the related variables.

Usage percentage was the percentage of usage of e-mail systems for the time spent in front of the computer as a whole. It is 30.22% on average. The minimum percentage of time spent for e-mails in front of the computer is 3% whereas the maximum value is 85%. That seems a wide range of distribution and the standard deviation is 22.03% which shows a high variation.

When the communication tool effectiveness is analyzed, the effectiveness of face-to-face has the highest average rating of 3.97 and the effectiveness of communication by SMS has the lowest average rating of 2.02.

When the attributes of communication are analyzed, continuity has the highest average rating of 3.72 and being accessible from everywhere and everytime have the lowest average ratings of 3.51.

Finally, the usage aim is measured for the main e-mail system stated by the respondents. As the e-mail system that is used for work or education purposes is required, respondents stated the e-mail systems that they use at work. So, the average usage aims of these stated e-mail systems are personal aim with an average rating of 2.60 and work or education purposes with an average rating of 3.47.

These variables will be analyzed in detail according to demographic differences later in this chapter.

In Table 5.7 below, the descriptive statistics for existing e-mail functions can be viewed.

When existing function average usage ratings are analyzed, the existing e-mail function that has the highest usage rating is 'Foldering' with an average usage rating of 2.99. The least frequently used existing e-mail function is 'Dictionary' with an average usage rate of 1.24.

Table 5.7 Descriptive Statistics for Existing Functions

	N	Mean	Std. Deviation	Minimum	Maximum
Foldering	169	2.99	1.06	1	4
Address Book	169	2.98	0.98	1	4
Trash	169	2.91	0.96	1	4
Archiving	169	2.70	1.11	1	4
Search	169	2.21	1.09	1	4
Personal Mailgroups	169	2.16	1.18	1	4
Filtering	169	2.13	1.10	1	4
Reminder	169	2.12	1.18	1	4
Spam Filtering	169	2.09	1.08	1	4
Calendering&Scheduling	169	2.07	1.08	1	4
Flagging	169	1.90	1.08	1	4
Rule	169	1.90	1.08	1	4
Note	169	1.77	0.95	1	4
Auto-reply	167	1.77	1.10	1	4
Diverting	169	1.66	1.03	1	4
Task&Contact Management	169	1.65	0.95	1	4
Address Blocking	169	1.62	0.91	1	4
Spell Check	169	1.59	0.90	1	4
Dictionary	169	1.24	0.62	1	4

The results of descriptive statistics for required functions can also be viewed in Table 5.8 below.

The respondents stated the importance rate of the required functions given in the list. The least important function for a required (ideal) e-mail system is ‘mobile warnings’ with an average rating of 2.18 whereas the most important function is ‘Antivirus (Virus preventing systems)’ with an average rating of 3.69. Then the second important function is ‘High Quota’ with an average of 3.59 and the third important function is ‘Spam Filtering’ with an average of 3.53.

Table 5.8 Descriptive Statistics for Required Functions

	N	Mean	Std. Deviation	Minimum	Maximum
Antivirus	169	3.69	0.54	2	4
High Quota	169	3.59	0.58	2	4
Spam Filtering	169	3.53	0.63	1	4
Address Book	169	3.50	0.65	1	4
Compatibility	169	3.46	0.68	1	4
Foldering	169	3.38	0.71	1	4
Auto Complete	169	3.33	0.70	1	4
Archiving	169	3.28	0.78	1	4
Integration	169	3.19	0.78	1	4
Advanced Search	169	3.18	0.69	1	4
Trash	169	3.17	0.79	1	4
Filtering	169	3.11	0.80	1	4
Reminder	169	3.05	0.79	1	4
Text Search	169	3.04	0.80	1	4
Separate Attachments	169	3.04	0.83	1	4
Search	169	2.98	0.81	1	4
Address Blocking	169	2.98	0.80	1	4
Customized Formatting	169	2.96	0.82	1	4
Task Communication	168	2.92	0.74	1	4
Personal Mailgroups	169	2.90	0.76	1	4
Auto-reply	169	2.86	0.82	1	4
Calendering&Scheduling	169	2.85	0.85	1	4
Workflow Integration	169	2.85	0.86	1	4
Rule	169	2.82	0.86	1	4
Diverting	169	2.80	0.83	1	4
Unlimited Photo Storage	169	2.80	0.88	1	4
Spell Check	169	2.76	0.91	1	4
Integration	169	2.76	0.93	1	4
Flagging	169	2.75	0.84	1	4
Color Coding	169	2.70	0.81	1	4
Task&Contact Management	169	2.69	0.88	1	4
Note taking	169	2.59	0.86	1	4
Chat Option	169	2.44	0.94	1	4
Dictionary	169	2.39	0.86	1	4
Voice Mailing	169	2.36	0.97	1	4
Mobile Warnings	169	2.18	0.95	1	4

The existing summary characteristics of the main e-mail systems can be viewed in Table 5.9 below.

Table 5.9 Descriptive Statistics for Existing Summary Characteristics

	N	Mean	Std. Deviation	Minimum	Maximum
Control	169	3.15	0.43	2	4
EoU	169	3.13	0.40	2	4
User Interface	169	3.10	0.39	2	4
Comfort	168	3.04	0.48	1	4
Scope	169	3.04	0.52	1	4
Speed	169	2.93	0.51	1	4
Flexibility	169	2.89	0.60	1	4
Satisfaction	169	2.88	0.49	1,5	4
Security	169	2.85	0.56	1	4
Reachability	169	2.79	0.78	1	4
Usefulness	169	2.78	0.52	1	4
Feeling Secure	169	2.78	0.63	1	4
Compatibility	168	2.61	0.63	1	4
Sociability	169	2.41	0.72	1	4

When the existing summary characteristics are analyzed, sociability has the least rating with an average of 2.41. That means people don't use e-mails very much for their social contacts. This result is logical because as the existing e-mail system most of the respondents stated the e-mail systems they use at work that has a low usage rate for social issues. The highest average rate is the control characteristics with 3.15 for existing e-mail systems and the second one is EoU with 3.13. That means people feel in control with the e-mail system that they use at work and also they think these e-mail systems are easy.

Finally, when the descriptive statistics for required summary characteristics is analyzed, all the means increase compared to the existing ones. This is also meaningful since people's requirements are always higher than their current situation. The importance they give to the required characteristics are naturally higher than the current situation. The descriptives for the required summary characteristics can be viewed in Table 5.10 below.

Table 5.10 Descriptive Statistics for Required Summary Characteristics

	N	Mean	Std. Deviation	Minimum	Maximum
Security	169	3.85	0.37	2	4
Speed	169	3.67	0.45	2.5	4
Reachability	169	3.53	0.53	2	4
User Interface	169	3.38	0.45	2.3	4
Control	169	3.37	0.60	2	4
Scope	169	3.31	0.73	1	4
Compatibility	168	3.29	0.69	2	4
Usefulness	169	3.27	0.60	1.5	4
EoU	169	3.26	0.53	2	4
Comfort	169	3.25	0.56	2	4
Flexibility	169	3.25	0.59	2	4
Sociability	169	2.54	0.72	1	4

Here, security has the highest importance in a required e-mail systems. Than comes speed and reachability. The least importance ratings were given to sociability, flexibility and comfort.

Gender, Age and Job Category Differences

Gender Comparison

In this study, the differences for the answers given to the questions according to the population characteristics were measured for gender, age and job category.

The differences according to gender were measured by using independent samples t-test.

Firstly, the communication and usage variables were compared according to gender differences. With the 95 % confidence interval, the significant difference has

been determined. All the results of the demographic variables comparisons according to gender can be observed in Table 5.11.

Table 5.11 Comparison of Communication and Usage Variables According to Gender

	Sig. (2-tailed)	Female Mean	Male Mean
Usage percentage	0.00**	36.76	23.75
Hotmail	0.00**	0.77	0.52
By e-mail	0.00**	2.69	2.38
Speed	0.00**	3.81	3.59
Security	0.02**	3.76	3.55
7*24 / Everytime	0.05**	3.62	3.41
Continuity	0.07*	3.79	3.66
By Chatting	0.08*	2.17	1.98
Netscape	0.08*	0.00	0.04
Outlook Express	0.26	0.15	0.22
By SMS	0.26	2.07	1.98
By Telephone	0.37	2.95	2.89
Everywhere	0.38	3.56	3.47
Yahoo	0.54	0.71	0.67
Face-to-face	0.66	3.98	3.96
MS Outlook	0.69	0.43	0.46
Usage for Work/Education	0.70	3.49	3.45
Personal Usage	0.83	2.62	2.59
Lotus Notes	0.85	0.13	0.14
Gmail	0.95	0.60	0.60

The significance values that are below 0.1 have been stated as significantly different variables. The significance values with stars indicate significantly different variables for females and males.

Firstly, the e-mail usage percentage significantly differs according to gender. The mean percentage of time females spend for e-mails in front of the computer is 36.76% whereas this percentage decreases to 23.75% for males.

When the effectiveness of communication tools is measured, the answers given to the effectiveness of “chat option” differs according to gender. Females state the effectiveness of the chat option with a mean of 2.17 whereas males state it averagely as 1.98 (The likert scale is 4 as stated in the methodology part. The effectiveness rate

increases from 1 to 4). So, females' rating for effectiveness of chat option is significantly higher than males' ratings for that option.

The effectiveness of e-mail option is also significantly different according to gender. The mean effectiveness rating of females is 2.69 whereas for males it is 2.38.

All the characteristics of communication except "from everywhere" significantly differ according to gender. The characteristics of communication, speed, continuity, security, and everytime accessibility have different mean importance rates for females and males. The mean ratings of females are 3.81, 3.79, 3.76 and 3.62 respectively for the variables above whereas the mean ratings of the males are 3.59, 3.66, 3.55, and 3.41 for the same variables.

For the e-mail usage frequency, the usage of Netscape and Hotmail differ significantly according to gender. Netscape is more frequently used by males, whereas Hotmail is more frequently used by females. Yet, the usage frequency of Netscape is only three between 169 respondents, so this result can not be concluded as a valid result. The frequencies of e-mail systems classified according to gender can be observed in Table 5.12 below

Table 5.12 Frequency of e-mail Usage According to Gender

	Female	Male	Total Usage
Yahoo	60	57	117
Hotmail	65	44	109
Gmail	50	51	101
MS Outlook	36	39	75
Outlook Express	13	19	32
Lotus Notes	11	12	23
Netscape	0	3	3
Total	84	85	

The reason of high usage frequency of Hotmail by females compared to males can be explained by instant messaging program of Hotmail-msn. As Hotmail is mostly used for its instant messaging program, and as females think that chat option is highly effective for communication compared to males, they most probably use instant messaging more than males and this increases the usage of Hotmail by females.

When the frequency of main e-mail usage according to gender is analyzed, it is mostly equal between females and males. There is not much difference between them. There is a little difference only for Yahoo: Twenty females stated Yahoo as the main e-mail system whereas this frequency decreases to thirteen for males.

This result of equality may be most probably because the main e-mail systems are the ones that are required by the respondents' companies, they don't choose them on their own. Yahoo difference comes from students (the frequency of main e-mail usage according to job category can be viewed in Table-5.18 later on the text) As they are free to choose the e-mail system, females and males can differ. The frequencies can be viewed in Table 5.13.

Table 5.13 Frequency of Main e-mail Usage According to Gender

	Female	Male	Total Usage
Ms Outlook	30	36	66
Yahoo	20	13	33
Lotus Notes	10	11	21
Gmail	10	10	20
Outlook Express	9	5	14
Webmail	1	6	7
Hotmail	3	2	5
Mozilla Thunderbird	1	2	3
Total	84	85	169

When the gender differences for the existing characteristics of e-mail systems are compared, the only significant difference is for speed. Females think that the speed of their existing e-mail program has the ranking 2.81 whereas males have the average of 3.05.

The difference between required characteristics is great for females and males. The characteristics Security, Scope, Compatibility, Comfort, Ease of Use, Sociability, Speed, Usefulness and User Interface are all significantly different for females and males. All the mean importance ratings for the above required characteristics for females are higher than males. The mean ratings for these characteristics can be observed in Table 5.14.

Table 5.14 Comparison of Required Characteristics According to Gender

	Sig. (2-tailed)	Female Mean	Male Mean
Scope	0.00**	3.51	3.12
Speed	0.01**	3.77	3.58
EoU	0.02**	3.36	3.17
Security	0.02**	3.92	3.79
Comfort	0.03**	3.35	3.15
Sociability	0.03**	2.66	2.42
Usefulness	0.06*	3.36	3.19
User Interface	0.07*	3.44	3.32
Compatibility	0.08*	3.39	3.20
Control	0.34	3.42	3.33
Flexibility	0.49	3.21	3.28
Reachability	0.94	3.54	3.53

The significantly different variables are the ones that have a star near the significance values.

When measuring the use of existing functions according to gender, the significantly different functions can be observed in Table 5.15. Females use address book, spellchecking and personal mail groups significantly more than males use. Males use filtering option and define Rules for e-mails significantly more than

females. This shows that females use e-mail systems for more social reasons and contacting people. They don't prefer to use complex functions whereas males prefer using the complex functions of e-mails and not use it only for social reasons. This sociability issue can also be observed in Table 5.14, the characteristic of sociability is significantly different according to gender. Females have a higher level of requirement for sociability than males.

Table 5.15 Comparison of Existing Functions According to Gender

	Sig. (2-tailed)	Female Mean	Male Mean
Filtering	0.07*	1.98	2.28
Personal Mailgroups	0.06*	2.33	1.99
Address Book	0.05**	3.13	2.84
Rule	0.05**	1.74	2.06
Spell Check	0.04**	1.73	1.45
Trash	0.00**	3.14	2.68
Search	0.99	2.21	2.21
Flagging	0.94	1.89	1.91
Calendering&Scheduling	0.88	2.08	2.06
Diverting	0.73	1.69	1.64
Note	0.70	1.80	1.74
Archiving	0.69	2.74	2.67
Dictionary	0.64	1.21	1.26
Task&Contact Management	0.55	1.61	1.69
Reminder	0.47	2.19	2.06
Address Blocking	0.43	1.56	1.67
Auto-reply	0.41	1.70	1.84
Spam Filtering	0.16	1.98	2.21
Foldering	0.11	3.12	2.86

The last comparison for gender is for the required functions of the e-mail systems. The significantly different required functions for gender are also stated in Table 5.16. It can be clearly observed that females always require more than males. The expectations of females are higher than the expectations of males for a required e-mail system.

Table 5.16 Comparison of Required Functions According to Gender

	Sig. (2-tailed)	Female Mean	Male Mean
Diverting	0,00**	3,54	3,22
Rule	0,00**	3,35	3,00
Address Blocking	0,00**	3,83	3,54
Note taking	0,01**	3,62	3,38
Search	0,01**	2,56	2,22
Filtering	0,01**	3,05	2,75
Reminder	0,03**	3,69	3,49
Archiving	0,04**	2,60	2,29
Address Book	0,05*	3,04	2,81
Foldering	0,05*	3,44	3,22
Task&Cont&Man	0,07*	3,62	3,45
Flagging	0,08*	2,92	2,68
Calen&Sched	0,09*	3,07	2,86
Integration	0,10	3,55	3,38
Workflow Integration	0,11	3,14	2,94
Unlimited photo storage	0,13	2,65	2,87
Formatting (customized)	0,14	3,14	2,96
Mobil warnings	0,26	2,44	2,27
Text search	0,29	2,92	2,78
Voice Mailing	0,31	2,76	2,62
Auto Complete	0,31	3,35	3,22
Chat Option	0,32	2,83	2,69
Color Coding	0,34	2,11	2,25
Task Communication	0,36	2,92	2,8
Antivirus	0,39	2,64	2,53
Integration	0,42	3,24	3,14
Advanced Search	0,42	3,23	3,14
Compatibility	0,48	2,80	2,71
High Quota	0,48	2,89	2,8
Separate attachments	0,50	3,15	3,07
Trash	0,55	2,67	2,74
Personal mailgroups	0,64	3,01	2,95
Auto-reply	0,71	2,80	2,85
Dictionary	0,77	2,96	3,00
Spell Check	0,80	2,82	2,79
Spam Filtering	0,92	3,05	3,04

Age Comparison

The differences for the answers according to age are measured by applying ANOVA.

The results can be observed in Table 5.17. When measuring the communication tool effectiveness, the options of e-mail and SMS differ according to age. The respondents that are in the category of 'less than 25' (the youngest category) have the rating of 2.27 (the lowest rating for e-mail effectiveness) for e-mail effectiveness whereas the category of '25-30' have the rating of 2.71 (the highest rating for e-mail effectiveness). Although these age categories seem to be closer between, this is a threshold level. The respondents that are 'less than 25' are all university students whereas the respondents that are in the '25-30' interval are the people working in the private sector after university graduation.

So students have other communication tools for communicating but when they start to work in the private sector, the main communication tool becomes e-mail for them as the communication tools are limited while working for a company.

Table 5.17 Comparison of Communication and Usage Variables According to Age

	Sig.	1 less than 25	2 25-30	3 31-40	4 41-50	5 more than 50
Usage percentage	1.00	30.16	30.56	29.77	28.00	30.00
By SMS	0.05**	2.11	1.97	2.09	2.00	1.40
By e-mail	0.00**	2.27	2.71	2.64	2.60	2.60
Face-to-face	0.79	3.95	3.97	4.00	4.00	4.00
By Telephone	0.31	2.98	2.91	2.91	2.80	2.60
By Chatting	0.31	2.10	2.01	2.32	1.80	1.80
Speed	0.87	3.66	3.71	3.77	3.80	3.60
Everywhere	0.79	3.48	3.56	3.50	3.60	3.20
Continuity	0.62	3.76	3.68	3.82	3.60	3.60
7*24 / everytime	0.40	3.48	3.61	3.36	3.20	3.40
Security	0.38	3.56	3.68	3.73	3.80	4.00
Personal Usage	0.00**	2.87	2.60	2.00	2.20	2.40
Usage for Work or Education	0.00**	3.24	3.57	3.82	3.00	3.60

The communication tool of using SMS has the lowest rating for the ‘more than 50’ interval and the highest rating for the ‘less than 25’ interval and this difference is significant between these two groups. Students may be preferring sms because they are one of the most important early-adopters of sms usage whereas the acceptance of sms technology is still low for the older people especially for the ‘more than 50’ interval.

Both of the usage aims are significantly different according to age. For personal usage, the highest usage rate is for less than 25 category as expected. Because these are the students that are not working in the private sector, so they mostly use the e-mail systems for their personal reasons. The lowest rating for personal usage is for 31-40 and later 41-50 intervals. These are the kind of people working in the private sector and they prefer less using e-mails for communicating with friends as they had no e-mail systems 20 years ago.

When the usage for work or education is analyzed, the highest rating is for the more than 50 and 25-30 interval. The 25-30 interval is meaningful as they are working in the private sector actively. More than 50 interval may have stated the aim

for work because they have been required to state the e-mail system they use for work.

When the existing characteristics are examined, the only significantly different variable according to age is the EoU characteristic of the existing e-mail system that respondents use. As observed in Table 5.18, the 'less than 25' interval has the highest ranking of 3.21 for EoU characteristic of the e-mail system whereas the interval '41-50' has the lowest ranking of 2.73. The reason why this lowest ranking is not 'more than 50' but '41-50' is because the people in the age interval of '41-50' are still working in the private sector but the people in the age interval of 'more than 50' are already retired. The ones that are retired could choose the easiest e-mail system for them because there is no obligation of using any specific e-mail system and its features stated by a company. However people having the '41-50' age interval are the ones that represent the oldest part of the working sample. The EoU of the existing e-mail system has the highest ranking for the age interval of 'less than 25' because they are the youngest part of the sample who can adopt the technological products more easily. Moreover, they don't have any obligation of choosing any specific e-mail system stated by a company because they are still students. This inference can also be proven by the ANOVA test that is made for the job category differences later on in this chapter. There is a significant difference between job categories for the EoU of existing e-mail system and the highest EoU rating is for students whereas the lowest EoU rating is for the other category which constitutes the retired people.

Table 5.18 Comparison of Existing Characteristics According to Age

	Sig.	1 less than 25	2 25-30	3 31-40	4 41-50	5 more than 50
EoU	0.08**	3.21	3.11	3.08	2.73	3.20
User Interface	0.89	3.13	3.08	3.10	2.95	3.10
Compatibility	0.80	2.66	2.59	2.55	2.40	2.80
Flexibility	0.72	2.87	2.93	2.82	2.60	3.00
Satisfaction	0.53	2.84	2.93	2.86	2.60	3.00
Scope	0.41	3.05	3.04	3.05	2.60	3.20
Reachability	0.36	2.85	2.83	2.55	2.40	3.00
Feeling Secure	0.26	2.85	2.76	2.73	2.20	2.80
Sociability	0.25	2.31	2.49	2.48	1.90	2.70
Control	0.24	3.16	3.12	3.27	2.80	3.20
Security	0.24	2.96	2.81	2.68	2.70	3.00
Comfort	0.22	3.10	3.03	3.00	2.60	3.20
Usefulness	0.16	2.66	2.86	2.81	2.70	3.05
Speed	0.13	2.99	2.94	2.77	2.50	3.10

Job Category Comparison

The differences according to job category have been measured through ANOVA. These differences can be observed in Table 5.19, Table 5.20 and Table 5.21.

In Table 5.19 below, comparison of communication and usage variables can be viewed.

Table 5.19 Comparison of Communication and Usage Variables According to Job Category

	Sig.	Engineer	Sales &Marketing	Finance &Accounting	Academic &Education	Student	Other
Usage Percentage	0.00**	23.92	42.79	33.81	34.55	27.71	46.11
By e-mail	0.00**	2.49	2.95	2.67	2.64	2.31	2.67
By Telephone	0.05**	3.03	3.00	2.81	2.91	2.85	2.67
By SMS	0.39	1.92	2.05	2.00	2.00	2.13	2.22
By Chatting	0.51	2.02	2.21	1.95	2.36	2.10	1.89
Face-to-face	0.57	3.97	4.00	4.00	4.00	3.96	3.89
Speed	0.03**	3.56	3.95	3.86	3.64	3.73	3.67
Continuity	0.49	3.67	3.74	3.86	3.55	3.75	3.78
Security	0.58	3.64	3.68	3.81	3.82	3.56	3.67
Everywhere	0.70	3.49	3.74	3.52	3.36	3.48	3.56
7*24 / everytime	0.74	3.49	3.68	3.57	3.64	3.46	3.33
Personal Usage	0.00**	2.38	2.32	2.38	3.09	3.00	2.56
Usage for Work/Education	0.00**	3.56	3.74	3.67	3.73	3.21	2.89

The usage percentage is the highest for other category as they are mostly retired people. The effectiveness of communication by e-mail has the highest ranking for sales & marketing people as they are using e-mail in their job directly as a tool. The effectiveness of communication by telephone is also has the highest for sales & marketing and engineers. Speed seems to be the most important for sales & marketing people for communication as speed is really important in their jobs. Personal usage has the highest ranking for students and academic sector, as the academic assistants in this sample are also students. Usage for work or education purposes is the highest for sales & marketing again because the most important tool they use in job is e-mail as stated above.

In Table 5.20 below, the comparison of existing characteristics and functions according to job category can be observed.

Table 5.20 Comparison of Existing Characteristics & Functions According to Job Category

	Sig.	Engineer	Sales &Marketing	Finance &Accounting	Academic &Education	Student	Other
Feeling Secure	0.00**	2.61	2.63	2.95	2.82	3.02	2.44
EoU	0.00**	3.03	3.11	3.14	3.24	3.31	2.81
Security	0.00**	2.70	2.63	2.93	3.05	3.10	2.56
Calendering&Scheduling	0.00**	2.31	2.74	2.67	1.82	1.38	1.67
Flagging	0.00**	2.00	2.58	2.57	1.91	1.27	1.56
Task&Contact Management	0.00**	1.77	2.16	2.19	1.18	1.17	1.67
Archiving	0.00**	2.80	3.21	3.00	3.09	2.25	2.22
Reminder	0.00**	2.41	2.95	2.71	1.82	1.33	1.67
Note Taking	0.00**	2.02	2.05	2.29	1.45	1.23	1.56
Search	0.00**	2.43	2.89	2.29	2.64	1.73	1.22
Rule Definition	0.00**	2.33	1.79	2.29	1.82	1.31	1.56
Auto-reply	0.00**	2.02	2.28	2.57	1.00	1.15	1.33
Reachability	0.01**	2.56	2.63	2.81	3.27	3.00	3.00
Usefulness	0.01**	2.65	2.84	3.08	3.05	2.73	2.72
Spell Check	0.01**	1.44	1.84	1.95	1.73	1.35	2.22
Dictionary	0.02**	1.21	1.53	1.33	1.09	1.06	1.67
Folding	0.05**	3.05	3.53	3.00	3.18	2.77	2.33
Filtering	0.06**	2.31	1.89	2.48	1.82	2.06	1.33
Trash	0.11	2.80	3.21	2.86	3.55	2.88	2.56
Comfort	0.16	2.97	2.95	3.10	3.00	3.19	2.89
Personal Mailgroups	0.18	2.53	2.52	1.73	2.25	2.00	2.16
Speed	0.28	2.92	2.82	2.88	2.95	3.05	2.67
Address Book	0.29	2.98	3.42	2.95	3.09	2.88	2.56
Sociability	0.31	2.42	2.32	2.45	2.86	2.36	2.17
Spam Filtering	0.32	2.10	2.00	1.71	2.18	2.33	1.78
Control	0.35	3.13	3.00	3.24	3.27	3.19	3.00
User Interface	0.36	3.06	3.03	3.05	3.20	3.19	3.00
Address Blocking	0.43	1.66	1.42	1.62	2.09	1.58	1.33
Satisfaction	0.49	2.79	2.89	2.93	2.91	2.98	2.83
Diverting	0.49	1.72	1.74	1.95	1.64	1.52	1.22
Compatibility	0.57	2.52	2.50	2.71	2.82	2.67	2.56
Scope	0.71	3.00	2.95	3.14	3.09	3.08	2.89
Flexibility	0.73	2.87	2.79	2.90	3.00	2.96	2.67

Students have significantly higher rating for the characteristics of the existing functions. The reason is they have the freedom to use the most appropriate e-mail system they choose so they feel higher comfort, EoU, security, and usefulness about their existing e-mail system. The lowest category for these characteristics is the retired people which is in the other category, because they are the oldest part of the

sample and they haven't adopted e-mail system usage as a whole. They also have the lowest rating for the usage of some functions like address book, searching, filtering, diverting, foldering, archiving and address blocking. The reason may be because they can use messages but they still don't have the habit of using the other functions.

Table 5.21 Comparison of Required Functions According to Job Category

	Sig.	Engineer	Sales &Marketing	Finance &Accounting	Academic &Education	Student	Other
Calendering&Scheduling	0.00**	2.92	3.32	3.24	2.91	2.42	2.67
Reminder	0.00**	3.13	3.47	3.29	3.09	2.71	2.89
Rule Definition	0.00**	3.07	2.89	3.05	2.91	2.40	2.67
Flagging	0.01**	2.74	3.16	3.10	3.00	2.48	2.33
Task&Contact Management	0.01**	2.75	2.95	3.05	2.91	2.33	2.56
Auto-reply	0.01**	2.89	3.05	3.33	2.64	2.69	2.33
Task Communication	0.02**	2.75	3.26	3.24	3.09	2.81	3.00
Spell Check	0.04**	2.52	2.68	3.19	2.91	2.79	3.22
Workflow Integration	0.05**	2.74	2.89	3.24	3.36	2.71	2.67
Antivirus	0.07*	3.54	3.79	3.67	4.00	3.77	3.67
Integration	0.09*	2.79	2.53	3.24	3.00	2.60	2.56
Note Taking	0.10*	2.52	2.84	2.95	2.55	2.38	2.78
Diverting	0.11	2.75	3.11	3.14	2.73	2.69	2.44
Personal Mailgroups	0.12	2.69	3.16	3.10	2.91	2.96	3.00
Voice Mailing	0.14	2.16	2.58	2.81	2.27	2.31	2.44
Chat Option	0.17	2.20	2.68	2.71	2.45	2.52	2.56
Unlimited Photo Storage	0.17	2.74	2.76	3.00	3.00	3.11	2.80
Compatibility	0.25	3.34	3.53	3.57	3.64	3.56	3.11
Dictionary	0.28	2.21	2.53	2.67	2.45	2.38	2.67
Advanced Search	0.32	3.21	3.05	3.43	3.36	3.08	3.00
Separate Attachments	0.40	3.00	3.26	3.00	3.36	3.02	2.67
Address Book	0.43	3.46	3.47	3.29	3.64	3.63	3.44
Auto Complete	0.44	3.26	3.47	3.48	3.09	3.40	3.11
Mobil warnings	0.45	2.10	2.00	2.57	2.18	2.19	2.11
Spam Filtering	0.48	3.46	3.42	3.52	3.45	3.65	3.78
High Quota	0.50	3.54	3.68	3.57	3.91	3.56	3.56
Foldering	0.51	3.34	3.63	3.29	3.45	3.40	3.11
Filtering	0.52	2.98	3.05	3.19	3.45	3.17	3.22
Address Blocking	0.62	3.00	2.74	2.95	3.00	3.10	2.78
Color Coding	0.64	2.66	2.68	2.86	3.00	2.69	2.44
Text search	0.65	3.08	3.11	3.24	2.91	2.96	2.78
Archiving	0.68	3.26	3.47	3.43	3.36	3.19	3.11
Formatting (customized)	0.76	2.95	3.05	3.19	2.91	2.90	2.78
Trash	0.78	3.08	3.21	3.10	3.36	3.27	3.11
Search	0.84	3.03	2.95	3.05	3.09	2.94	2.67
Integration	0.89	3.21	3.00	3.29	3.09	3.21	3.22

The e-mail usage frequencies according to job category can be viewed in Table 5.22.

Table 5.22 Frequency of e-mail Usage According to Job Category

	Engineer	Sales &Marketing	Finance &Accounting	Academic &Education	Student	Other	Total Usage
Yahoo	41	9	11	6	45	5	117
Hotmail	33	12	10	9	40	5	109
Gmail	42	6	8	7	33	5	101
MS Outlook	44	9	12	2	6	2	75
Outlook Express	15	8	2	3	4	0	32
Lotus Notes	9	2	5	3	1	3	23
Netscape	3	0	0	0	0	0	3
Total	61	19	21	11	48	9	

When the e-mail usage frequency is analyzed, there are some differences according to job category. The first three e-mail systems the engineers use are MS Outlook, Gmail and Yahoo. The most frequently used e-mail system of Sales & Marketing departments is Hotmail, then comes Yahoo and MS Outlook, and Outlook Express. The reason why sales& marketing people mostly use Hotmail is also because of its chatting program msn. They use msn to contact people, which is a very important part of their job.

Finance & accounting departments are just similar to engineers regarding the e-mail systems they use. When students are observed, the first three e-mail programs they use are only the webmails: Yahoo, Hotmail and Gmail. As expected they don't use e-mail systems of Lotus Notes, MS Outlook and Outlook Express (especially Lotus Notes) because these are the e-mail systems that are mostly used in companies as an obligation but not in daily life.

Also because of this reason, students and other category are the ones who rarely use the support functions of the e-mail systems like task& contact

management, flagging, calendaring & scheduling, reminders and note taking (significantly different existing functions).

Frequency of main e-mail system according to job category can also be observed in Table 5.23.

Engineers, Sales & Marketing and Finance & Accounting seem to use Ms Outlook as the most frequent main e-mail system. Academic ones are using Lotus Notes or Outlook Express. Students have the highest frequency of main e-mail system as Yahoo with the frequency of 24 between 48 students (50%), then Gmail comes with the frequency of 11. Other job categories seem to use different e-mails and there is no specific main e-mail system they state.

Table 5.23 Frequency of Main e-mail Usage According to Job Category

	Engineer	Sales &Marketing	Finance &Accounting	Academic &Education	Student	Other	Total Usage
Ms Outlook	38	9	12	0	5	2	66
Yahoo	4	0	1	2	24	2	33
Lotus Notes	9	2	5	3	0	2	21
Gmail	4	2	0	2	11	1	20
Outlook Express	3	5	1	3	1	1	14
Webmail	0	1	1	0	5	0	7
Hotmail	1	0	1	0	2	1	5
Mozilla Thunderbird	2	0	0	1	0	0	3
Total	61	19	21	11	48	9	169

Comparison of Existing and Required Characteristics & Functions

In this part the existing and required characteristics of the product are compared to determine the sufficiency of characteristics and functions.

In order to compare them, paired t-test has been applied. The mean values of the existing characteristic or function and its mean value for required e-mail services has been compared. In Table 5.24 and 5.25 below, the paired t-test results can be observed.

The variable, significance levels, their paired differences and existing and required system means have been stated in the table.

Table 5.24 Comparison of Existing and Required Characteristics by Paired t-test

	Sig. (2-tailed)	Paired Difference Mean	Existing Mean	Required Mean
Security	0.00**	-1.00	2.85	3.85
Speed	0.00**	-0.75	2.93	3.67
Reachability	0.00**	-0.74	2.79	3.53
Compatibility	0.00**	-0.69	2.61	3.29
Usefulness	0.00**	-0.49	2.78	3.27
Flexibility	0.00**	-0.36	2.89	3.25
User Interface	0.00**	-0.28	3.10	3.38
Scope	0.00**	-0.28	3.04	3.31
Control	0.00**	-0.23	3.15	3.37
Comfort	0.00**	-0.20	3.04	3.24
EoU	0.01**	-0.13	3.13	3.26
Sociability	0.03**	-0.13	2.41	2.54

Table 5.25 Comparison of Existing and Required Functions by Paired t-test

	Sig. (2-tailed)	Paired Difference Mean	Existing Mean	Required Mean
Spam Filtering	0.00**	-1.44	2.09	3.53
Address Blocking	0.00**	-1.37	1.62	2.98
Spell Checking	0.00**	-1.18	1.59	2.76
Dictionary	0.00**	-1.15	1.24	2.39
Diverting	0.00**	-1.14	1.66	2.80
Auto-Reply	0.00**	-1.09	1.77	2.86
Task&Contact Management	0.00**	-1.04	1.65	2.69
Filtering	0.00**	-0.98	2.13	3.11
Reminder	0.00**	-0.93	2.12	3.05
Rule	0.00**	-0.92	1.90	2.82
Flagging	0.00**	-0.85	1.90	2.75
Note taking	0.00**	-0.82	1.77	2.59
Calender&Scheduling	0.00**	-0.78	2.07	2.85
Searching	0.00**	-0.77	2.21	2.98
Personal Mailgroups	0.00**	-0.74	2.16	2.90
Archiving	0.00**	-0.58	2.70	3.28
Address Book	0.00**	-0.52	2.98	3.50
Foldering	0.00**	-0.39	2.99	3.38
Trash	0.00**	-0.26	2.91	3.17

The test has been applied for 95% confidence interval that means the mean differences which have significance levels less than 0.5 can be stated as significantly different for existing and required cases. When the significance levels of the tables are observed it can be concluded that all the means of existing variables are increasing at the required side significantly, because all the significance levels are smaller than 0.5. So, that means people are not satisfied with either the characteristics or the functions of their existing e-mail systems they use. Or, they are satisfied with some of them, but they want more. This shows also that people have an aspiration for perfection. For the most appropriate e-mail system, they state all the functions and characteristics as very important but not think about some priorities.

Knowledge of Respondents about e-mail Functions

While measuring respondents about their usage of existing e-mail functions, the knowledge of them was also measured. As stated in the methodology part, to measure the usage of e-mail functions, a list of the functions was given to the respondents and they answered this question as they know it ‘doesn’t exist’ or ‘don’t know whether it exists or not’. Later a frequency analysis was made to understand which functions have how many frequencies for these two options. The frequency analysis of the functions for the knowledge of functions can be viewed in Table 5.26.

Table 5.26 Frequency of Existing Knowledge of the Existing Functions

	Doesn't Exist	Don't know if exists
Dictionary	9	90
Spell Check	5	56
Task&Contact Management	11	50
Rule Definition	6	50
Auto-reply	10	46
Spam Filtering	10	39
Diverting	8	38
Flagging	9	37
Address Blocking	3	35
Reminder	6	27
Note taking	3	27
Personal mailgroups	6	26
Calender&Scheduling	9	24
Search	1	19
Filtering	1	16
Archiving	1	11
Foldering	3	4
Trash	1	2
Address Book	0	0

From the table, it can be clearly observed that respondents have the least knowledge for the function ‘Dictionary’. Ninety respondents out of 169 don’t know

if there exists a dictionary in the e-mail systems they use. The second least known function is 'Spell Check' and the third one is 'Task & Contact Management' with the frequencies of fifty-five and fifty. These results are also concordant with the usage frequencies. The least usage average of the functions were for dictionary, spell check, address blocking and Task & Contact Management as stated in Table 5.7 before.

The most known function is address book with a frequency of zero that means nobody stated it doesn't exist or don't know whether it exists or not. Also the usage rating of address book is high as stated in descriptives before. The second most known function is trash and the third one is foldering with the frequencies of two and four. Foldering has this frequency of four because of gmail users because Gmail has no foldering option but it has labeling option. The surprising thing is that only three respondents stated foldering doesn't exist. Yet, there are twenty Gmail users as the main e-mail system and only seven respondents stated that foldering doesn't exist or they don't know if it exists. The remaining thirteen have stated that foldering exists for Gmail even if it does not. Maybe it's because they want to think about labeling similar to foldering, or they really don't know that there is no foldering option in Gmail.

From the results of these frequencies, the most known and least known e-mail functions can be analyzed and while creating a new e-mail system, the least known functions could be developed and advertised to people more.

Multiple Linear Regression Results

In order to measure the research model that reflects the relationship between the characteristics, linear and multiple regression was applied. To apply the regression, all the summary variables for each characteristic were calculated. Their ability to represent one summary variable was calculated by the reliability analyses and some of the variables were cancelled to represent the summary variables. The reliability analyses results were previously stated in the methodology part.

In the regression analyses, the adjusted R^2 and the significance values are the most important decision factors. The beta coefficients state how much the related independent variable affect the dependent variable. The summary data of these hypotheses can be viewed in Table 5.27.

The framework results are shown in Fig. 5.1. Of the hypothesized 31 paths, 16 are significant. The significance values and the beta coefficients of the independent variables for the regression are stated in the figure. Only confirmed hypotheses are stated with their coefficients and significance values stated on their paths.

Table 5.27 Regression Results

Dependent Variable	Independent Variables	B	Standardized Beta	Sig	Adj R ²
Satisfaction	Constant	0.943		0.000	0.541
	Attitude	0.644	0.737	0.000	
Attitude	Constant	0.766		0.014	0.248
	Control	0.313	0.265	0.003	
	FeelSecure	0.283	0.215	0.006	
	Comfort	0.146	0.163	0.043	
Control	Constant	1.229		0.000	0.239
	EoU	0.341	0.316	0.000	
	User Interface	0.274	0.247	0.003	
FeelSecure	Constant	0.189		0.410	0.457
	Security	0.660	0.582	0.000	
	Flexibility	0.245	0.230	0.000	
Comfort	Constant	0.753		0.007	0.313
	Security	0.236	0.278	0.000	
	Flexibility	0.159	0.199	0.006	
	UserInterface	0.228	0.186	0.011	
	Usefulness	0.161	0.177	0.014	
Usefulness	Constant	1.038		0.001	0.164
	UserInterface	0.366	0.270	0.000	
	Flexibility	0.210	0.240	0.002	
EoU	Constant	1.004		0.000	0.370
	UserInterface	0.460	0.449	0.000	
	Speed	0.173	0.225	0.001	
	Reachability	0.070	0.137	0.036	

Discussion

The results of the framework model have been stated in Table 5.28. The relationships between the characteristics of the e-mail systems can be viewed in the table. There are seven dependent variables which are measured through 31 hypotheses. All variables have significance levels less than 0.05 ($p < 0.05$).

The significant findings of the study can be summarized as follows;

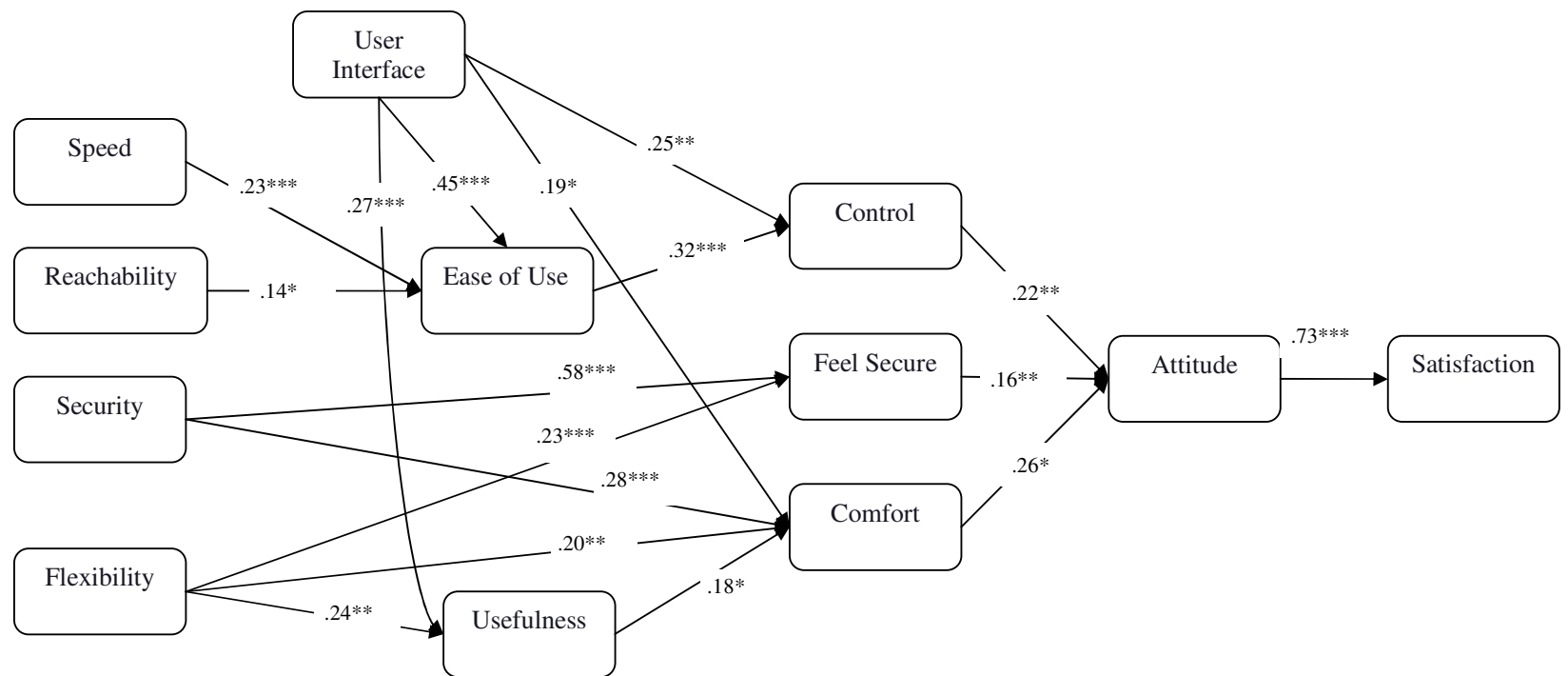
- Satisfaction is significantly affected by attitude.
- Attitude is significantly affected by control, feel secure and comfort.
- Control is significantly affected by EoU and user interface but not significantly affected by usefulness.

So, users think that when the product is easy to use and user interface has good characteristics, they feel in control. Yet, the usefulness of the product doesn't affect feeling control of the product.

Feeling Secure is significantly affected by security and flexibility but not by user interface, usefulness, speed and reachability.

That means users feel more secure if the security of the e-mail system and the flexibility is higher. The other variables stated above don't affect feeling secure variable significantly.

Comfort is significantly affected by security, flexibility, user interface and usefulness but not by EoU, speed and reachability.



* : $p < 0.05$
 ** : $p < 0.01$
 *** : $p < 0.001$

Fig. 5.1 Results of the model

Table 5.28 Summary of the Research Findings

Hypothesis	Finding
H1: Attitude→Satisfaction	Supported
H2a: Control→Attitude	Supported
H2b: Feel Secure→Attitude	Supported
H2c: Comfort→Attitude	Supported
H3a: User Interface→Control	Supported
H3b: EoU→Control	Supported
H3c: Usefulness→Control	Not Supported
H4a: User Interface→Feel Secure	Not Supported
H4b: EoU→Feel Secure	Not Supported
H4c: Usefulness →Feel Secure	Not Supported
H4d: Speed→Feel Secure	Not Supported
H4e: Reachability→Feel Secure	Not Supported
H4f: Security→Feel Secure	Supported
H4g: Flexibility→Feel Secure	Supported
H5a: User Interface→Comfort	Supported
H5b: EoU→ Comfort	Not Supported
H5c: Usefulness → Comfort	Supported
H5d: Speed→ Comfort	Not Supported
H5e: Reachability→ Comfort	Not Supported
H5f: Security→ Comfort	Supported
H5g: Flexibility→ Comfort	Supported
H6a: User Interface→EoU	Not Supported
H6b: Speed→ EoU	Supported
H6c: Reachability→ EoU	Supported
H6d: Security→ EoU	Not Supported
H6e: Flexibility→ EoU	Not Supported
H7a: User Interface→ Usefulness	Supported
H7b: Speed→ Usefulness	Not Supported
H7c: Reachability→ Usefulness	Not Supported
H7d: Security→ Usefulness	Not Supported

So, the degree of feeling comfort increases when the e-mail system is more secure, flexible and useful. Also better user interface characteristics increase the degree of feeling secure. Easiness of the e-mail doesn't have significant effects on feeling comfort. Also speed and reachability don't directly affect feeling comfort.

Usefulness is significantly affected by user interface and flexibility whereas speed, reachability and security don't have significant effects on usefulness

CHAPTER VI

CONCLUSION & FUTURE STUDIES

The results presented in this study are especially beneficial for understanding e-mail systems users that are innovative early adopters. By understanding their required desires for the product and the relationships among the existing characteristics and functions of the product, a good conceptual design of the product can be created.

In this study, the specific type of customers that are working in the private sector were analyzed and their ideas about the current e-mail systems and their ideal e-mail systems have been collected especially through questionnaires.

One of the limitations were all the respondents answered the required characteristics with very high importance. Maybe a ranking of the characteristics and functions would have better results but as there are so many characteristics and functions, respondents wouldn't appreciate ranking these.

There are really significant differences for usage characteristics and requirements between demographic groups like gender, age, job category.

Females are hardly satisfied and are more social compared to males. Students use e-mail systems for more personal aims than the working people. The respondents that are older do not frequently use other functions of e-mails except messaging.

Most of the respondents don't know the existence of dictionary and spell check in their current e-mail systems. There are also some other functions that they really don't know if it really exists or not. As a result, some of the functions should be advertised to people more so that all the functions would be used frequently in e-mail

systems. If they are still not being used, than demolition of these functions totally would be another solution in order to keep the simplicity of e-mail systems.

With this study, it became more clear that e-mail systems is a kind of product which is used according to the suggestions coming from word of mouth. This result was especially found out after the focus studies. Whenever a trusted person suggests an e-mail system or some of its features, people start using them automatically.

So the best advertisement of features of e-mail systems would be presenting these features to the people who have good trust power on others. If they are familiar with some features that are not well-known, they would suggest these features to others to be used.

One more result of this study is; e-mail systems is a kind of product which is required to have simple and useful functions. Adding more functions in order to have competitive advantage among e-mail systems products would not be a good solution. There are some basic features like high quota, user interface, security,etc that people give high importance and these features should be developed in order to have the competitive advantage among other e-mail systems products.

This study is one of the first researches about e-mail features usage characteristics. There are not many of this kind in the literature. Moreover the new model TACVAS created here would be applied to other IS products in order to understand the customer requirements.

This e-mail study could also be applied to the later adopter type of customers (e.g. who are less experienced with the e-mail systems and computers) so that their different desires and needs can be assessed. The results of this kind of customers would be totally different from this study.

So this result shows, e-mail systems are really a kind of product that should be diversified according to the customer type. A house wife and a finance manager would use different functions of e-mail systems and they would most probably have different requirements for an ideal e-mail system. The customer types should be determined and the most appropriate e-mail systems combinations should be created for each.

As e-mail systems is a software product, it's really harder to measure the customer ideas about the product and its features than other kinds of products. Some more models that are developed for IS can also be integrated to this study to be able to measure the customers more effectively.

APPENDIX

Table 1 Focus Study e-mail Functions List

Address Blocking
Distribution List
AutoReply
Scheduling
Spam Filtering
Content Filtering
Follow-up Flags
Note Taking
Divert
Search
Rule
Calendaring
Spelling and Thesaurus
Archiving
Task Management
Reminder
Folder Management
Address Book
Filtering
Summary Statistics
Query Language
Reporting
Deleting only attachments from the messages
Automatic transfer of the attachments to the harddisk
Sending voice mails
Transferring the received e-mails to mobile phone
Sending and receiving person and subject defined e-mails
Security through password and cyrptology
Defining standard forms for answering e-mails
Chat option
Warning system for received e-mails (rule defined)
Time defined message sending and automatic answering system
Anti-virus search for attachments

Table 2 Focus Study e-mail Characteristics List

Security
Reachability
Speed
Compatibility
User Interface
Flexibility
Control
Comfort
Ease of Use
Usefulness
Scope
Personalization
Customization
Integration

Table 3 Questionnaire

I. BÖLÜM: GENEL SORULAR					
1 Cinsiyetiniz:					
	Kadın				
	Erkek				
2 Yaşınız:					
	25'den az				
	25-30				
	31-40				
	41-50				
	50'den fazla				
3 Eğitim Durumunuz:					
	Okuyazar				
	İlkokul mezunu				
	Ortaokul mezunu				
	Lise mezunu				
	Üniversite öğrencisi				
	Üniversite mezunu				
	Yüksek lisans ve üzeri				
4 Mesleğiniz					
5 Bilgisayar başında geçirdiğiniz vaktin yaklaşık yüzde kaçını e-mail ile geçiriyorsunuz?					
		%			
(Lütfen yandaki kutucuğa rakam giriniz)					
6 Aşağıdaki iletişim yöntemlerini etkileri yönünden değerlendiriniz					
		Tamamen etkilidir	Biraz etkilidir	Etkilidir	Çok etkilidir
6.1	Yüz yüze				
6.2	Telefon ile				
6.3	Chat ile				
6.4	E-mail ile				
6.5	SMS ile				
7 İletişim ile ilgili aşağıdaki ifadelerin önemi hakkında fikrinizi belirtiniz					
		Hiç önemli değil	Biraz önemli	Önemli	Çok önemli
7.1	Hızlı olması				
7.2	Kesintisiz olması				
7.3	Güvenli olması				
7.4	7*24 / her istediğim anda olması				
7.5	Heryerden olması				
II. BÖLÜM: KULLANDIĞINIZ E-MAIL SİSTEMİ İLE İLGİLİ SORULAR					
8 Kullandığınız e-mail sistemi/sistemleri nelerdir?					
(Birden fazla işaretleyebilirsiniz)					
8.1	Netscape				
8.2	MS Outlook				
8.3	Outlook Express				
8.4	Lotus Notes				
8.5	Hotmail				
8.6	Yahoo				
8.7	Gmail				
8.8	Diğer (Lütfen aşağıda belirtiniz..)				

9 İş / Eğitim amaçlı kullandığınız sizin için en önemli e-mail sistemi hangisidir?

--

10 Amaçları yönünden bu e-mail sisteminin kullanma düzeyinizi değerlendiriniz	çok az	az	yoğun	çok yoğun
10.1 Kişisel amaçlı				
10.2 İş/Eğitim amaçlı				
10.3 Diğer (Lütfen aşağıda belirtiniz.)				

11 Lütfen aşağıdaki ifadelere katılma derecenizi belirtiniz. Soruları cevaplarken 9. soruda belirttiğiniz e-mail sisteminin gözünüze alarak cevaplayınız	Kesinlikle Katılmıyorum	Katılmıyorum	Katılıyorum	Kesinlikle Katılıyorum
11.1 Mail sistemlerini sadece mesaj alıp vermek amacıyla kullanıyorum				
11.2 İş mesajlarım ve özel mesajlarımın hepsini sadece bir mail sisteminde topladığımda kullanıyorum				
11.3 Mail sistemlerini mesaj alıp verme dışındaki diğer özellikleri için de kullanıyorum				
11.4 Farklı amaçlar için farklı mail sistemleri kullanıyorum				

12 İle ilgili aşağıdaki özelliklerle ilgili ifadeler katılma derecenizi belirtiniz.	Kesinlikle Katılmıyorum	Katılmıyorum	Katılıyorum	Kesinlikle Katılıyorum
12.1 Erişimi güvenlidir				
12.2 Mesajların üçüncü şahıslar tarafından izlenemez / görüntülenemez				
12.3 Esnek bir yapısı olduğunu düşünüyorum				
12.4 Beni rahatsız eden katı ve kuralcı bir yapısı var				
12.5 Birçok özelliğe sahip ve kapsamlıdır				
12.6 İstediklerim her özelliğe sahiptir				
12.7 Karakterlerin bozuk çıkması beni rahatsız ediyor (Özellikle Türkçe-İngilizce karakter farklılıklarında)				
12.8 Uyan mesajları açık ve anlaşılabilir				
12.9 Bu e-mail sisteminde ekranları anlaşılır buluyorum				
12.10 Bu e-mail sisteminin ekran özellikleri (renk, font gibi...) sistemin kullanımını kolaylaştırıyor				
12.11 Sistemde birşey yapmak istediğimde kayboluyorum				
12.12 Heryerden ulaşabiliyorum				
12.13 Her çeşit uygulama ile uyumludur				
12.14 Bu e-mail sisteminin genel olarak hızlı olduğunu düşünüyorum				
12.15 Eklentileri indirmesi (download) ve yüklemesi (upload) yeterince hızlıdır				
12.16 Sosyal faaliyetler düzenlemek için kullanıyorum				
12.17 Buluşmaya vaktim olmayan insanlarla ilişkiyi sürdürmek için kullanıyorum				

13 'de kullanım kolaylığı ve fayda ile ilgili ifadeler katılma derecenizi belirtiniz	Kesinlikle Katılmıyorum	Katılmıyorum	Katılıyorum	Kesinlikle Katılıyorum
13.1 Bu e-mail sisteminin öğrenmek kolaydır				
13.2 Bu e-mail sisteminde istediğim işlemi kolayca yapabiliyorum				
13.3 Bu e-mail sisteminde ustalaşmam çok çaba gerektirdiğini düşünüyorum				
13.4 Bu e-mail sistemi üretkenliğimi artırıyor				
13.5 Bu e-mail sistemi yaptığım işlerdeki performansımı artırıyor				
13.6 Bu e-mail sistemi yaptığım işlerdeki etkinliğimi artırıyor				
13.7 Spam mesajları yeterince önüyor				
13.8 Bu e-mail sisteminin işlerim için yararlı olduğunu düşünüyorum				

14 'e tutumunuz, memnuniyetiniz, kontrol ve rahatlık ile ilgili ifadeler katılma derecenizi belirtiniz	Kesinlikle Katılmıyorum	Katılmıyorum	Katılıyorum	Kesinlikle Katılıyorum
14.1 Kullanırken kendimi güvende hissediyorum				
14.2 Kullanırken kendimi rahat hissediyorum				
14.3 Kullanırken kontrolümü kaybetmiyorum				
14.4 İletişim ve diğer işlemlerim için araç olarak e-mail kullanmayı seviyorum				
14.5 Bu e-mail sisteminin kullanımını seviyorum				
14.6 Bu e-mail sisteminin kullanmaktan memnunuzum				
14.7 Bu e-mail sistemi beklentilerimi tamamen karşılıyor				
14.8 Bütün iletişimimi e-mail ile yapıyorum				

15	'ı aşağıdaki işlevler açısından değerlendiriniz	Mevcutta değil	Mevcutta olduğu	Var ama iş levsiz	As kullanıyor	Kullanıyor	Çok Kullanıyor
15.1	Takvim ve Zaman Planlama						
15.2	İş takibi amacıyla bayraklama						
15.3	Görev koyma ve takibi						
15.4	Adres Defteri						
15.5	Klasör yaratma						
15.6	Arşivleme						
15.7	Hatırlatma						
15.8	Not alma						
15.9	Arama						
15.10	Filtreleme						
15.11	Yönlendirme (Başka bir e-mail adresine)						
15.12	Kural Tanımlama						
15.13	Adres Bloklama						
15.14	Spam mesajları önleme sistemleri						
15.15	Dilbilgisi ve Yazım Kontrolü						
15.16	Sözlük						
15.17	Otomatik Cevaplama Sistemi (ofis dışındayken)						
15.18	Kişisel mail grubu tanımlayabilme						
15.19	Çöp Kutusu						
15.20	Diğer (Lütfen aşağıda belirtiniz.)						

III. BÖLÜM: OLMASINI İSTEDİĞİNİZ E-MAIL SİSTEMİ İLE İLGİLİ SORULAR

Aşağıdaki soruları e-mail sistemine ait değişik özelliklerin önemini düşünerek cevaplayınız

16	Bir e-mail sisteminde aşağıdaki özelliklerden herbirinin ne derece önemli olduğunu belirtiniz.	Hiç önemli değil	As önemli	Önemli	Çok önemli
16.1	Güvenlik				
16.2	Esnek bir yapısının olması				
16.3	Katı ve kuralcı bir yapıya sahip olmaması				
16.4	Birçok özelliğe sahip ve kapsamlı olması				
16.5	Karakterlerin bozuk çıkması(Türkçe / İngilizce)				
16.6	Uyarı mesajlarının açık ve anlaşılır olması				
16.7	Ekranların anlaşılır olması				
16.8	Renk, font gibi ekran özelliklerinin kullanış ve istediğim gibi olması				
16.9	Sistemde birşey yapmak istediğimde kaybolmamak				
16.10	Heryerden ulaşabilmek				
16.11	Her çeşit uygulama ile uyumlu olması				
16.12	Hızlı olması				
16.13	Eklentileri indirme (download) ve yüklemenin (upload) hızlı olması				

17	Bir e-mail sisteminde kullanım kolaylığı ve fayda ile ilgili aşağıdaki ifadelerle katılma derecenizi belirtiniz	Hiç önemli değil	As önemli	Önemli	Çok önemli
17.1	Öğrenmenin kolay olması				
17.2	İstediğim işlemi kolayca yaptırabilmek				
17.3	Çok az çaba ile ustalaşabilmek				
17.4	Üretkenliğimi artırması				
17.5	İşteki performansımı artırması				
17.6	İşteki etkinliğimi artırması				
17.7	Spam mesajları yeterince önlemesi				
17.8	Bir bütün olarak, işim için kullanışlı olması				

18	Bir e-mail sisteminde rahatlık, kontrol ve sosyallik ile ilgili ifadelerle katılma derecenizi belirtiniz	Hiç önemli değil	As önemli	Önemli	Çok önemli
18.1	Kullandıkça kendimi rahat hissetmek				
18.2	Kullandıkça herşeyin kontrolümde olması				
18.3	Sosyal faaliyetler düzenlemek için kullanabilmek				
18.4	Bu işime vaktimin olmadığı insanlarla iletişimi sürdürebilmek için kullanabilmek				

19 Bir e-mail sisteminde aşağıdaki işlevlerin herbirinin ne derece önemli olduğunu belirtiniz				
	Hiç önemli değil	Az önemli	Oranmli	Çok önemli
19.1 Takvim ve Zaman Planlama				
19.2 İş takibi amacıyla bayraklama				
19.3 Görev koyma ve takibi				
19.4 Adres Defteri				
19.5 Klasör yaratma				
19.6 Arşivleme				
19.7 Hatırlatma				
19.8 Not alma				
19.9 Arama				
19.10 Filtreleme				
19.11 Yönlendirme (Başka bir e-mail adresine)				
19.12 Kural Tanımlama				
19.13 Adres Bloklama				
19.14 Spam mesajları önleme sistemleri				
19.15 Dilbilgisi ve Yazım Kontrolü				
19.16 Sözlük				
19.17 Otomatik Cevaplama Sistemi (ofis dışındayken)				
19.18 Kişisel mail grubu tanımlayabilme				
19.19 Çöp Kutusu				
19.20 Eklentilerin farklı bir klasörde durması ve gerektiğinde eklentileri silip mesajları arşivde tutabilme				
19.21 Her çeşit işletim sisteminde çalışabilmesi, her çeşit mail server'ına bağlanabilmesi				
19.22 Yüksek Kota Limiti				
19.23 Sadece bir mail sisteminde her çeşit mesajları (İş,özel..) toparlayabilme imkanı				
19.24 Gelişmiş arama işlevi				
19.25 Virüsleri önleme sistemleri				
19.26 Görev ve İletişim Yönetimi				
19.27 Renk kodlaması (direk yollanmış mesajlar kırmızı, Ceden yollanmış mesajlar yeşil,grup mesajları gri..vs gibi)				
19.28 Chat option (maileşen insanların ikisi de online iken maileşmelerden chat option'a geçebilme)				
19.29 Konuşmaları yazıya aktararak mesaj haline getirebilme ve mesajı istediğim adrese ses yoluyla yollayabilme				
19.30 Mail gönderirken adres yazımında kayıtlı kontak ismini otomatik tamamlama				
19.31 Mesajların içeriğindeki metinlerden kelime araması yapabilme				
19.32 Mailbox'una yeni mail geldiğinde cep telefomuma uyarı gelmesi				
19.33 Yazacağım mesajların formatını (font, büyüklük, renk, arka plan..) isteğime göre biçimlendirebilme				
19.34 Limitsiz Fotoğraf Depolama (Fotoğraf ekli mesajları mail server'ın kendi fotoğraf hafızasına atabilme)				
19.35 İş akışı ile bütünleştirip iş isteklerinin veritabanıyla bağlantılı bir servisi				
19.36 Kimlik numarası gibi kişiye özel tek bir e-mail adresi alımı				
19.37 Diğer (Lütfen aşağıda belirtiniz.)				

Table 5 Comparison of Existing Characteristics According to Gender

	Sig. (2-tailed)	Female Mean	Male Mean
Reachability	0.27	2.73	2.86
Compatibility	0.92	2.60	2.61
Feeling Secure	0.32	2.73	2.82
Comfort	0.64	3.02	3.06
Control	0.84	3.15	3.14
Attitude	0.79	3.00	3.02
EoU	0.54	3.12	3.15
Flexibility	0.36	2.85	2.93
Satisfaction	0.99	2.88	2.88
Scope	0.24	2.99	3.08
Security	0.36	2.81	2.89
Sociability	0.45	2.37	2.45
Speed	0.00	2.81	3.05
Usefulness	0.54	2.75	2.80
User Interface	0.63	3.08	3.11

Table 6 Comparison of Existing Functions According to Age

	Sig.	1 less than 25	2 25-30	3 31-40	4 41-50	5 more than 50
Calender&Scheduling	0.00	1.44	2.31	2.91	2.20	2.60
Flagging	0.00	1.47	2.03	2.64	2.00	2.00
Task&Contact Man	0.00	1.32	1.72	2.27	1.60	2.00
Address Book	0.75	2.95	2.92	3.23	3.20	3.00
Foldering	0.05	2.90	3.12	3.18	2.20	2.00
Archiving	0.01	2.47	2.77	3.36	2.20	2.20
Reminder	0.00	1.50	2.32	3.14	2.40	2.20
Note	0.00	1.45	1.81	2.50	1.80	1.80
Search	0.04	1.92	2.40	2.50	1.60	2.40
Filtering	0.24	2.05	2.11	2.59	1.60	2.00
Diverting	0.00	1.52	1.53	2.18	2.00	2.80
Rule	0.00	1.50	2.17	2.23	1.60	1.60
Address Blocking	0.53	1.58	1.59	1.82	1.20	2.00
Spam Filtering	0.46	2.21	1.97	2.32	1.60	2.00
Spell check	0.00	1.29	1.63	2.14	1.40	2.40
Dictionary	0.00	1.03	1.24	1.68	1.20	1.80
Auto Reply	0.00	1.25	1.97	2.55	1.40	2.00
Personal Mailgroup	0.24	2.15	2.08	2.55	1.40	2.60
Trash	0.90	2.92	2.88	3.05	3.00	2.60

Table 7 Comparison of Required Characteristics According to Job Category

	Sig.	Engin	Sales &Marketing	Finance &Accounting	Academic &Education	Student	Other
Eou	0.00	3.04	3.39	3.52	3.48	3.31	3.41
Flexibility	0.46	3.18	3.37	3.29	3.32	3.30	2.94
Sociability	0.56	2.40	2.58	2.69	2.59	2.60	2.67
Speed	0.07	3.53	3.74	3.79	3.82	3.75	3.67
Usefulness	0.04	3.12	3.50	3.52	3.36	3.22	3.42
UserInterface	0.50	3.29	3.39	3.49	3.48	3.41	3.42
Security	0.22	3.79	3.95	3.95	4.00	3.81	3.89
Scope	0.16	3.13	3.53	3.48	3.55	3.35	3.22
Reachability	0.02	3.46	3.58	3.52	4.00	3.56	3.22
Compatibility	0.29	3.16	3.39	3.43	3.64	3.27	3.33
Comfort	0.11	3.10	3.37	3.43	3.18	3.29	3.44
Control	0.05	3.18	3.42	3.48	3.64	3.46	3.56

Regression Outputs

HYPOTHESIS 1: Dependent Variable: Satisfaction
Independent Variables: Attitude

Table 8 Model Summary Hypothesis 1

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	Df1	df2	Sig. F Change	
1	,737(a)	,543	,541	,33532718	,543	198,809	1	167	,000	1,806

a Predictors: (Constant), E_Attitude

b Dependent Variable: E_Satisf

Table 9 ANOVA Hypothesis 1

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	22,355	1	22,355	198,809	,000(a)
	Residual	18,778	167	,112		
	Total	41,133	168			

a Predictors: (Constant), E_Attitude

b Dependent Variable: E_Satisf

Table 10 Coefficients Hypothesis 1

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	,943	,140		6,745	,000
	E_Attitude	,644	,046	,737	14,100	,000

a Dependent Variable: E_Satisf

HYPOTHESIS 2: Dependent Variable: Attitude

Independent Variables: Control, Feel Secure, Comfort

Table 11 Model Summary Hypothesis 2

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	,458(a)	,209	,205	,50702021	,209	43,967	1	166	,000	1,807
2	,493(b)	,243	,233	,49775813	,033	7,235	1	165	,008	
3	,511(c)	,261	,248	,49306562	,019	4,156	1	164	,043	

a Predictors: (Constant), EComfort

b Predictors: (Constant), EComfort, EControl

c Predictors: (Constant), EComfort, EControl, EFeelingSecure

d Dependent Variable: E_Attitude

Table 12 ANOVA Hypothesis 2

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11,303	1	11,303	43,967	,000(a)
	Residual	42,674	166	,257		
	Total	53,976	167			
2	Regression	13,095	2	6,548	26,427	,000(b)
	Residual	40,881	165	,248		
	Total	53,976	167			
3	Regression	14,106	3	4,702	19,340	,000(c)
	Residual	39,871	164	,243		
	Total	53,976	167			

a Predictors: (Constant), EComfort

b Predictors: (Constant), EComfort, EControl

c Predictors: (Constant), EComfort, EControl, EFeelingSecure

Table 13 Coefficients Hypothesis 2

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1,368	,251		5,453	,000
	EComfort	,540	,081	,458	6,631	,000
2	(Constant)	,870	,308		2,824	,005
	EComfort	,420	,092	,356	4,587	,000
	EControl	,274	,102	,209	2,690	,008
3	(Constant)	,766	,309		2,476	,014
	EComfort	,313	,105	,265	2,978	,003
	EControl	,283	,101	,215	2,799	,006
	EFeelingSecure	,146	,071	,163	2,039	,043

a. Dependent Variable: E_Attitude

HYPOTHESIS 3: Dependent Variable: Control

Independent Variable: Ease of Use, User Interface

Table 14 Model Summary Hypothesis 3

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.462(a)	.214	.209	.384	.214	45.350	1	167	.000	
2	.506(b)	.256	.247	.375	.042	9.403	1	166	.003	1.915

a Predictors: (Constant), E_EoU

b Predictors: (Constant), E_EoU, E_UserInterf

c Dependent Variable: EControl

Table 15 ANOVA Hypothesis 3

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.685	1	6.685	45.350	.000(a)
	Residual	24.617	167	.147		
	Total	31.302	168			
2	Regression	8.005	2	4.002	28.517	.000(b)
	Residual	23.297	166	.140		
	Total	31.302	168			

a Predictors: (Constant), E_EoU

b Predictors: (Constant), E_EoU, E_UserInterf

c Dependent Variable: Econtrol

Table 16 Coefficients Hypothesis 3

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.574	.236		6.684	.000
	E_EoU	.502	.075	.462	6.734	.000
2	(Constant)	1.192	.261		4.558	.000
	E_EoU	.350	.088	.322	3.977	.000
	E_UserInterf	.277	.090	.248	3.066	.003

a. Dependent Variable: EControl

HYPOTHESIS 4: Dependent Variable: Feel Secure
Independent Variables: Security, Flexibility

Table 17 Model Summary Hypothesis 4

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.644(a)	.414	.411	.486	.414	118.105	1	167	.000	
2	.681(b)	.463	.457	.467	.049	15.183	1	166	.000	1.615

a Predictors: (Constant), E_Security

b Predictors: (Constant), E_Security, E_Flex

c Dependent Variable: EFeelingSecure

Table 18 ANOVA Hypothesis 4

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	27.944	1	27.944	118.105	.000(a)
	Residual	39.512	167	.237		
	Total	67.456	168			
2	Regression	31.255	2	15.627	71.660	.000(b)
	Residual	36.201	166	.218		
	Total	67.456	168			

a Predictors: (Constant), E_Security

b Predictors: (Constant), E_Security, E_Flex

c Dependent Variable: EFeelingSecure

Table 19 Coefficients Hypothesis 4

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.695	.195		3.561	.000
	E_Security	.730	.067	.644	10.868	.000
2	(Constant)	.195	.227		.858	.392
	E_Security	.660	.067	.582	9.862	.000
	E_Flex	.242	.062	.230	3.897	.000

a. Dependent Variable: EFeelingSecure

HYPOTHESIS 5: Dependent Variable: Comfort

Independent Variables: Security, Flexibility, User Interface, Usefulness

Table 20 Model Summary Hypothesis 5

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.412(a)	.170	.165	.440	.170	33.973	1	166	.000	2.162
2	.515(b)	.265	.256	.415	.095	21.333	1	165	.000	
3	.558(c)	.311	.299	.403	.046	11.029	1	164	.001	
4	.580(d)	.337	.321	.397	.026	6.294	1	163	.013	

a Predictors: (Constant), E_Security

b Predictors: (Constant), E_Security, E_Flex

c Predictors: (Constant), E_Security, E_Flex, E_UserInterf

d Predictors: (Constant), E_Security, E_Flex, E_UserInterf, E_Useful

e Dependent Variable: EComfort

Table 21 ANOVA Hypothesis 5

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.576	1	6.576	33.973	.000(a)
	Residual	32.132	166	.194		
	Total	38.708	167			
2	Regression	10.255	2	5.127	29.734	.000(b)
	Residual	28.453	165	.172		
	Total	38.708	167			
3	Regression	12.048	3	4.016	24.704	.000(c)
	Residual	26.661	164	.163		
	Total	38.708	167			
4	Regression	13.039	4	3.260	20.699	.000(d)
	Residual	25.669	163	.157		
	Total	38.708	167			

a Predictors: (Constant), E_Security

b Predictors: (Constant), E_Security, E_Flex

c Predictors: (Constant), E_Security, E_Flex, E_UserInterf

d Predictors: (Constant), E_Security, E_Flex, E_UserInterf, E_Useful

e Dependent Variable: EComfort

Table 22 Coefficients Hypothesis 5

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.030	.177		11.486	.000
	E_Security	.355	.061	.412	5.829	.000
2	(Constant)	1.505	.202		7.450	.000
	E_Security	.281	.060	.326	4.705	.000
	E_Flex	.255	.055	.320	4.619	.000
3	(Constant)	.880	.272		3.241	.001
	E_Security	.236	.059	.275	3.976	.000
	E_Flex	.202	.056	.254	3.613	.000
4	E_UserInterf	.292	.088	.235	3.321	.001
	(Constant)	.717	.275		2.604	.010
	E_Security	.234	.058	.272	3.999	.000
	E_Flex	.168	.057	.211	2.969	.003
	E_UserInterf	.233	.090	.188	2.600	.010
	E_Useful	.162	.065	.177	2.509	.013

a. Dependent Variable: EComfort

HYPOTHESIS 6: Dependent Variables: Usefulness
Independent Variables: User Interface, Flexibility

Table 23 Model Summary Hypothesis 6

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.354(a)	.125	.120	.49042449	.125	23.960	1	167	.000	
2	.422(b)	.178	.168	.47689708	.053	10.608	1	166	.001	1.774

a Predictors: (Constant), E_UserInterf

b Predictors: (Constant), E_UserInterf, E_Flex

c Dependent Variable: E_Useful

Table 24 ANOVA Hypothesis 6

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.763	1	5.763	23.960	.000(a)
	Residual	40.166	167	.241		
	Total	45.929	168			
2	Regression	8.175	2	4.088	17.974	.000(b)
	Residual	37.754	166	.227		
	Total	45.929	168			

a Predictors: (Constant), E_UserInterf

b Predictors: (Constant), E_UserInterf, E_Flex

c Dependent Variable: E_Useful

Table 25 Coefficients Hypothesis 6

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.295	.305		4.241	.000
	E_UserInterf	.479	.098	.354	4.895	.000
2	(Constant)	1.032	.308		3.354	.001
	E_UserInterf	.366	.101	.271	3.619	.000
	E_Flex	.212	.065	.244	3.257	.001

a. Dependent Variable: E_Useful

HYPOTHESIS 7: Dependent Variable: Ease of Use
Independent Variable: User Interface, Speed, Reachability

Table 26 Model Summary Hypothesis 7

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.563(a)	.317	.313	.32930029	.317	77.520	1	167	.000	1.902
2	.606(b)	.368	.360	.31781101	.051	13.293	1	166	.000	
3	.621(c)	.386	.375	.31414709	.018	4.895	1	165	.028	

a Predictors: (Constant), E_UserInterf

b Predictors: (Constant), E_UserInterf, E_Speed

c Predictors: (Constant), E_UserInterf, E_Speed, EReachability

d Dependent Variable: E_EoU

Table 27 ANOVA Hypothesis 7

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8.406	1	8.406	77.520	.000(a)
	Residual	18.109	167	.108		
	Total	26.515	168			
2	Regression	9.749	2	4.874	48.260	.000(b)
	Residual	16.767	166	.101		
	Total	26.515	168			
3	Regression	10.232	3	3.411	34.560	.000(c)
	Residual	16.284	165	.099		
	Total	26.515	168			

a Predictors: (Constant), E_UserInterf

b Predictors: (Constant), E_UserInterf, E_Speed

c Predictors: (Constant), E_UserInterf, E_Speed, EReachability

d Dependent Variable: E_EoU

Table 28 Coefficients Hypothesis 7

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.343	.205		6.550	.000
	E_UserInterf	.578	.066	.563	8.805	.000
2	(Constant)	1.038	.215		4.835	.000
	E_UserInterf	.503	.067	.490	7.549	.000
	E_Speed	.183	.050	.237	3.646	.000
3	(Constant)	.992	.213		4.652	.000
	E_UserInterf	.463	.068	.451	6.780	.000
	E_Speed	.172	.050	.222	3.443	.001
	EReachability	.073	.033	.142	2.212	.028

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