AN EXAMINATION OF THE FACTORS INFLUENCING YEMENI BANK USERS' BEHAVIOURAL INTENTION TO USE INTERNET BANKING SERVICES

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<u>ORIGINAL LITERARY WORK DECLARATION</u>

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ABSTRACT

Investigating bank customers' attitudes, perceptions, norms, behavioural controls and their influence on behaviour can be the right step in understanding the psychological factors affecting individuals to use Internet Banking (IB) in Yemen. This study attempted to provide such an understanding by elaborating Ajzen's Theory of Planned Behaviour (TPB), a widely applied psychosocial theory in modelling behaviour. In addition, the Diffusion of Innovation (DOI) provides the widely applied concepts of the diffusion of innovation by modelling the attributes of innovation as part of attitudinal belief and the communication channels as part of normative belief.

The purpose of this study was to examine the potential prominent factors relating to adopting and using Internet Banking in Yemen as a challenging context representative of developing countries. It also intended to scrutinize the role of Users' Informational-based Readiness (UIBR) in the presence of other psychological determinants in predicting IB adoption as well as whether or not adopter groups differ from each other in terms of their readiness and the other theoretical factors, and whether or not UIBR is among the prominent predictors which contribute to IB adoption in Yemen.

A sample of 369 bank customers was randomly obtained by means of a self-administered survey. A usable response rate of 59.2 % was achieved. SPSS version 14 was used to conduct a series of data analyses of variables assessment for validity and reliability tests and evaluation of regression models in both direct and indirect layers of predictors. The findings of the survey and the empirical bank website evaluation yield several findings.

The results of multivariate tests showed that the direct predictors of attitude, Users' Informational-based Readiness (UIBR), Perceived Behavioural Control (PBC) and Subjective Norm (SN) positively affect behavioural intention to use Internet banking. Cross- validating tests showed that all the direct predictors except SN could be generalized as the prominent predictors of IB. The overall prominent predictors, combined both direct and indirect, obtained in the **study's UR-TPB Model** involved Relative Advantage/Compatibility (RAC), UIBR, Attitude, Observability, Technology Facilitating Condition, PBC and Self-efficacy. The model accounted for $R^2 = 75$ percent of the variation of a person's BI to use IB. The model's accuracy was judged by the adjusted $R^2 = .75$. The trimmed model explained substantial variance of Intention, Attitude and moderate variance of SN with substantial variance of PBC.

In contrast to the rejecter groups, innovator and early adopter groups were represented by those of higher levels of awareness, experience, knowledge and exposure to IB. The respondents significantly viewed IB as advantageous, easy to use and not desirable to be observable. The study showed that IB use in Yemen is still not strong, and this could be due to the newness of IB in general. Banks in Yemen, based on the empirical evaluation of banks' websites, indicated an acceptable level of informational presence while they were lagging behind at the transaction level. The study makes a significant contribution to theory and academic understanding of the adoption in areas of IS, and specifically IB in the Yemeni context which may guide policy makers and bankers towards the successful diffusion of innovations.

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LIST OF SYMBOLS AND ABBREVIATIONS

In this work, this study is going to refer to commonly used term by the abbreviation

shown as fellows;

ATM Automated Teller Machine

ATT Attitude toward Behaviour

BI Behavioural Intention

CAC Cooperative and Agricultural Credit Bank

CAIB Credit Agricole Indosuez Bank

CFA Confirmatory Factor Analysis

CSE Computer Self-Efficacy

CSO Central statistical Organization

df Degree of Freedom

DOI Diffusion of Innovation

DSS Decision Support Systems

EFA Exploratory Factor Analysis

GNP Gross National Product a

HMR Hierarchal Multiple Regression

IB Internet Banking

ICT Information Communication Technology

IDB Islamic Development Bank

IMF International Monetary Fund

IBY International Bank of Yemen

IS Information Systems

ISP Internet Services Provider

IT Information Technology

ITU International Telecommunication Union

LRA Linear Regression Analysis

MIS Management Information Systems

MTIT Ministry of Telecommunication and Information Technology

NAM Non Aligned Movement

NBY National Bank of Yemen

OIC Organization of Islamic Conferences

PBC Perceived Behavioural Control

PC Personal Computer

PDA   Personal Digital Assistant

PEOU   Perceived Ease of Use

PRISK   Perceived Risk

PRS   Poverty Reduction Strategy

PU   Perceived Usefulness

RAC   Relative advantage/compatibility

RD   Result Demonstrability

RFC   Resource Facilitating Condition

SBYB   Shamil Bahrain Bank

SCT   Social Cognitive Theory /

SE   Self-Efficacy

SLT   Social Learning Theory

SMS   Short Message Services

SN   Subjective Norm

SPSS   Statistical Package for Social Science

SST   Self-Service Technologies

TFC   Technology Facilitating Condition

TRA   Theory of Reasoned Action

TPB   Theory of Planned Behaviour

TAM   Technology Acceptance Model

TAM2   Extension of Technology Acceptance Model

TIB   Tadhamon International Islamic Bank

UBL   United Bank Limited

UIBR   User Informational-Based Readiness

UN   United Nation

WAP   Wireless Application Protocol

WB   Watani Bank

WTO   World Trade Organization

YBRD   Yemen Bank for Reconstruction and Development

YCB   Yemen Commercial Bank

YGB   Yemen Gulf Bank

CHAPTER ONE: INTRODUCTION

This chapter is the introductory part to this study, therefore; the researcher is going to introduce the historical background and related information on the country of Yemen where this study was carried out. In this chapter, there are eight sections in which the researcher strives to introduce and discuss issues such as the research problem, the purpose of doing this study and highlighting the research questions and objectives. In section 1.6, the researcher will present the significance of the current study and move on to highlight important research terms and their usage, and then end in the last section by explaining the thesis organization and outlining the organization of the chapters.

1.1 Introduction

Researchers such as Ainin S. & NoorIsmawati (2003); Zolait (2003) and Shih & Fang (2004) among others have viewed the Internet as a new channel for doing business. Consequently, the Internet gave the chance to Web tools and software solutions to make information a two-way process, for instance, e-mail, chat services, customer care service, billing, financial transaction services, and surveys of customer needs. Moreover, individuals and business organizations that fully utilize the Internet, overcome the timing and geographical location problems because they are on the Web 24 hours, 7 days a week as an open outlet for their products and services to be online, seen and promoted. Moreover, some interactive web sites such as Amzon.com and bank web sites can proceed towards the delivery of the services and products to the customer such as checking balances, paying utilities bills, inquiry on services provided and transferring money from one account to another among others.

This study examines Internet Banking (IB) in the Republic of Yemen. It investigates the prominent predictors of IB adoption in Yemen. This study argues that previous empirical studies in this discipline are either from Western or Asian developed contexts, while there are only a few studies examining the adoption of IB concerning the developing countries, specifically those on the Arab world and Yemen. Yemen's financial services sector is dominated by the banking system. The banking system consists of the Central Bank of Yemen, 17 commercial, specialized, and Islamic banks with a wide network of bank branches, which cover the major cities in the country. Further details on the banks in Yemen will be discussed in Chapter 2 section 4. Whilst, previous major studies emphasised exploring the psychological determinants provided by a theoretical framework, none of them attempted to look into other determinants related to the user's readiness as this study attempt to do.

1.2 Problem Statement

In the era of Information Technology (IT), banks make the effort to incorporate and introduce multiple methods of financial services in order to serve markets better and to gain competitive advantage over their competitors. One of these methods introduced recently is IB (IB) by which banks provide their services through the Internet. IB is widespread in developed countries such as the United States, Europe, and growing in some neighbouring Middle East countries, but still not predictable in some countries such as Yemen. For instance, research on the factors that identify and influence the adoption of IB have still not been academically studied in non-Western and developing country such as the Republic of Yemen. There are some efforts by the government of Yemen that encourage banks in Yemen to use and introduce up-to-date technologies. In the light of stiff competition among banks in Yemen, banks themselves are now

competing to gain a larger market share and to use advanced technologies to retain customers in the future.

The literature reviewed in this field shows that the Republic of Yemen is lagging behind in this technology. Besides, the research has found that there is a gap in the literature pertaining to the study of the status of IB in the national context level, specifically, studies on investigating the prominent predictors of IB. On the other hand, this study has found that the government of Yemen is encouraging moves to implement such IT projects that encourage payment and transaction systems based on the Internet such as IB, electronic rial[1] <www.e-rial.post.ye>, electronic stamps <www.e-stamps.post.ye>, e-payment of electricity, water, and telephone bills <www.e-rial.post.ye/moneyorder>, and one for postal money transfers through the Internet <www.e-stamps.post.ye> (CBY, 2004 and Yementimes, 2002).

Last but not least, the attractive geographical location of Yemen positioned in the important marine trade route that links major Middle Eastern, North Africa and European countries with East Asian countries makes Yemen worthy of consideration as a commercial hub. The Government announced the Aden sea port as a free trade zone to motivate international companies to invest and trade in Yemen. This step requires a modern and strong banking system with multiple channels of easy money transaction. This cannot be achieved without adopting such banking technologies, specifically the IB, to modernize, and facilitate banking services for investors to better serve them when dealing with government departments (B2G and G2B) or with other business departments (e-services, e-commerce, e-insurance, e-customs, e-travel, and e-tender). Therefore, this research aims to close this gap by exploring the factors influencing Yemeni banks' customers who perhaps differ from bank customers in the developed countries in terms of their psychological behaviour and informational based readiness to

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[1] Rial is the official currency for Republic of Yemen

use IB services. Since this study aims to look into the adoption determinant from the developing and non western context, the pillars underpinning this study's approach are based on researcher's observations. The researcher observed that past research in the discipline of IB adoption strived to identify a number of determinants from the behavioural science. Several authors studied the determinants in the mirror of psychological variables for these authors in IB adoption utilized theories like TRA, TPB, TAM, TRA and Triaindas. Some researchers recently started to emphasize the importance of adding other non psychological variables such as adopter's experience (e.g. Brown, et al. 2004; Karjaluoto et al. 2002; Black et al. 2001; Tan & Teo 2000; and Taylor & Todd (1995c), exposure (e.g. Chang, 2004, and Stafford, 2001), knowledge (e.g. Fredriksson, 2003) and awareness (Devlin & Yeung, 2003 and Aggarwal et al., (1998). This implies that past research in the IB discipline has established the need to examine other factors that influence the individual's intention to use IB. Thus, this study reveals a critical gap in studying the determinant of IB adoption. The study explains the view that there is a need to examine further factors beyond the psychological determinants. Along this line, the study proposed that not only psychological determinants can explain the individual's intention but also other determinants referred to as the User Informational Based Readiness (UIBR).

The UIBR is drawn from the notion that in the digital era, some individuals might have the greater chance to have a higher level of UIBR than some others. Therefore, there will be different customers with different levels of knowledge, experience, exposure, and awareness of IB. Along this line, the study suggests that an individual's level of knowledge, experience, exposure, and awareness of IB (UIBR) could work together in identifying the determinants of IB adoption based on the effect of individuals' intention to use or not use this particular innovation.

1.3 Purpose of the Study

There are diverse views on what predictors might influence adopters' behaviour from different contexts to use IB. Therefore, the purpose of the current study is to take a rigorous theoretical approach to identify the psychosocial factors influencing IB use based in the Republic of Yemen. In order to achieve the current study's purpose, applied psychosocial theory provided by Taylor & Todd, (1995a) was utilized because it incorporates Ajzen (1991)'s Theory of Planned Behaviour (TPB) with aspects of Rogers' (1995) Diffusion of Innovation (DOI) theory which both provide an appropriate theoretical framework for the current study to explain and examine behaviour towards adopting IB in Yemen.

1.4 Research Questions

Based on the literature review found on information systems, this study is going to focus on the issue of IB adoption. Mainly, the study is going to focus on investigating the effect of three constructs; attitude (ATT), subjective norm (SN) and behaviour control (PBC) on potential adopters' behavioural intentions to adopt IB and the extent of their influence on them. In addition, the study aims to assess the effect of user readiness that is based on awareness, information, experience and exposure on the adoption. Other factors such as interaction norms and demographic variables may also play a role by influencing the adopters to adopt IB. More particularly, the current study has two basic research questions as follows:

Question: 1

"What are the prominent predictors of IB adoption that could affect (influence) a user's behavioural intention?"

Question: 2

"What is the role of the user's informational-based readiness in predicting IB

adoption?"

Consequently, several issues arise from the two research questions highlighted above including some specific research questions which were formulated to achieve the aims of the current study:

Q1.1 How do the direct factors (customer attitudes, subjective norms, and PBC) predict and explain customers' behavioural intention towards the adoption of IB?

Q1.2 How do the indirect factors (behavioural beliefs, normative beliefs, and control beliefs) relate to the respective direct factors (customers' attitudes, subjective norms, and PBC) and together explain customers' behavioural intention to adopt IB?

Q2.1 How do the external factors (awareness, knowledge, experience, and exposure) predict and explain bank customers' behavioural intention to use IB?

Q2.2. How does the UR-TPB (User Informational based Readiness for Internet Banking) model perform in comparison with the TPB (Theory of Planned Behaviour) model in explaining customers' intention to use IB?

Q3. How do the external factors relevant to the demographic part (sex, age, nationality, education, marital status, type of job, personal income, household income, type of housing and area of residence) explain bank account holders' behavioural intention to use IB?

1.5 Research Objectives

This study seeks to achieve the following objectives;

1. To identify the prominent predictors that will most likely influence adopters' behavioural intention to adopt IB based in Yemen.

2. To examine the role of external variables of the user's informational-based readiness (awareness, knowledge, experiences and exposure) and demographics (sex, age, nationality, education, marital status, type of job, personal income, household income, type of housing, area of residence) in predicting users' behavioural intention to adopt IB based in Yemen.

3. To investigate to what extent the indirect factors (behavioural beliefs, normative beliefs, and control beliefs) relate to the respective direct factors (customers' attitudes, subjective norms, and PBC) and their ability to explain customers' behavioural intention to adopt IB in managing their accounts at the banks?

4. To test and validate the proposed research model's ability to predict and explain the behavioural intention of bank customers to use IB and to compare its performance with the original DTPB.

1.6 Significance of the Study

Research in banking technologies by identifying the prominent predictors of IB adoption is a hot topic in adoption research. Therefore, studying IBs' determinants of the developing countries like Yemen will not only serve the development of technology in Yemen but it can also contribute to the body of knowledge in the IB adoption area in both theory development and for IS practitioners. Also, this study seeks to be a helpful tool and provide guidelines for comparative as well as for further incremental studies in

the feature in Yemen and the region. The significance of the study can be summarized in the following points:

- To furnish detailed information on factors influencing IB adoption in Yemen for policy development and decision makers at the national, regional and banking industry levels.

- The study's findings will be key points and motivational factors for other studies and researchers in Yemen specifically and the Arab region to move towards studying the other aspects of IB. Furthermore, it will contribute to the scholarly research and literature in the field of IB integration by providing a basis for understanding the extent to which research conducted elsewhere may be applied to any of the Arab countries.

- The study might identify certain useful psychological (attitude, norms & perceived behaviour control) factors that can help bank managers, policy makers and research institutes to further understand the customers' needs and expectations of IB in Yemen.

- The work is projected to provide a suitable IB model that can fit in the Yemeni context which could be best exemplified for other developing countries.

- Internet banking is a very new technology for Arab countries and specifically in the Yemeni context, which has not been studied by other researchers. Therefore, it is worthwhile to carry out this study and come up with research findings that could serve in different ways in the expansion of the knowledge of IB to a different context which might be different in terms of culture and adoption rate such as Yemen in the Arab region.

- Studying IB adoption from the national perspective is of significance because most existing findings about IB adoption are either from Western nations (e.g. findings from Finland by Karjaluoto et al., 2002 and Mattila et al. 2003; Italian context by

Corrocher, 2002 and Hasan et al., 2002; the UK by White & Nteli 2004; Estonia by Eriksson et al. (2005), and from Turkey by Polatoglu & Ekin 2001 and Akinci et al., 2004) or from well-developed countries (e.g. Singapore, & Australia) which have still not been validated to suit both the Arab context, generally, and the Yemeni context, specifically. This study will provide empirical evidence from a non-Western country with a different environment, culture, customers and values, that is, the Yemeni context.

- The availability of financial and information transactions via the Internet is a top priority for those organizations seeking and planning to do e-commerce in Yemen. If the local banks cannot provide online banking transactions that are necessary for e-commerce, e-government e-services and the other online activities of those organizations, they will face teething problems to conduct pure e-commerce or maybe e-commerce will not be possible for them in the absences of online banking.

1.7 Definition of Terms and their Usage

This research uses a number of common phrases in particular contexts. The meaning intended in this study is described in the following list:

Internet Banking (IB): In particular, it refers to how an account holder can perform a wide range of banking transactions such as inquiring about account balances, renewing time deposits, obtaining statements, paying utilities bills, transferring funds, and trading securities electronically via the bank's web site by either wired devices (Personal Computer with modem) or wireless devices (Satellites and PDA devices) (White & Nteli, 2004 and Chan and Ming-te, 2004).

Information Technology (IT): refers to the application of computer hardware and software to business and organisational processes. Information Systems is used synonymously.

<u>**User's Informational Based Readiness to IB, (UIBRIB):**</u> in this study refers basically to the individuals or bank account holders' readiness in terms of awareness of IB, having knowledge of IB, being experienced in aspects of IB and being previously exposed to IB which gives the acronym of (UIBR).

<u>**Customer:**</u> in this study refers to any of those individuals who are considered as bank account holders.

1.8 Thesis Organization

This thesis comprises seven parts as follows;

Chapter 1, *Introduction:* This chapter is an introductory chapter that describes the nature of the research, the issues with which the research is concerned, the objectives of the study, the reason it is worthwhile undertaking the study within other academic disciplines.

Chapter 2, An *Overview of ICT and Financial System in Yemen**:* This chapter states the foundation, and present relevant background of Information Technology (IT) in Yemen as well as in the Arab region. In addition, this chapter outlines the major related infrastructure projects in Yemen, and then presents the financial system of Yemen and ends with an evaluation of the Yemeni banks presence on the net and the Banking Self Service Based Technology available in Yemen.

Chapter 3, *Literature Review:* This chapter reviews the literature that is relevant to this research project. It addresses the theoretical basis to build a theoretical framework, underlying adoption theories and then performs an analysis of the literature using the framework

Chapter 4, *Research Methodology:* This chapter describes the methods used to conduct the research. The method section provides an overview of the overall research design, and then documents it in more detail.

Chapter 5, *Data Analysis Part 1***:** The study in this chapter focuses on assessing the reliability and validity of study's measures. Mainly, it looks at the internal consistency using Cronbach's alpha and factorial validity through employing factor analysis techniques.

Chapter 6, *Data Analysis Part 2***:** The researcher in this chapter presents descriptive statistics analysis followed by regression analysis for testing the hypotheses. The researcher in this chapter also discusses the study's model development, presents empirical findings of path analysis and lastly presents the analysis of Yemeni banks' Websites.

Chapter 7, Conclusions: The final chapter presents the synthesis and integration of the findings from the literature review, which is used to provide concluding answers to the research questions.

1.9 Research Methodology

Briefly, this study relies on the "Hypothetico-Deductive methods" in which a set of quantitative approach rules are employed to answer the research questions. This research has taken positivism as its philosophical stance and adopted the behavioural science paradigm. In this study, the research questions were put in formulated hypotheses to be tested and then the primary data required were collected via a highly self-administered survey covering a sample of bank users. The SPSS program and multivariate techniques were used as a means of testing the validity of the information obtained via the procedures of data analysis. The specific details of this study's method and several related issues will be discussed in Chapter Four.

1.9 Internet Banking Research in Context

The key point of this section is to give a clear picture of the current trends in IB in the world. In this study, some successful published studies in some countries from both developed and developing countries will be highlighted. In this section, the existing literature on IB will be presented based on countries, study main aims and the study findings. Table 1.1 illustrates past research conducted on the adoption of IB and summarizes the findings of studies on IB adoption from different regions.

Table 1.1 Summary of Previous IB Adoption Studies

Context	Reference Study Main Aims	Study Main Findings
Australia	Sathye, (1999) adoption of IB by Australian	The main obstacles to IB non-adopters were security concerns and lack of awareness. Also, he identified young, educated, and wealthy groups of customers as the important customer for development of IB.
Malaysia	Suganthi et al. (2001), IB adoption perspective	Among Malaysian users and banks, Internet accessibility, awareness, attitude towards change, computer and Internet access costs, trust, security, ease of use and convenience are the major factors affecting the adoption of IB in Malaysia.
New Zealand	Chung &Paynter (2002),Evaluation of IB in NZ	Found that NZ banks do not provide IB services that meet customer requirements and recommended factors such as security up-to-date information, response time, services free from technical problems and ease of use are considered very important for increases I-banking performance.
S. Korea	Chang (2004), IB Adoption	IB adoption is affected by individual characteristics such as demographics, the exposure to the hazard, information seeking, and banking behaviour.
India	Malhotra & Singh (2004),IB adoption	Among Indian banking sector they found several significant differences in the profile of banks that offer IB and banks that do not.
Thailand	Rotchanakitumnuai & Speece (2003)IB	Barriers to IB adoption, found that the main barrier among Thai corporate customers was security concerns (focus on IB Barriers)
Hong Kong	Chau,& Lai (2003) determinants of IB	There are significant influences of personalization, alliance services, and task familiarity on perceived usefulness and of accessibility on perceived EOU.
Hong Kong	Chan & Ming-te (2004), Adoption	Reveal that CSE indirectly has significant influence on the adoption of IB and the risk perception hindered the IB adoption.
Hong Kong	Lai & Li (2004) IB TAM	The invariance analysis revealed that, the relationships between PEOU, PU, ATT, and ITO were positive and highly significant; findings also support prior research showing that TAM is a good model for evaluating intention and actual use of IT.
Taiwan	Wang, et al.(2003) IB Determinants	found that PEU, PU , and perceived credibility effect significantly and positively the behavioural intention to adopt IB.
Taiwan	Shih & Fang (2004) used the DTPB to studied IB adoption in Taiwan	DTPB model has better explanatory power for behavioural intention, attitude and subjective norm than the TRA and pure TPB models. Also findings show that intention to adopt IB can be explained by attitude in both models. However, in the decomposed TPB model, only relative advantage and complexity are related to attitude, while compatibility is not

Table 1.1 Summary of Previous IB Adoption Studies (Continued)

Context	Reference Study Main Aims	Study Main Findings
Singapore	Tan & Teo (2000) Factors Influencing the Adoption of IB	Found intention to adopt IB services can be predicted by attitudinal and PBC, but not by SN factors. The attitudinal factors relative advantage; experience, and needs; compatibility, trialability; and risk are significant. Complexity has a negative relationship with adoption intentions and is not significant.
Singapore	Liao & Cheung (2002) IB and consumer attitudes	Found that accuracy, security, transaction speed, user-friendliness, user involvement, and convenience were the most attributes in the perceived usefulness of IB in retail banking.
Singapore S. Africa	Brown,et al. (2004) IB adoption a comparative study	Attitudinal factors like relative advantage, banking needs, Internet experience, perceived risk and government support were influences in Singapore, but not South Africa and could be accounted for the greater influence of compatibility in South Africa as compared to Singapore
Singapore	Gerrard & Cunningham (2003) Diffusion of IB	Among Singapore consumers there are 8 prominent factors of adoption extracted from 41 statements to measure the characteristics relating to the adoption of IB (social desirability, compatibility, convenience, complexity, confidentiality, accessibility, economic benefits, and PC proficiency
Ireland USA	Bradley & Stewart (2002) drivers and inhibitors of IB	Study identified that drivers of banks' adoption of IB are the technology itself, its relative advantage including cost reductions and bank ability to deal with customers, consumer demand and competitive pressures while the inhibitors are rapidity of technological change, banks' existing systems, and banks' lack of innovative culture and low levels of demand.
UK	Jayawardhena & Foley (2000) Changes in the banking sector- the case of IB	Found fourfold challenge to banks strategies providing IB; they need to satisfy customer needs which are complex, face up to increased competition from within the sector and from new entrants, address the demands placed upon on the supply chain and finally, invent new products and services.
UK	White& Nteli (2004) IB in the UK	Examining the IB in the UK pertaining to answer Why are there not more customers? The study revealed that, security is the key concern for consumers
Estonia	Eriksson et al. (2005) IB acceptance	From Estonian customer perspective, perceived usefulness of IB is primary reason that Estonian bank customers use the Internet for banking while the perceived ease of use of the IB does not directly increase the use of IB but it does lead to greater perceived usefulness, which then increases that use.
Turkey	Polatoglu. & Ekin (2001) IB services acceptance	From Turkish consumers' perspective, study found nine factors that, influenced the diffusion of IB (relative advantage, observability, trialability, complexity, perceived risk, type of group, type of decision, and marketing effort. Also they found IB very reliable to senior IB's Customers.
Turkey	Akinci et al. (2004)	Found IB was the most preferred delivery channel, majority of IB users were male, and mid-age consumers (aged 31-50) constituted the major IB using segment.
Finland	Karjaluoto et al. (2002) IB	Found that attitude towards IB was influenced by prior experience of computers and technology as well as attitudes towards computers.
Finland	Mattila et al. (2003) IB	Found household income and education had a significant effect on IB adoption among mature consumers in Finland, while difficulties in using computers with lack of personal service in IB were the main barriers.

Table 1.1 Summary of Previous IB Adoption Studies (Continued)

Context	Reference Study Main Aims	Study Main Findings
Jordon	Awamleh et al.(2003), IB in Jordanian banks	Major challenges facing IB in Jordan are the high cost of telecommunications, non-availability of information technologies, packages, solutions, and human resources, which facilitates optimum use of technology.
Oman	Sabbagh & Molla, (2004), Adoption and Use of IB in Oman	Compatibility, relative advantage and ease of use as the most important factors affecting intention to adopt IB.
Saudi Arabia	Jasimuddin (2001) evaluate Saudi Arabian Banks on the Web	IB in Saudi Arabia offers only a restricted range of services and is still a very marginal activity in Saudi Arabia. IB used by the Saudi banks mainly for brand awareness and promotion.

The preceding Table 1.1 displayed brief information on the previous Internet Banking adoption studies by countries and summarized their main findings. Based on reviewing the available literature, on Internet banking adoption from several contexts, it might be concluded that major academic research looked into the evaluation of adoption from the providers' side more than exploring individual adopter receptivity for the adoption. Some research opted for exploring the overall status of Internet banking within the country. Thus, Internet banking has become a business necessity, rather than a means for banks to gain a strategic advantage.

CHAPTER SUMMARY

The study appears to have three major research questions followed by four other relevant sub-questions which are stated in section 1.2 respectively. The research objectives were highlighted in the light of the research questions listed in this chapter. This chapter briefly underlined how this thesis is organized and presented a summary of previous IB adoption studies and their main findings were presented in the last sections. The next chapter will discuss issues pertaining to the development of ICT and the financial system in Yemen.

CHAPTER TWO: AN OVERVIEW OF ICT AND THE FINANCIAL SYSTEM IN YEMEN

This chapter consists of six sections, which discuss and present some related information about the Republic of Yemen. For instance, the first three sections highlight the background of the Yemen and electronic banking while the fourth section is designed to cover the country's financial system history. Section 5 presents the issue of the diffusion of banking self-service based technology in Yemen. The last section provides information on IB in Yemen. In addition, the study discusses and evaluates the presence of banking operations in Yemen on the web.

2.1 Historical Background on Yemen

Prior to commencing in the context of IB, the researcher would like to provide some general information about Yemen. The Republic of Yemen or in Arabic "Al-Jumhuriyah al-Yamaniyah" which is called "Al-Yaman" for shortly, is a country located in the southwestern corner of Asia in the Arabian Peninsula. Formerly, the Republic of Yemen was the land of the Queen of Sheba who is the most famous historical women leader (Rhodes, 2004). The Queen was called "**Balqis"** and her respected political dialogue and story with Prophet Solomon or "Sulaiman" was mentioned in the Holy Qur'an (Al-Quran.34: 15). In addition, some Surah "verses" in the Holy Qur'an tell some real stories related to the people and the land of Yemen (e.g. Quraish, Al-Fil "The Elephant" and Saba "Sheba"). This confirms that Yemen is known as a historical country with several different civilizations and events which took place there. The former name of Yemen was 'Arabia Felix' as the ancient Romans used to call it.

The modern history of Yemen developed in two regional parts of the country. The first part is called north Yemen, which was partly ruled by the Ottoman Empire which

got its independence from the Ottoman empire in 1918, while the other part was under British colonization, The British had set up a protectorate area around the southern port of Aden in the 19th century. There was a revolution on 14 October 1963 against the British. The British withdrew from what became south Yemen in 1967. Three years later, the southern government adopted a Marxist regime, and this part was called the "People's Democratic Republic of Yemen"

Similarly, some historical changes also took place in the other part of Yemen. The major change in this part is when the Ottoman Empire (Turks) withdrew from the north part of Yemen; this part fell into the hands of a royal family named "Beit Hameed Al-Deen". The royal system of "Beit Hameed Al-Deen" was not accepted by the people of Yemen specially those who believed that the royal regime caused Yemen to be left behind and brought the people of this part of the country to a deplorable situation in terms of poverty, health and education. There was resistance against this system and it was ended by a successful revolution on 26th September 1962 with the declaration of the new republican regime in the north, "Yemen Arab Republic". More recently, the Central Statistical Organization (CSO) reported that the Republic of Yemen was formed on 22nd May 1990 from the two former Yemeni states, the Yemen Arab Republic (north Yemen) and south Yemen of the Marxist People's Democratic Republic of Yemen (CSO, 2003). The two countries unified as the Republic of Yemen. Rhodes (2004) says that Yemen has the only permanent elected parliament in the Arab world and Yemeni women were the first in the Arabian Peninsula to have the right to vote.

I. Location, Economy and Population

The Republic of Yemen is an Arabian country bordering Saudi Arabia to the north, the Red Sea to the west, Oman to the east and the Arabian Sea to the south (refer to the M**ap of Yemen** in APPENDIX I). It is located between the 12th and 20th North parallels and the 41st and 54th East longitude lines.

Yemen is a mountainous country with a moderate climate (Othman, 1982). The country consists of 19 governorates and its political capital is Sana'a. According to the CSO (2003) the country has a total area of 527,970 sq km (205,908 sq Miles), with a population of 19,494,999 persons and an annual population growth rate of 3.5 percent (CSO, 2003). Arabic is the official language and Islam is the religion of the country.

Yemen is a member of many recognized international organizations such as the Organization of the Islamic Conferences (OIC), the United Nations (UN), the International Telecommunication Union (ITU), and the World Trade Organization (WTO), among others. In addition, it is a member of some regional organizations such as the Arab League (AL), the Non Aligned Movement (NAM), the Islamic Development Bank (IDB), and the Economic and Social Commission for Western Asia (ESCWA). Appendix I shows maps of the Republic of Yemen.

According to the CSO (2003), the main important commodities of the country are oil, canned fish, soft drinks, cigarettes, assorted textiles and cement. The foreign trade statistics occupy special importance in rationalizing the decision and updating strategic plans affecting the structure of the national economy of the country. The collaborating countries that Yemen does trading with are wide and the top four out of the twenty exporting countries to Yemen are the United Arab Emirates (UAE), Saudi Arabia, Kuwait and the U.S.A for the years 2001 and 2002, while the top four countries importing from Yemen are Thailand, India, China, and Korea (CSO, 2003).The GDP purchasing power parity is $15.09 billion (2004 est). Yemen has embarked on an International Monetary Fund (IMF), which supported a structural adjustment programme worked to maintain tight control over spending. Table 2.1 shows the gross national product and per capita GNP from 1999 to 2002. It also shows the population and the contribution of financial institutions to the country's GDP.

Table 2.1 Gross National Product (GNP 2002-2001)

Items		2002	2001	2000	1999
Residents mid-year population	(MIL.person)	19495	18900	18261	17700
GDP at market prices	(MIL.YR)	1753505	1608065	1539386	1172794
Net Factor Income from abroad	(MIL. YR)	-130484	-113566	-125746	-74262
GNP at market price	(MIL.YR)	1623021	1494499	1413640	1098532
	(MIL. Us$)	9222	8863	8741	7053
Average exchange rate of us $ per Y. Rails		176.00	168.83	161.73	155.75
GNP per Capita:	(Y. Rails)	83253	79074	77413	62064
	(US $)	473	469	479	398
GDP of financial institutions at constants prices					
	(MIL. YR)	4659	4508	4006	4317

Source : Central Statistical Organization: Statistic Year-Book 2002 issued Aug 2003 Sana'a

II. ICT History in Yemen

The history of Information Communication Technology (ICT) in Yemen has its roots in the early 1970s when an English company (Wireless & Cables) established the international telecom company in Aden with a telegraph station using V.H.F radio and a submarine cable. In the mid-1970s, according to Bizet and Pierre (1982), the Yemen Arab Republic decided to improve its limited telephone network. The Government of North Yemen enabled a French consortium to install a turnkey digital telecommunications network, which brought north Yemen into the era of modern telecommunications technology. The programme ended with the installation of the required transmission and switching infrastructure to enable the digital network (change from analog to digital). The communication sector has witnessed some improvements during the last ten years in terms of technology. Most Yemeni regions are linked to the national telecom network using the new technologies such as fibre optics and sea cable technology. Also, the Global System for Mobile Communications (GSM 900) was launched in February 2001. According to the ITU (2005)[1] report, fibre optics connections cover more than 34,000 kilometres in service and 1,200 kilometres under execution. The major cities are connected currently and expansion is planned for modern technology and capacity. There are some prominent signs contributing to the

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[1] <http://www.itu.int/ITU-D/ldc/documents/projects-2001/yemen.pdf> viewed on (1/9/2005)

diffusion of the existing technology in Yemen. This study is going to discuss and elaborate on this issue in detail in the following sections. Table 2.2 presents a brief history of the development of ICT in the Republic of Yemen.

Table 2.2 Brief History on the Development of ICT in Yemen

Year	Details
1870	Started international telecom in Aden with a telegraph station using V.H.F radio and a submarine cable which covered 70% of the globe
1963- 1969	Telegraph switching centre was installed, and Telegraphic centres (using Morse Code) used to transmit telegrams.
1970	Proper international telex, telegraph and telephone services introduced in the north part of Yemen.
1971	A global scale of communication started when two V.H.F Radio stations were built to link Sana'a, Aden and Bahrain
1973 -1976	1. Launch of Hodeidah and Taiz branches telex bureau and telegram services. 2. First earth station Standard-B was opened. Telex and telephone services used manual switchboards.
1979	1. First international Automatic Telex Exchanges (ATX) in Sana'a and Hodaidah Via direct lines. 2. Open Technical Training School
1980	1. Microwave links between major cities in the northern governorates. 2. –Open its 2nd earth station which is Standard-A.
1981 – 1987	1. Launch of SPC (E10B`s) local telephone exchanges (ETSS), allowing for home international telephone calls. 2. The second Intelsat Atlantic Ocean Region (AOR) E/Station of 30m Dish. 3. ARABSAT earth station. 4. International Telephone Exchange (NEAX) installed allowing IDD facility.
1990 – 1993	1. TeleYemen was formed. 2. New cellular mobiles systems were introduced by TeleYemen. 2. No-break power system installed. 3. Cardphone service. 4. The first Intelsat Indian Ocean Region Digital IDR E/S was launched. 5. IDR Standard-A, earth station was launched upgrading the old Standard-A fully digital system.
Sept. 1996	TeleYemen introduced the Internet (Y.net) service for Yemeni people.
1997- 2003	Home Direct service inaugurated to 11 different countries, Prepaid Calling Card Service, E/Station upgraded to Digital IDR E/S, New Switch Centre (ISC3) installed, IVR system Online billing, TeleYemen service enquiries and complain , Easy Access
2000-2006	Global System for Mobile Communications (GSM 900) lunched in February 2001.

Source: for further details refer to: <http://www.teleyemen.com.ye/intro.htm> viewed at 20:51pm on 8 january,2005

As shown in the preceding Table 2.2, the history of ICT development in Yemen is highlighted by four major events. The first event was the establishment of Aden's telegraph station in the year of 1970. The second event took place 10 years later, when microwave communication technology linked major cities in the northern governorates of Yemen. Another ten years on 1990 the third event took place with the establishment of a new communication company as a government joint project with the British

Wireless & Cable Company "TeleYemen". The fourth event in the development process of ICT took place in 2000 by introducing the Global System for Mobile Communications (GSM 900).

2.2 ICT in Yemen

The government of Yemen is prioritizing the development and use of Information Communication Technology (ICT). The Ministry of Planning and International Cooperation (MPIC), reported that the development in the area of telecommunications had surpassed the objective targeted by the plan of the Poverty Reduction Strategy (PRS) and other plans (MPIC, 2003). There are many projects established to create suitable infrastructure needed for the transition to a digital economy. Yemen's Ministry of Telecommunication and Information Technology (MTIT) is leading the supervised diffusion of the technology in Yemen, and is responsible for telecommunications development and administrative policy. Yemen's strategic vision for the third five-year plan (2006-2010) is to become a credible player, user and provider of ICT. Yemen's vision of moving towards the IT era, will be a remarkable move to overcome the traditional communication problems of all Yemeni citizens, improve government efficiency and transparency, develop alternative sources of income, improve livelihood and reduce poverty. The Public Telecommunication Cooperation (PTC)'s national network uses a 34,140 Mbps digital microwave system with a few 8Mbps links to the minor switching centres.

There are many contributors to ICT development in the Republic of Yemen. Three of the more prominent ones are; PTC, TeleYemen, and City of Technology (COT) which will be highlighted in the following sections in addition to their notable contributions in developing ICT in the country.

2.2.1 The Public Telecommunications Corporation (PTC)

The Public Telecommunications Corporation (PTC) was established according to presidential decree No 20 issued in 1980. It is 100% state-owned and currently has over 752,000 fixed lines with 100% of its subscribers connected to digital exchanges as reported by Tarifica Alert (2002)**.** The PTC is a government division directly supervised by the Ministry of Communication in charge of the development of IT over the entire Yemeni territory. As well as establishing a modern telecommunications network, that provides worldwide direct access telephone calls, facsimile service, and Internet service, the PTC owns and supervises good IT projects such as the Yemeni Gateway of Internet (YGI)[2], city of technology and General Telecommunications Institute (GTI)[3]. Alcatel and PTC signed a contract to expand and upgrade the network of Yemen's fixed-line operator Public Telecommunication Corporation (PTC). The upgrade means that improved services such as high-speed Internet access and multimedia services were made available to subscribers by the end of September 2002**.**

2.2.2 TeleYemen

TeleYemen has its history rooted in Yemen. It started in 1945, as Cable and Wireless Co., which was a telegraph station in the southern part of Yemen. From there it grew to become the biggest telephone company in Yemen, providing full telex, telegraph, and telephone services to the entire country. In 1971, they formed V.H.F radio stations to link the cities of Sana'a and Aden and the country of Bahrain. In 1990, the Public Telecommunication Corporation (PTC) and Cable & Wireless agreed to be partners as a joint venture company named TeleYemen. Since its establishment, TeleYemen has made every effort to bring technology and telecommunications to

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[2] For further details visit <http://www.yemen.gov.ye:2020/egov/moc/yemennet.htm>
[3] For further information on GTI activities visit <http://www.yemen.gov.ye:2020/egov/moc/gti.htm>

Yemen. One of the historical achievements of TeleYemen is its pioneering efforts in introducing the cellular service in 1992 and the Internet service, called Y.net, in September 1996 for the first time in Yemen. TeleYemen was the pioneer in introducing modern telecommunication tools and infrastructure in Yemen such as IDD (International Direct Dialling) service, UTACS cellular mobile services on December 31st 2003 TeleYemen shares are fully owned by the Yemeni government (PTC). TeleYemen has played a vital role in developing telecommunications in Yemen.

2.2.3. City of Technology

The Communication and Information Technology City is one of the incubators in Yemen, which has been operational in the capital city of Yemen since 2003. The project was developed by the Public Telecommunications Company of the Ministry of Telecommunications and Information Technology of Yemen (MTIT). It is the first city of technology, which was established and launched in May 2002 to support the business development of Information and Communications Technology (ICT) in the Republic of Yemen. In addition, the setting-up of similar cities is planned to cover the major cities of the states of the Republic. The City of Technology (COT) is in charge of managing the e-library, journal of telecommunication and information, e-rial and as well as supervising the centre for software development which is responsible for software production, development, and specific programs and applications needed by companies, banks or government sectors.

2.3 Infrastructure Projects

The fundamental infrastructure, especially which serves the ICT usage development, has been given special attention by the government of Yemen. The

Ministry of Communications has started implementing the National Programme for Information Technology (NPIT) as a step towards accomplishing a complete IT infrastructure for all vital sectors. Yemen is one of the International Telecommunications Union (ITU) members, as well as participating in Arab Sat and the Oxygen project of world communications. Mohsen (2003) reported that the total amount invested by the Yemeni government and private sector in developing IT infrastructure in 2002 was USD 150 million. Government concerns are given to expanding the telephone network using fibre optic, which will be sufficient to link up the rest of the remote regions in Yemen. The huge projects, undertaken by government are the Yemeni Gateway to the world of Internet assigned to be implemented by the PTC and e-government. The most significant of these recent projects is the establishment of the National Payment Gateway. Yementimes (2002) reported that the total cost of the project was USD 244,000 spent to set up eight Internet Protocol (IP) addresses. This project including a website for the electronic rial <www.e-rial.post.ye>, a website for electronic stamps <www.e-stamps.post.ye>, a site for e-payment of electricity, water, and telephone bills <www.e-rial.post.ye/moneyorder>, and one for postal money transfers through the Internet <www.e-stamps.post.ye>.

2.3.1 Computers and Peripherals

Computing systems and computers, according to Mohsen (2003), were first used in Yemen in the nineteen seventies. In 1977, the first Yemeni computer company was established (Yemen computer Co. Ltd. YCC). The company functions as a computer hardware, software distributor, and application service provider (ASP). So far, this study has found difficulty in getting accurate statistical data on the number of PCs and relevant peripherals existing in the country.

As a matter of fact, a number of Yemen's private and public sector companies , the banking industry, trading corporations, colleges, universities, training centres and hospitals are using computer hardware and software. Furthermore, introducing the Internet services to the public in late 1995 increased the demand for PCs by users as well as by the newly established public cyber cafés. The well-known international computer manufacturers and traders are represented in Yemen and have their local distributors. Software became a profitable business, especially for training centres, colleges and trading companies. In terms of governmental offices and the public sector, Yementimes (2004) reported that the government was working on a presidential project pertaining to spreading computers in the public sector. The first phase covered the distribution of 4,426 sets by 2002. The second phase of the presidential project started in April 2004 with more than five thousand computer sets. These initiated steps have been described as one of the practical measures of the Yemeni government towards electronic government. In terms of servers operating in Yemen, Mohsen (2003) reported that there are fewer than 450 Network Servers in operation in 420 private and government establishments.

2.3.2 Telephone Network

According to MPIC (2003), it is reported that there is a radical increase in the number of active phone lines available for public use. The phone line capacity in 2003 increased to 1,161,041 compared to 769,427 lines in 2002 (CSO, 2003). The number of lines in active service as well had increased from 542204 to 684,884 lines (CSO, 2003). Mobile phone lines also totalled 679,049 in 2003 compared to 480,787 in 2002. Yementimes (2004) reported that the total telephone capacity in Yemen by the end of by year 2005 reached 1.6 million telephone lines and it is expected to reach 3 million public lines by 2009. According to MPIC (2003), there is a large gap in the distribution

between the urban and rural areas because rural population have only 117,014 lines of the leased line telephones comprising 10 percent of the service capacity and 61,185 active phone lines representing 9 percent of the total in active use.

TeleYemen monopolized the mobile phone service in the past but now, according to CSO (2003), there are three additional companies operating GSM mobile services in Yemen, namely, Saba-phone, Spacetel and Al-Thuraia. Moreover, according to http://www.worlditreport.com[4], Yemen will be the first of the Arab countries to use a mobile telecom system of Code-Division Multiple Access (CDMA) to cover all regions of the country. The new system will be better than the GSM system. CDMA is a digital cellular technology that uses spread-spectrum techniques and does not assign a specific frequency to each user.

2.3.3 Internet

The Internet is a revolutionary event in telecommunications and information technology in Yemen. It has opened up new opportunities for a networked society and has established new concepts for human communication and interaction. Pons (2004) says that, many Arab countries are starting to embrace the benefits of the Internet and e-commerce specifically, within and outside their boarders. The huge numbers of local Internet service providers (ISPs), the establishment of Arabic language web browsers and computer software, and greater consumer demand have helped to boost Internet presence among Arab world countries. Internet users in the Arab world in 2004 are estimated to be more than 8.2 million and expected to reach 25 million users by the year 2005, which represents 2.54% of the total Arab population (Pons, 2004).

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[4]<http://www.worlditreport.com/News/&mod=search&searchWords=yemen&st_id_search=95784&time=0&sub=1> viewed 4 February 2005

The social and technical impact of the Internet is enormous in both developed and developing countries. In the context of Yemen, Ynet introduced The Internet service in September 1996. Mohsen (2003) reported that in the early stages of Internet users were dialling Internet connectivity at a maximum speed of 33.6 Kbps. TeleYemen initiated the service with a capacity of 2,000 subscribers at first. The demand for service has increased yearly reaching 4,000 subscribers in 1999. Nowadays, the PTC is offering Analogy Dial-up connection and this service is free of charge. In addition to this service, Yemen Net offers Leased Line connections for ISP's with different speeds (64KB/S, 128KB/S, 256KB/S, 512KB/S, 1MB/S, 1.5MB/S and 2MB/S)[5]. The monthly fees range from $300 to $2000. Zolait (2003) reported that the future of the Internet in the Republic of Yemen depends largely on the realization of its advantages and benefits to the private sector as well as to public users.

2.3.4 Internet Service Providers (ISP)

There are two licensed companies who monopolize the Internet Services (ISP) in Yemen. These companies are TeleYemen, which started in 1996, and the PTC, which began in 2002. The government owns both. Y.Net, or as it was formerly known TeleYemen, offers dial-up access, ISDN, and web hosting.

2.3.5 Application Service Provider (ASP)

In 1977, the government licensed the Yemeni computer company to undertake the computing solution for the public and private sector. Recently, the city of technology COT (refer to section 2.2.3) which was discussed previously, has a professional team that was assigned the task of developing all computer applications

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[5] <http://www.yemen.gov.ye:2020/egov/moc/yemennet.htm> viewed on 1/12/2005

and programs. There are quite a number of local and international ASP companies in Yemen such as YemenSoft[6] and Yemen Computer Company[7].

2.3.6 E-government Project

The Internet and the World Wide Web facilities have gained extensive acceptance in the developed world. People who use the net, exchange e-mail and do online banking and now they also want government services to be provided over the Net. In this way, Basu (2004) believes that e-government is more than just a government website on the Internet. It involves the automation or computerization of existing paper-based procedures that will prompt new styles of leadership, new ways of transacting business, and new ways of fully communicating with citizens and communities. Briefly, e-government refers to the delivery of information and services online through the Internet.

The government in the Republic of Yemen are moving much of their information-based services onto the Internet. Thus, the initial steps toward the e-Yemen project took place in Yemen and the government launched its e-government portal in 2002. The e-government strategy for the Republic of Yemen consists of several phases followed by subsequent implementation phases, which will cover the provision of the required infrastructure, as well as the development and implementation of the systems identified. The first phase that cost USD one million was completed by providing an information portal to the public and business with the latest information on various government policies, regulations, prerequisites, directions and such other details which can provide a large amount of service (Al-Kamali, 2002). The second phase of the e-government project was completed by upgrading the portal (Interaction

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[6] <http://www.yemensoft.net/>
[7] <www.yccnet.com >

Portal) with additional services to provide an interactive service such as web-call back, web chat, and call centre support. A transaction portal will be the third phase of the Interaction Portal which will be able to provide services that will allow users to transact on the web such as obtaining visas, bidding for tenders, registering new businesses and other such government services. The final stage will be achieved by integrating all back-end applications with the transaction portal so that transactions can be done seamlessly. The researcher believes that the success of e-government projects in Yemen may have many challenges as follows; (1) e-government is subjectively tied to the willingness of the political regime to become more transparent, (2) encouraging the use of ICT in government operations and facilities, (3) the dissemination of static information by electronic means, (4) working towards effective interaction with the public, citizens, and business via the Internet. Table 2.3 illustrates e-government ratings for Arab world countries whereby Yemen scored a ranking of 24.7 % rating based on the features that are available online at national government websites.

Table 2.3 E-Government Country Ratings for Arab World

Country	Ratings for Year 2004	Country	Ratings for Year 2004	Country	Ratings for Year 2004
Bahrain	33.0	Egypt	28.0	Jordan	29.7
Saudi Arabia	30.7	Morocco	25.6	Algeria	22.8
Kuwait	30.1	Iraq	34.0	Somalia	12.0
Oman	28.5	Libya	24.0	Eritrea	12.0
Qatar	28.3	Tunisia	23.2	Sudan	26.3
Yemen	24.5	Syria	20.0	philistine	N/A
Arab Emirates	24.0	Lebanon	29.0		

source: Darrell (2002) Global E-Government, 2002 <http://www.insidepolitics.org/egovt02int.html>

2.3.7 E-commerce in Yemen

The practice of E-Commerce is increasing worldwide as reported by Ainin and NoorIsmawati (2003). Along this line, the Yemeni government has been moving towards and thinking of e-commerce and e-government for a few years. This is an evident from a specialized conference held in Yemen ("E-commerce in Yemen", jointly Organized by the Ministry of Planning, the Ministry of Commerce & Industry and the Government of Yemen, Sana'a, May 27-31 1999). It is also obvious from the speech of the Minister of Communications who discussed issues on the Internet gateways project in a workshop organized on the 30 of December 2001. On the other hand, Alriyadh newspaper (2003) reported that in the year 2002 the Yemeni government allocated the amount of 60 million US dollars to be invested in establishing the basic necessary requirements of e-commerce and e-government. These are good steps and it means that Yemen is preparing to join the ranks of the e-commerce member countries. Another practical step taken by the government was the offering of e-rial, which is used for doing online payments for online financial transactions. Furthermore, some financial institutions in Yemen provide different types of advanced electronic payment channels. Overall, commercial and corporate institutions such as companies, banks, insurance and private business concerns are also using various means of ICT. Every day, more websites are being uploaded onto the web. Major business users primarily rely on computers for word processing, e-mail correspondence, accounting, and Internet browsing. Rates of using computers for maintaining databases and payroll facilities, for personal e-mail by employees, and for software application are growing.

2.3.8 E-Publications and Multi-Media

On-line versions of most local Yemeni journals, newspapers, and media are available online and can be easily browsed from the web. Many forms of entertainment and traditional Yemeni songs and news can be accessed free from many of the Yemen's websites such as the Yemen Radio portal <http://www.yemenradio.net/songs/songs.php> as well as others, which can be sold and downloaded. Yemeni web designers have produced various types of entertainment and educational and documentary links as well as some which have been produced in CDs format and video clips (e.g. <http://www.sanaacity.com>). Information stored in these links ranges from the history of the country to links that bring individuals to several other sights pertaining to Yemeni culture such as art, architecture, music, poetry and the theatre. A number of digital magazines are published every month in Yemen, IT periodicals already exist, and some are published in a web version such as the telecommunications and information technology magazine (<http://www.titmag.net.ye>). There are also some private websites designed to promote aspects of Yemen, notably <http://www.yemenweb.com>, <www.yemenmap.com>, and <http://yemennet.com/en/>.

With respect to political parties in Yemen, most of them have their own websites, which cover information about their history, political issues, press releases, election campaigns and some links to other government divisions or related community organizations. Furthermore, the house of parliament website has been available since 1999[8]. It provides information about its membership; philosophy, constitution, policy, political issues and the website also provides an option to send feedback.

Major government divisions and ministries have a presence on the web and their websites provide useful information pertaining to their activities. All government

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[8] <http://www.parliament.gov.ye >

publications such as republican resolutions, the constitution, laws, treaties, and conventions are easily obtained from the Internet (e.g. e-G[9], NIC[10]; WNC[11]; and COCA[12]). In addition, commercial information pertaining to investment law, investment opportunities, customs tariffs, customs procedures and tax is published online (e.g. giay[13]; AFZ[14]; <u>Yemen customs</u>; and TA[15]). Those are just examples because it will be beyond the scope of this study to trace all the Yemeni publication on the web. Some Yemeni websites offer facilities such as search engines that enable the user to search for required information (e.g. <<u>www.sanaacity.com</u>>).

2.4 Information Technology in the Arab World

Computerization in some Arab world countries took place in the early 1960s. In the early stages of introducing computing systems in the Arab world the major concern and focus of much effort was given to the Arabization of software products. These efforts resulted in developing an Arabic computer standardized code, which is (ASMO-449), established in 1985 under the Arab Standards and Metrology Organization (ASMO) and the Arabization Coordination Bureau, specialized organizations under the Arab League (Goodman and Green 1992). Some Arab software companies played a role in ICT diffusion for Arab users such as Sakhr Software Company (Founded in 1982) and Saudisoft[16] Co. Ltd (founded in 1983) among others, committed to being leading providers of information technology products to Arab users. The MA/2 products were developed by Saudisoft, which is considered as an Arabic compiler. In terms of building software capabilities, Goodman and Green (1992) noted that there is no computer

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[9] <http://www.yemen.gov.ye/egov/egov-arabic/index.html>
[10] <http://www.nic.gov.ye>
[11] <http://www.yemeni-women.org.ye/>
[12] the Central Organization for Control and Auditing
[13] General Investment Authority <http://www.giay.org/index.htm>
[14] Aden Free Zone <http://www.aden-freezone.com>
[15] Tax Authority <http://www.tax.gov.ye>
[16] <http://www.saudisoft.com>

hardware-manufacturing firm of great consequence in the Middle East countries. However, many of the countries in the region have good universities and send large numbers of people abroad for technical and business training. So far, Egypt seems to have the most extensive and successful record in software industries as well as some Arab countries such as Saudi Arabia, Kuwait and Tunisia. Sudan was an early serious user of computing, with two mainframes in 1965, one for data processing and one for scientific computation at the University of Khartoum (Goodman and Green, 1992). Recently, researchers have come up with an ICT index for the Arab World. Reasonably, this index is used in predicting ICT adoption among Arab world countries. Table 2.4 shows ICT Adoption among Arab world countries. The higher index score indicates more aggressive ICT adoption in that particular country. The index covers four ICT parameters: PC installed base and the number of Internet users, mobile and fixed phones lines.

Table 2.4 Arab World ICT Use Index for Year 2002-2003

Country	2002	2003
Unite Arab Emirates	1.40	1.50
State of Bahrain	1.15	1.26
State of Kuwait	0.95	1.17
State of Qatar	0.75	0.92
kingdom of Saudi Arabia	0.50	0.61
Republic of Lebanon	0.52	0.54
Kingdom of Jordan	0.46	0.49
State of Palestine	0.31	0.40
Republic of Tunisia	0.25	0.40
Sultanate of Oman	0.35	0.39
Kingdom of Morocco	0.27	0.30
Republic of Egypt	0.21	0.26
Republic of Syria	0.15	0.23
Libya	0.16	0.19
Republic of Algeria	0.10	0.15
Republic of Yemen	0.05	0.09
Republic of Iraq	0.04	0.06
Republic of Sudan	0.03	0.05
Total	0.22	0.27
Mean	.425	.500
source: Madar Research, (Accessed on 5-Feb-05) from this link <http://www.madarresearch.com/journal/estatdetail.aspx?estatid=7>		

Table 2.4 indicates that there are three countries leading ICT adoption for the years 2002 and 2003. In addition, it shows a steady improvement in the adoption in each single Arab state and the total index, which moved from 0.22 for the year 2002 to 0.27 for the year 2003.

2.4.1. Internet Users in the Arab World

The availability and use of information and communication technology has considerably increased in the Arab world in the last decade. This is also true of Yemen and other Middle East Countries (MEC), although they are still lagging behind compared to developed countries. Evidence drawn from an estimate made by the research unit of the Internet Al-Alam Al-Arabi (IAW)[17] magazine says, "The number of Internet users in the Arab world will soon reach one million". According to the magazine, the main difficulty was to arrive at the most realistic estimates when some of the ISPs tended to inflate the size of their clients to save face with the competition

2.4.2 Internet Banking Research in the Arab Region

Academic research on aspects pertaining to banking technology and IB in the Arab region is still very limited. Nevertheless, the literature reviewed in this context is growing and this study found some research studying the adoption aspects of some delivery channels and self-service banking in the sector of retail banking. Aladwani (2001) conducted a field study about the drivers, development challenges, and expectations of online banking from the perspectives of senior Kuwaiti IT managers, and potential customers. More recently, Al-Sabbagh and Molla (2004) tried to explore the adoption and the use of IB in the Sultanate of Oman. They also looked into the

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[17] <http://ditnet.co.ae/itnews/me/99>

obstacles to adoption and motivational factors in the Omani context. With respect to IB research at the organization level, Awamleh et al. (2003) studied the adoption of IB at the banks level in a case study of Jordan. The study was conducted based on a replicated model and researchers concluded that IB in Jordan is still in the introductory phase if compared to the USA. At the bank level, Jasimuddin (2001) described the presence of Saudi banks on the Web. The author focused on investigating the kind of information delivered by Saudi banks on their websites and the contents of these sites. In addition, some studies researched other types of banking technologies rather than IB. For instance, Al-Ashban and Burney (2001) investigated the adoption of Tele-banking technology by Saudi customers. Similarly, the study of El-Haddad & Almahmeed (1992) surveyed Kuwaiti consumer behaviour towards the acceptance of Automatic Teller Machines (ATMs). So far, published research on IB as well as in the field of adoption of other banking technologies in Arab countries located in Africa, Syria, Iraq, Lebanon and Yemen is not available yet.

2.4.3 Global IB Development and Growth

Bradley and Stewart (2003) say that the development of online banking has come about as part of the development in ICT that enabled banks' services to be offered via the Internet. Beck (2000) reported that in 1995, Becker[18] started Virtual Financial Services (VIFI) in Indianapolis, a firm that provides the software services that make IB possible. In 1996, he started the process of his First Internet Bank and by 1997, the bank received its charter. First IB in Indianapolis opened its on-line doors in February 1999. At the early stages of IB, Orenstein (1998) says that banks are aiming to build a relationship and destination with the customer, as well as establishing themselves as regularly updated, one-stop shopping sites by luring customers to explore their websites

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[18] David Becker is the First Internet Bank founder and president

by presenting a menu of financial services and other value-oriented offerings. Perumal and Shanmugam (2004) reported three types of IB that are being put into operation; Informational IB, which is at the basic level of IB, Communicational IB and Transactional IB.

2.4.4 IB in the Arab World[19]

The banking industry in the world has to face the new challenges of globalisation; deregulation, financial innovation, and the Internet revolution are forcing existing Arab-banking systems towards change and liberalizing their financial markets (Anonymous, 2003). IB history emerged in the 1990's. For this reason, to discuss the matter of IB everywhere does not go beyond exploring the current situation as a descriptive analysis of the last ten years of (1995 to 2005).

Roth (2001) says that online banking is popular among those in the Middle East who are using the Web. IB in the Arab world is still growing and it has been around in some countries of the Middle East region such as the United Arab Emirates since 1997 (Oliver, 2000). In addition, he says that each country in the Middle East has two or three banks with the most advanced banking technology. More precisely, Roth (2001) reported that 14 percent of the Internet users in Arab world countries where online banking is available have registered for it. Moreover, Roth (2001) believes that the Middle East Web could attract USA bankers and from his point of view, the adoption rates in some Arab countries match or exceed adoption rates in the USA. For instance, the adoption rate in Bahrain is 17 percent, the United Arab Emirates is 21 percent, and Kuwait is 29 percent. In Saudi Arabia alone, Moores & Zentelligence (2002) reported that less than 5 % of the population used on-line banking in the year 2002 and the

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[19] The Arab world is generally defined as the following countries: Yemen, Saudi Arabia, Oman, UAE, Qatar, Bahrain, Kuwait, Iraq, Syria, Jordan, Lebanon, non occupied part of former Palestine (West Bank and Gaza), Egypt, Sudan, Somalia, Eritrea, Libya, Tunis, Algeria, Morocco, and Mauritania.

critical mass of usage for IB is perceived to be 20 to 25 percent of the population. Moreover, they said that banks are witnessing from four to five times annual growth in the number of customers using IB. Banks offering IB services in Saudi Arabia at the time of the report were five, namely the Arab National Bank, National Commercial Bank, Saudi British Bank, Saudi American Bank, and Riyadh Bank. Roth (2001) examined the 100 largest Arab banks and found that 18 of them offer their customers online transaction services.

2.5 Yemen's Financial System

The study, in this section, attempts to review issues on the country's financial system. Several issues will be discussed such as the financial history, leaders of this industry in Yemen, an evaluation of the banking sector, and then the study will move on to evaluate the presence of this sector on the web to understand their utilization of the technology of the Internet.

2.5.1 History of Yemen's Financial System

As far back as 1839, there were no commercial banks in Yemen. In 1871, two companies started the first money exchange offices in Aden. These companies were known as the Captain Lock Tomas Agency who started bank Aden and an Indian (Gahwajee Dansha) company. Both offices dealt with the financial needs of foreign commercial and marine companies operating in the region. In 1894, the National Bank of India opened a branch in Aden, which dominated the financial market until 1950 (CBY, 1991).

Prior to 1962, Yemen was under the royal family of Beit Hameed Al-Deen who ruled the country for several decades. The financial system of the country was not yet

developed. One of the achievements of the Yemeni revolution, which took place on 26th September 1962, was expediting the implementation of a unified financial system for the administrative and economic sectors in the Yemen Arab Republic (Othman, 1982). The Yemen Bank for Reconstruction and Development (YBRD) was founded on 28th October 1962 as a public shareholding company with 51 % of its paid up capital owned by the government of Yemen and the remaining 49 % owned by the private sector. The YBRD Bank undertakes all governments banking activities as well as banking and financial services for Yemeni citizens. According to the IMF (2001) report, the Yemeni banking system by the year 2000 consisted of the Central Bank of Yemen and 13 commercial banks with total assets of Yrs 233 Billion (US$ 1.5 billion) equivalent to 22% of the GDP, and three specialized stated-owned development banks.

Since Yemen has a rich trading culture and has an excellent geographical location advantages, the development process demanded further expansion of the financial system to fit the requirements of the economic development process. Subsequently, several financial houses were established. In addition to the three types of financial banks, (Industrial Bank, Housing Credit Bank and Co-operative & Agricultural Credit Bank), the postal deposits system and foreign exchange traders are also available. Currently, Yemen has been moving towards the cyber financial system since the year 2002 when the government introduced the electronic payments gateway and the e-rial for the first time.

2.5.2 Leading Banking Industry in Yemen

The banking industry in Yemen has developed steadily over the last three decades. Currently, the modern banking system which exists in Yemen can provide the major kinds of services to its customers. The import and export trade, as well as development projects, are now financed either by local banks or through credit lines from affiliated

international banks (Rajab, 1985). Retailing banks in this study are classified into commercial banks, Islamic banks, and specialized banks. In addition, there are either local or foreign fully licensed banks by the monetary authority of Yemen, the Central Bank of Yemen (CBY). Fully licensed banks are authorized to offer the broadest range of financial services, including service delivery through the Internet. At the time of collecting study data, the total number of banks operating in Yemen was seventeen. A summary of the structure of leading banking system is shown in Table 2.5 as follows;

Table 2.5 Distribution of Banks Operated in Yemen

List of Banks	Date of Est.	Head Office	Capital** YR Million	Shareholders		Total Branches
Commercial Banks			31/12/2004	Shareholding	%	
Yemen Bank for Reconstruction and Development	1962	Sana'a	2000	Government Private	51 49	37
National Bank of Yemen	1969	Aden	2100	Government	100	34
United Bank Ltd.	1972	Sana'a	1250	Pakistan	100	2
Arab Bank	1972	Sana'a	2000	Jordan	100	7
Banque Indosuez	1975	Sana'a	1304	France	100	5
Yemen Commercial Bank	1993	Sana'a	1234	private	100	8
Yemen-Kuwait Bank for Trade and Investment	1979	Sana'a	1250	private	100	3
Inter.Bank of Yemen	1980	Sana'a	1250	Yemen private Saudi banks	75 25	5
Rafidain Bank	1982	Sana'a	60	Iraq	100	1
Al-Watani	1998	Sana'a	1482	Yemeni private	100	1
Yemen Gulf Bank	2001	Sana'a	1250	Yemeni private	100	1
Shamil Bank Of Yemen And Bahrain	2002	Sana'a	2000	Private	75 25	3
Islamic Banks:						
Islamic Bank for Finance and Investment	1995	Sana'a	1250	Yemeni private	100	1
Al Tadamon Islamic Bank	1996	Sana'a	3000	Yemeni private[2]	100	5
Saba Islamic Bank	1997	Sana'a	1974	Yemeni private[2]	100	1
Specialized Banks: Housing Credit Bank	1977	Sana'a	200	Government Yemeni private	70 30	2
Cooperative and Agricultural Credit Bank	1982	Sana'a	293	Government cooperatives	87 13	29
Industrial Bank of Yemen (liquidation)	1976	Sana'a	N/A	Government Yemeni private	70 30	1

Source : * CBY, Republic of Yemen: Statistical Appendix: 2005 International Monetary Fund
(IMF) reports and web sites
** Al-Samawy, 2005

There are 11 commercial banks, eight of which are local fully licensed banks, and three are foreign banks. In addition, there are two government-majority owned specialized banks (the Housing Credit Bank (HCB) and the Cooperative and Agricultural Bank (CACB). The other three are licensed to perform as Islamic banks. There are also three specialised state-controlled development banks: the Yemen Bank for Reconstruction and Development; Housing Credit Bank; and the Co-operative and Agricultural Credit Bank. The Yemeni banking sector is relatively small and several banks are under-capitalized. In terms of both assets and capital, Table 2.5 depicts that Tadamon International Islamic Bank, the National Bank of Yemen and the Yemen Bank dominate the banking sector in Yemen.

2.5.3 Evolution of the Banking Industry

The banking sector plays a vital role in the development process of Yemen. At the time of the study, the Yemeni banking sector consisted of 17 commercial banks, of which 12 are local banks and five non-local banks. It also includes seven specialized banks and financial institutions operating in the fields of investment and credit for industry, agriculture, housing and rural development. There are 181 branches affiliated to these banks and institutions. The monetary policy is controlled by the Central Bank of Yemen (CBY). The CBY is an independent institution established in 1971, which merged with the Bank of Yemen in 1991. According to the CBY[20], the other main functions of the Central Bank of Yemen are to be in charge of currency issue, the management of Official Reserves, the supervision of the country's banking sector and as banker to the Government. Prior to 1999, the capability of customers in Yemen to utilize banking services was discussed by Arab business forum[21], which reported that Yemen is still largely a cash-based economy, with only around 2.7 % of the population

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[20] For further information on CBY visit <http://www.centralbank.gov.ye/>
[21] <http://www.go-east-forum.com/docs/countries_overview/yemen.htm>

having a bank account. This leads us to believe that a wide section of the population in Yemen refrains from dealing with the banking sector. On the other hand, the performance of the banking system in Yemen, according to the IMF (1999) report, shows that the banking system in Yemen suffers from some problems such as a large volume of non-performing loans, inadequate loan provisioning, low bank capitalization, and weak enforcement of prudential standards. Therefore, Yemen's prime minister noted the urgent need to reform and re-structure the banking sector in Yemen (Ramat-Gan, 2004). On this issue, the government paid attention which resulted in the fourth conference for executives under the motto "Banking Business in Yemen," (Reality-Problems- Horizons), on Sunday, November 28, 1999, in Aden (Yementimes, 1999).

2.5.4 Developing Banking System in Yemen

The reform programme of the banking system in Yemen, which was recommended by the fourth conference, took place (IMF, 1999). Along this line, the governor of the Central Bank said, "The Yemen banking system has witnessed positive changes as the Central Bank of Yemen has taken many measures to improve the performance of the sector" (Yemen Observer, 2005; Al-Samawy, 2005). In order to cope with new global financial developments, the Central Bank has decided banks operating in Yemen must raise their capital to YR 6 billion. as well as, referring the draft law of financial leasing submitted to parliament for approval. Initially, the government's reform programme was a good idea but other aspects that can contribute to the improvement of the banking system in Yemen were not discussed in the programme. For instance, the government's contribution in activating the use of banking services by other individuals and increasing the rate of the population of bank account holders.

The study believes that the reasons for those individuals who avoid dealing with the banking sector to serve their financial transaction needs could be somehow related to the range of the services provided by the banks. For instance, the reason could be because banks do not offer; (1) adequate instruments based on the information sharing needed by customers, (2) a transactional website to make the financial service of banks easy to use by remote customers, (3) more utility like conducting IB at reasonable cost and in a short time. Thus, part of the responsibility of developing banks' activities and operations falls upon the banks themselves, represented in the need to produce adequate electronic channels of service delivery to attract more users to banking and financial services, which would, in turn, help to reduce the cost of money transactions and increase the rate of bank account holders in society. Al-Samawy (2005) reported that the users of bank services are not more than 3 percent of the total population. In addition, the government should conduct its financial transactions through the banking system instead of depending on the treasury. In other words, government should encourage the payment of dues and employees' wages in the country through the banks (banking system). This step would encourage and attract more users to use banking financial services.

Recently, the banking system in Yemen has been providing a wide range of financial services to its customers, for instance, customers' services whereby they provide, time deposits, call accounts, saving accounts, current accounts, inward and outward transfers, SWIFT transfers, bankers' drafts, travelers' cheques, and currency exchange. As well as providing commercial services such as irrevocable letters of credit, bills of exchange, letters of guarantee, bills of collection all for trade purposes. In addition, they provide some credit facilities services like overdrafts, loans, advances and project finance, and syndicated loans. The use of card payment is limited but growing.

Both MasterCard and Visa are offered by domestic and foreign banks. Moreover, some banks have started their online banking services such as ATM, IB, and SMS banking.

2.6 Utilization of Internet Technology by Yemeni Banking Sector

The Internet in Yemen offers the banking sector a new channel for delivering services to their customers, and extending their presence beyond the country's borders. Al-Samawy (2005) reported that the CBY is the biggest user of computers in Yemen with more than 1000 PCs and 100 Internet lines used by the bank's staff. In addition, the CBY is connected to its branches and the Ministry of Finance online in order to get daily data on expenditure and returns. Surveying the banking financial services demonstrated by existing web sites of banks, which operate in Yemen as on Saturday, 12 November 2005 a variety of functions, can be performed ranging from basic information provision to full transactional capability. Since there is no previous study on how the banking sector in Yemen utilizes Internet technology, this study divided this section into two parts. The first part will discuss the theoretical aspect of web evaluation techniques and models. The analytical part (Part 2) will be dealt with in Chapter 6 (refer to section 6.8 pages 352-359) whereas the analysis of the existing web sites of banks in Yemen will be performed based on those several models' guidelines. This study has classified the Web evaluation techniques into three categories as follows:

(1) Utilization,

(2) Websites Interactivity and

(3) Websites contents.

These three categories will be studied from the theoretical perspective by elaborating each category and related model components. The information systems (IS) literature provides useful tools for the techniques being used to evaluate banking presence via the World Wide Web (Web). Waite and Harrison (2002) reported that financial service

websites can perform a variety of functions ranging from basic information provision to full transactional capability. Thus, development in IB depends on the utilization of the Internet and the availability of a bank's website (Bradley and Stewart, 2003). Moreover, the website features and design as reported by Waite and Harrison (2002) are most likely to attract and retain target customers. In the case of studying IB issues, the study was motivated to look into how the banks introduce themselves on the Web.

Orlikowski & Baroudi (1991) reported that, "Much of the information systems research being conducted ...for example implementation studies ...are concerned with how information technology is successfully introduced into organizations". (Page 6)

In this connection, evaluating banks' websites begins by investigating the initial steps those banks take to get involved in a digital environment by having a website (Rao et al., 2003). There are four functions of E-commerce available to organizations to benefit from the Web, which are; (1) informational presence; (2) portals; (3) transaction integration; and (4) enterprise integration. At the presence level, the website provides information and primarily one-way communication to any potential user, while the portals level is viewed as the introduction of two-way communication (Rao et al., 2003). These three models evaluate the banking presences based on different bases. For instance, Southard and Siau (2004) looked into the level of functionality, while Diniz (1998) looked into the level of interactivity on three levels of functions. Jasimuddin (2001) looked into the contents of the website based on certain features. Similarly, the tailored Hersey's Model looked into web elements based on the following seven components; Information, legal statement, order, ease of use, aesthetic effects, performance among others. The study will explain these models in the following sections.

2.6.1 Web Utilization Model

One of the methods recently used to evaluate banks' websites is that used by Southard and Siau (2004). They evaluated banks' websites based on the bank's website functions offered to users. For instance, Achour and Sedrine (2005) reported that some banks limit their presence on the Web to providing their customers with an informational website. According to Diniz (1998), other banks extend their presence on the Web to improve customer relationships with the bank. Some authors such as Diniz (1998), Southard & Siau (2004) and Chung & Paynter (2002) pointed out that offering the banks' customers transactional functions is one of the Web presences utilizations that banks can exploit. Table 2.6 depicts Web's level of Utilization Model

Table 2.6 Web's Utilization Model

Level (0) Informational	**Level (1)Administrative**	**Level (2) Transactional**
1. General Bank Info. And History 2. Financial Education Information 3. Employment Information 4. Interest Rate Quotes 5. Financial Calculators	6. Account Info. Access 7. Applications for Services 8. Personal Finance Software Applications	9. Account Transfer Capabilities 10. Bill-pay Services 11. Corporate Services 12. Online Insurance Services 13. Online Brokerage Services 14. Online Trust Services
Total Points achieved	**Total Points achieved**	**Total Points achieved**
Level (3) Portal	**Level (4) Others**	
15. Links to Financial Info. 16. Links to Community Info. 17. Links to Local Businesses 18. Links to Non-local Businesses	19. Wireless Capabilities 20. Search Function	
Total Points achieved	**Total Points achieved**	
Total Scores: Level (0) + Level (1)+ Level (2)+ Level (3)+ Level (4)=20		

Source: Southard & Siau (2004)

Southard and Siau (2004) pointed out that there are five separate levels of web information provision, which can be identified on a bank's site. Starting with the basic level, level (0) in which the Internet presence of the bank on the web merely provides general information about the bank and its financial services, with no interaction between the institution and the customer. Administration level (1) in which the bank's Internet presence provides information about the bank and its financial services, allowing interaction between the bank and the customer through e-mail links. At this level, the customer can get the monthly balance statement via e-mail or by downloading

it from the bank's website. Level (2) is the transactional stage that allows the bank's account holder to interact with the bank electronically through the bank's website and receive information, such as an electronic loan applications, pay bills and account transaction capabilities. It also, offers the customer the opportunity to share information, such as account balances or transaction details. Then there is the portal level (3) in which the bank's presence exceeds the transactional level to provide links to financial, community, local and non-local businesses information. The highest level (4) allows the customer to process information wirelessly as well as enjoy the use of search engine facilities.

Southard and Siau (2004) merely sought to understand the nature of Web functions and to what level the bank utilized Internet facilities when they publish their website. In this way, this study has inferred that banks could utilize internet technology through their websites for multiple purposes and appear in different forms. Banks can use the Web technology to provide information to users, or to assist the bank in its administrative work. At the advanced levels, banks can also use the Web to enable customers to do the transactions they need from the bank. In addition, banks can utilize the website to function as a portal that provides customers the linkages to other business in a two-way of interaction and community information, or to enable the customer to use bank facilities wirelessly.

2.6.2 Banks' Website level Using the Interactivity Model

Earlier in 1998, Diniz had used a different instrument to evaluate US banks' websites. Diniz's (1998) method attempted to investigate the functionality of websites based on three levels of interactivity. Diniz (1998)'s point of view is that banks use the Web as an information delivery tool, to enable transactions or to improve relationships with customers. In addition, the bank's level of usage of the Web based on those three

functions is also divided into three levels, which are; basic, intermediate and advanced level.

Using the interactivity approach is very useful in evaluating banks' websites as well as being easier to produce a clear evaluation to the bank's usage of Web technology. Guru et al. (2003) found that the interactivity approach is useful to evaluate an Islamic bank's websites regarding IB. Very recently, Awamleh and Fernandes (2005) used the interactivity approach to investigate web based banks in the United Arab Emirates. Table 2.7 indicates elements in both function levels and interactivity levels as follows;

Table 2.7 Website Interactivity Model

Function	Level of Interactivity		
	Basic	**Intermediate**	**Advanced**
Informational	Electronic Brochures, Means of Contact, Special Events	Search Engines, Reports Download, Economic Information	Subscriptions, Interface Customization, Advertisements
Transactional	Opening Accounts, Check Book Requests Card Requests	Balance Enquiry, Bill Payments, Funds Transfer	Electronic cash, Electronic Signature, Electronic Checks
Improve Customer relationship	Electronic Mail, Suggestions Forms or (Complaints Forms) Feedback Forms	Advising Tools, What–if Calculations, Calculators	Videoconferences, Service Developments

Diniz (1998)'s Bank Web Site Evaluation Model

2.6.3 Websites' Contents Models

With regard to the bank websites' contents, there are two models which can assist us to understand and compare banks' presence on the Internet. Both of these models looked into the evaluation of banks' website contents. The first method was introduced by Jasimuddin in 2001 which was used for evaluating banking websites based on classified contents. This method was developed in 2001 and used by Jasimuddin (2001) to investigate Saudi Banks' websites based on 19 features that can explain to what extent banks utilized web technology as shown in Table 2.8.

Table 2.8 Websites' Contents: Jasimuddin's Model

Web Sites Contents	Scores
1. Internet banking	
2. Financial Market	
3. Retail banking	
4. Corporate Banking	
5. Investment Services	
6. Treasury services	
7. About the bank	
8. Financial Outlook	
9. Hot links	
10. ATM/Branches/Find Us	
11. Job/Human resources	
12. Publications	
13. Press Releases/ News	
14. Contact and email	
15. Your feedback	
16. Site map	
17. Site search	
18. On line form	
19. Rates	
Total Scores	**19**

Source: Jasimuddin, (2001)

The second method was introduced by Chung and Paynter (2002) who used another methodology to evaluate banks' websites, which is based on Hersey's modified model. Hersey's original technique was designed to evaluate websites of the insurance industry; therefore, it is not appropriate for evaluating banks' websites as mentioned by Chung and Paynter (2002). In a study aimed to evaluate seven NZ banks regarding their IB websites, Chung and Paynter (2002) used some of the applicable components that appeared in Hersey's model. Some of the components were removed (e.g. negotiation items) and some components were added or modified to make them applicable to the banking sector. (Tailored Hersey's Model). Recently, this model was utilized by Ainin et al. (2005) to evaluate Malaysian banks' websites. According to them, the website can be used to study the effectiveness, functionalities and Internet strategy of these banks. In Table 2.9, the study presents the components as well as their elements used to evaluate New Zealand's bank's websites as follows:

Table 2.9 Websites' Contents: Hersey's Model

Components	Elements
Information	Company Information Customer Information Product Information
Legal Statement	Legal disclaimer Privacy policy Security policy
Order	Check account balance Transfer funds between accounts Check bank statement Purchase bank product (e.g. open an account) Download account information Make payment Order cheque or deposit book Request loan changes Cheque reconciliation Make IRD payment Change password After sales services (e.g. email enquires)
Ease of use	Frequent Asked Question (FAQ) Tutorial/Demonstration Search function Help function Navigation menu/buttons
Aesthetic effects	Graphics Animations
Performance	Update frequency (daily) Response time (within 5 seconds) Download time (within 10 seconds) Technical problems
Others	Innovation features Competitions or rewards Community contribution

Source: Chung and Paynter (2002)

2.7 Banking Self Service Based Technology in Yemen

Yemeni banks face stiff competition from foreign banks operating in the country such as Arab bank as well as those looking to enter the Yemeni market once restrictions barring their entry are removed by the Internet and other mass media communications. On the other hand, banks that are currently operating in Yemen will have to increase their cost effectiveness. In 2004, the Central Bank of Yemen issued decrees related to reforming the banking system to improve its performance in Yemen. Decree No 60548 issued on 7/8/2004 encourages all banks to improve their financial services that are based on the electronic devices. Furthermore, they were requested to offer their existing

and potential customers more advantages and value-added services, in order to maintain their share of the market (CBY, 2004). Many banks have started to offer more services, which are "Self Service Based Technology". For instance, by the year 2004, ATM services were provided by six banks and covered the major cities in Yemen. Some banks offered SMS banking, phone banking and IB, among other services, to both lower operational costs and retain existing customers or attract new ones (e.g. YGB, YCB, & IBY). Some banks offer customers lower rates and charges on their IB services, in order to encourage them to migrate from traditional to online channels. However, the return on investment has not yet proved positive for these banks, indicating that traditional "brick and mortar" banking will continue to serve as the banks' core banking channel in Yemen for at least the next few years. Moreover, many financial institutions view the introduction of new delivery channels, such as the telephone and IB, as an opportunity for differentiating themselves in the market (Thornton and White, 2001).

2.7.1 Digital Payment in Yemen

Daniel (1999) reported that online banking, as the newest delivery channel offered by the retail banks in many developed countries, received wide agreement that this channel will have a significant impact on the market. Prior to 2000, the online channel of banking offered in Yemen was ATM services then IB and telephone banking, which was first introduced in the Yemen in 2002. The electronic funds transfers at point of sale (EFTPOS) terminals are growing and have a presence as a payment device used by individuals in Yemen. Recently, the government of Yemen introduced the electronic rial (e-rial) as a payment tool used commonly to pay for utility bills. The e-rial similarly functioned as a debit card. Out of the 17 banks operating in the Yemen, there are four banks offering their clients some banking services electronically through different

devices such as ATM, Internet, phone and mobile SMS. One of these banks is foreign and three are local. All of these national and international banks have headquarters in the capital city of Sana'a. These are the Yemen Gulf Bank (YGB), the International Bank of Yemen (IBY), Watani Bank (WB), an. the Arab Bank (AB). The four banks represent 68 percent of Sana'a-based banks offering e-banking services, an impressive figure, when compared to the overall penetration of e-banking services in Yemen, as well as internationally. The other two national banks, the Yemen Bank for Reconstruction and Development (YBRD), and Tadhamon International Islamic Bank (TIB), have a presence on the Web at the informational level.

Although the foreign banks operating in the Yemen offer banking services electronically through their international branches, the researchers observed that there are only three banks which extend their electronic services at the transactional level to their customers in Yemen, which are the Yemen Gulf Bank (YGB), the Arab Bank and also recently Yemen Commercial Bank (YCB). Moreover, one point that can be mentioned about the AB is that it was the first bank to introduce the ATM service to Yemeni customers (in five large cities), as well as being the leader in the credit card business and offering phone banking (AMEinfo, 2002). IB services offered are quite similar to those provided by international and foreign banks although there are no e-banking standards governing the provision of services, nor fully advanced technology in use, in the country. The main services include the transfer of funds between accounts, the payment of bills and account, electronic statements and balance inquiries. Variations among bank services include such services as the transfer of funds to third party bank accounts, the payment of additional types of bills such as usual utility bills like telephone bills electricity bills, water bills and credit card bills, the opening of new accounts, the purchase of deposit certificates and the redemption of reward points (AMEinfo, 2002). Table 2.10 shows E-Banking offered by banks in Yemen.

Table 2.10 Commercial Banks Offering E-Banking in Yemen

Bank Name	Website	level of e-banking	phone banking	ATMs	Retail IB	Corporate IB
YGB	<www.yg-bank.com>	Transactional Informational	Yes	Yes	Yes	Yes
IBY	<www.ibyemen.com>	Transactional Informational	Yes	Yes	Yes	Yes
WB	<www.watanibank.com.ye>	Transactional Informational	Yes	Yes	Yes	Yes
AB	<www.arabank.com>	Transactional Informational	Yes	Yes	Yes	Yes
CAIB	<www.calyon.com>	Transactional* Informational	Yes	N/A	Yes	Yes
UBL	<www.ubl.com.pk>	Transactional* Informational	N/A	N/A	Yes	Yes
YBRD	<www.ybrd.com.ye>	Informational	N/A	N/A	Yes	Yes
TIB	<www.tib.com.ye>	Informational	N/A	Yes	Yes	Yes
YCB	<www.ycbank.com>	Transactiona Informational	N/A	N/A	Yes	Yes
SBYB	<www.sbyb.com>	Informational	N/A	Yes	Yes	Yes
NBY	<www.nbyemen.com>	Informational	N/A	N/A	Yes	Yes
* Services in this level not available to local customers **** Abbreviations used is ; (YGB)Yemen Gulf Bank, (IBY) International Bank of Yemen, (WB) Watani Bank, (YBRD)Yemen Bank for Reconstruction and Development, (AB) Arab Bank, (CAIB) Credit Agricole Indosuez Bank, (UBL) United Bank Limited, Tadhamon International Islamic Bank (TIB), Yemen Commercial Bank (YCB) , Shamil Bahrain Bank (sbyb), national bank of yemen (NBY)						

Source: Researcher's design (2005) Date :7-Feb-2005)

Other services include e-mail access, requests for cheque books and credit cards, outward remittances, and the setting-up and cancellation of standing instructions. Customers can also customize the e-banking services to suit their particular banking needs. However, only the Arab bank offers customers a demo, despite the relative novelty of the service in Yemen. The majority of banks offering online banking provide an integrated "click-and-mortar" service. Online banking serves as a supplement to the banks' existing offline channels, including bank branches, ATMs and telephone banking.

2.7.2 Mobile Banking and Tele-Banking

According to AMEinfo (2002), the Arab Bank (AB) was the first bank to allow customers to carry out a number of transactions using phones such as checking account balances, transferring funds, and ordering cheque books. The Yemen Gulf Bank, the

International Bank of Yemen IBY[22] and the Watani Bank (WB) offer two types of Tele-Banking facilities, which enable customers to inquire about any banking information around the clock in two languages, Arabic and English, by just dialling (the specific given number). All they provide is two types of phone banking services, tele-banking services made available to the public and the second service of tele-banking reserved for bank users only[23] (customers access code needed).

In addition, a number of Yemeni banks provide interactive SMS-based mobile phone banking. Those are the Yemen Gulf Bank (YGB) SMS services , the Yemeni Commercial Bank (YCB), the International Bank of Yemen (IBY) SMS services which provide three types of SMS: 1) Event Driven EDSMS features balancing check, limit balance, payment due, transaction completion, account modification. 2). Time Driven TDSMS, features notification of account balance, the last 5 transactions, currency rates stock rates at configured time due to customer desire. 3) Pull Service PSSMS in which the user can check his balance by sending SMS to the YGB server, make cheque book requests, find last transactions and foreign exchange rates. Given the high penetration of mobile phones in Yemen, this service can be expected to make an impression, supported by the increasing mobility of the larger part of banking customers in Yemen, and in major cities in particular. Similarly, fixed line penetration, is a major driver for Tele-banking services in Yemen. Some banks in Yemen provide Tele-banking services, supported by interactive Voice Response Systems or customer service representatives. For instance, the International Bank of Yemen (IBY) offers two types of online services via the phone. One of these online services is made available only for IBY customers, whereby an access code is provided to customers to log in. The IBY's customers are offered accessibility to the following e-banking services: check up-to-the-minute account balances, check the last five transactions, and request a statement of account,

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[22] For further details on IBY Tele-banking visit <http://www.ibyemen.com/en/phone_banking.php>
[23] For further details on the whole range of Tele-banking visit <http://www.yg-bank.com/tele_banking.html>

transfer funds from one account to another, pay bill, change access code, change pin, order cheque books and ATM services. The second type of online banking as a general service made available for the public allows them to verify foreign currency exchange rates, inquire about the IBY's interest rates, and inquire about Western Union services.

2.7.3 ATM

According to the YCB annual report 2004, the Central Bank instructed and motivated local and foreign banks to move towards an automated system, as well as develop their electronic financial services. Many banks in Yemen provide ATM services and have spread this service to the major capital cities in Yemen. Currently, there is no updated data on the actual numbers of ATM machines in Yemen. In the year 2004, the Central Bank of Yemen reported that the total number of ATM machines was 60 units provided by six foreign and local banks (CBY, 2004). More recently, according to the IBY's General Manager and the CBY's annual reports for the year 2004 it was revealed that the IBY has 30 ATMs nationwide situated in many of the country's governorates and has plans to increase the number to 100 by end of year 2005[24].

2.7.4 Internet Banking in Yemen

IB has made real headway in Yemen; however, its adoption rate, user acceptance, and utilization by Yemeni Internet users are still unknown because no such research on that particular area has been done yet. In general, the IMF (2003) reported that electronic banking is still in its early stages of development in Yemen. Most national and foreign banks in Yemen, whether they offer online banking services or not, have established websites that provide information on their products and services. There are

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[24] Peter Willems Yemen Times Staff "1st credit card issued in Yemen Issue: (815), Volume 13 , From 10 February 2005 to 13 February 2005

four banks found with no website representation, as of yet, which are the Saba Islamic Bank, Al-Rafidayn Bank, the Yemen Kuwait Bank for Trade and Investment, and the Islamic Bank for Development. Their sites are down, under construction or not available. Bank websites range from the basic to the complex. Those offering e-banking services have highly developed websites offering demos, information, interactive features and tools to facilitate customer banking.

Some banking services on the Internet are still not available in Yemen. However, banks such as the Yemen Bank for Reconstruction and Development (YBRD) and Tadhamon International Islamic Bank (TIB) have set up their websites on the Internet recently, but the services are limited to product information and rate inquiries. Banks in the Republic of Yemen are aware of the business opportunities created by the Internet, but most of them are in a wait-and-see mode and only a few of them are seriously considering it. Few Yemeni banks are now offering IB, while most other banks are planning or in the process of implementing online services.

Some of the leading Yemeni banks have realized the reality of online banking recently and started to believe in it to help them grab a bigger share of the market. The initiator was the Yemen Gulf Bank (YGB), which has become the first bank in Yemen to offer Internet and mobile phone banking. They started offering IB services enabling for example, customers to check their balances, order cheques, transfer money from one account to another, and pay bills. In general, the IB in Yemen is driven by three national banks. The banks' names and their websites are listed below:

1- Yemen Gulf Bank (YGB) <http://www.yg-bank.com/index.html>,

2- Yemeni Commercial Bank (YCB) (<http://www.ycb.com.ye/ycben/index.htm>)

3- IBY <http://www.ibyemen.com/en/english.php>.

Most international banks in Yemen offered IB. Furthermore, IB specifically was pursued energetically by one of the national banks, which is the Yemen-Gulf Bank,

while two other banks known as the International Bank of Yemen (IBY) and Watani Bank (WB) are planning to go for complete IB services soon. It is also provided by some international banks such as the Arab Bank, Credit Agricole Indosuez Bank and the United Bank Limited. Bankers in Yemen are also very interested in further advancement in this field. In connection with this, a symposium Organized by the ABF[25] & YBA[26] on March 12, 2003 in Sana'a resulted in great emphasis being put on developing IB, mobile banking, Tele banking and other electronic banking services in Yemen (Al-Mayasi, 2003). All seventeen banks in Yemen took part in this symposium. According to Yementimes (2002), the Yemen-Gulf Bank conducted a seminar in September 2002 which concentrated on electronic banking and other services that had been introduced in Yemen for the first time by banks. The bank's Chairman, Mr. Al-Zubairi, revealed that the Yemen-Gulf bank is the leading pioneer in Yemen in online banking and the leading bank in a range of distinguished services not available in any other bank in Yemen. Besides, he said, "This study has a long-term plan to provide advanced technology in our services". Generally speaking, it is believed that IB at the national level is very necessary as it will support e-Government efforts in establishing transaction channels and gateways among government departments, clients, and financial organizations in order to enable online payment for such services as taxes, fees and other government charges. The IB services available in Yemen are presented in Table 2.11. The classification of these services is discussed based on Perumal & Shanmugam's (2004) and Southard & Siau's (2004) methods in identifying IB types.

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[25] Arab Bank Federation
[26] Yemeni Banks Association

Table 2.11 Services Available on Internet Banking in Yemen

	Information	Administrative	Transaction	Other
Type of Services	Bank profile History	Account balance	Card payments	Open accounts
	Financial products	Financial statement	Cash withdrawal	Live date
	Exchange rate	Cheque Book Request	Pay utility bills	Financial advice
	Consultation	Change Pin Code	ATM	Links To UCW
	New services and announcements	SMS Banking using GSM mobile	Account-Account Transfer	Personal finance management
	FAQ	Application forms	Cheque Stop	e-rial
	Bank's News	ATM Card Stop		
	e-mail communication			
Source: Chang (2004) :Yemen & Gulf Bank 2005, YCB & IBY : Ministry of telecommunication (**Yemen**)				

Generally speaking, IB is the most recent delivery channel for banks in Yemen, which serve in the retail banking services. Banks in Yemen have started thinking of a greater presence on the Web and they believe that using information systems, telecommunication and technologies, customers can reach out to the bank and get not only general information about its services but also the opportunity to perform interactive retail banking transactions. Online banking refers to several types of services through which bank customers can request information and carry out most retail banking services such as balance reporting, inter-account transfers, bill-payment, among others, via a telecommunications network without leaving their homes or organizations.

2.7.5 Future of Internet Banking

With the success of online services and the exponential growth of Internet usage, new communication channels of the banking industry have emerged. Perumal & Shanmugam (2004) say that the number of customers banking online is expected to increase significantly over the next few years in both industrial nations and developing countries. Moreover, Watson (1998) reported that experts believe IB will become a

major alternative to bricks and mortar banks. Empirical evidence which enhances this belief is the concern for the operational cost, Anonymous[2] (1996) reports that the cost of creating a functional IB site is between $1 million and $2 million compared with the $1.5 million to $2 million required to set up one traditional branch and the $300-350,000 a year required to operate it.

According to Beck (2000), the founder of IB, IB is the new banking of the 21st century whereas it has been noted that as user acceptance of IB has been stronger than expected. Moreover, all the banking consultants are advising their clients to get on the Net (Beck, 2000). According to Deloitte[27] Touche Tohmatsu (1998), staggering IB growth is predicted. The Internet use by financial services customers would grow 449% in two years time. Also 54% of all customer transactions could take place on the Internet. From the retail and financial services perspective, the growing ability to reach private individuals with online services has opened up new opportunities for sales and marketing at a low cost. From the banks' perspective, inessential cost required to serve ten million customers by the Internet may cost as little as $1-2 million, a traditional branch network could cost as much as $900 million (Anonymous[2], 1996).

These developments also bring a new challenge. Firstly, the bank wishes to offer its complete range of services at any time and in any place. Secondly, the starting-point for online business activities is the level of trust, which already exists in the bank's relationship with its customers. Thirdly, it is crucial for both parties that the accustomed level of security and reliability is maintained in any future online contact. Therefore, online banking solutions that will guarantee a good environment for IB to take place are required.

Delivery of financial services over the Internet is, at least in theory, a potential killer of bureaucratic procedure. Customers benefit from convenience, access to

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[27] Deloite Touche Tohmatsu is an accounting and consulting firm.

valuable information such as stock prices, and a wealth of value-added services. Banks benefit from a cost reduction per transaction that is a fraction of the cost of more traditional delivery channels (Barbesino et al., 2005).

Based on the UNCAT Report (2001) "On the Internet it does not matter if you are big or small" and "Internet kills monopolies". The adoption of IB by the selected business sector is important to their ongoing survival as;

- IB improves the adopter's ability to compete with larger organizations.

- IB enables them to operate on an international scale.

- IB provides a cost-effective way for the banking industry to market their business services.

- IB Improves communications, gathers information, and identifies potential business partners.

- Internet delivered e-services are increasingly being made available to consumers.

Not surprisingly, therefore, many banks have launched IB services in the Republic of Yemen. The efforts in this area are encouraging and those banks which still have not provided IB should hurry up and join. There are many reasons that will facilitate and motivate the Yemeni banking industry to go ahead with online banking. These reasons from the perspective of the banking and finance industry are that they have long been a major user of Electronic Data Interchange (EDI), intranets and extranets ensuring electronic communications among dealers. The advent of the EC, however, has also spurred households to make use of electronic banking and online trading of financial securities (UNCAT, 2001).

2.7.6 Government National Payment Gateway

Electronic payment methods expedite payment online and reduce processing costs according to Turban et al. (2004). In connection with the existing efforts of the Yemeni government IT strategy and the vision of the (2001-20025) for the post services development plan leading towards electronic exchange and online transaction, the government realizes the need to deal with the information revolution taking place all over the world. The e-rial, e-post and e-stamps services have been introduced to the public as virtual currency allows users to do micro payment for any financial debts of the public services such as phone, electricity, and water bills, money transfer, shopping and other service fees. In addition, they are an intermediate system between the user and the service-oriented establishments. The E-rial payment system is categorized as a credit card gateway, which is defined according to Turban et al. (2004, p.497) as "an online connection that ties a merchant's systems to the back-end processing systems of the credit card issuer". The E-rail is defined by the issuer as a "numerical wallet and a virtual account operated by an electronic card to be bought from post offices accompanied by a secret and personal code number". Using e-rial will bring some advantages to vendors, users as well as the government. E-rial will liberate users from using paper money, routine and the administrative complexities and the traditional money transfer between the distant cities of Yemen. In addition, Yementimes (2002) reported that e-rial usage would result in savings on expenses spent on labour and would provide a more efficient, convenient, and reliable payment method. A number of establishments that prefer the usage of technologically advanced payment methods online are currently using this service.

2.7.7 The Development and the Potential of Internet Banking

The potential of IB for a developing country like Yemen can be drawn from the rapid penetration of self-service-based technologies in the banking industry within the past two decades. This phenomenon provided a sound base for the bankers' efforts to bring technology to their competitive strategic plans in the banking industry. Banks in developed countries especially in the US, according to Sarel and Marmorstein (2003) have invested heavily in developing online capabilities, in the expectation of migrating customers to the new cheaper delivery system. Retail banks have long been involved in introducing new distribution channels such as ATM, telephone banking, voice response units (VRUs), personal computer banking (PC banking) and, more recently, Internet Banking (IB). The primary goal for the new channels, according to Sarel and Marmorstein (2003), has always been to lower the marginal cost per transaction.

CHAPTER SUMMARY

In this chapter, an overview of ICT and the financial system in Yemen were provided. Remarkably, the government of Yemen is prioritizing the development and use of ICT. Thus, Yemen's MTIT is leading the supervised diffusion of technology in Yemen, and is responsible for telecommunications development. The leading banking industry is classified into commercial, Islamic, and specialized banks. In terms of both assets and capital, the TIB, the NBY and the YB Bank dominate the banking sector in Yemen. Moreover, some banks have started their online banking services such as ATM, IB, and SMS banking. Some banks in Yemen provide Tele-banking services, supported by interactive Voice Response Systems or customer service representatives. Most international banks in Yemen offer IB and some of the commercial banks are offering IB such as YGB and YCB. Some IB services on the Internet are still not available in Yemen. The next chapter will provide the literature review related to this study.

CHAPTER THREE: LITERATURE REVIEW

3.1 Introduction to Internet Banking

Literature in quantitative research, according to Cronk and Fitzgerald (2002), helps researcher in identifying past research, find out gaps in understanding, derive theoretical and conceptual frameworks, guide research in the interpretation of the findings, and explain important variables and suggest relationships between them. This chapter presents the literature review related to the concept and the construct used in the research framework.

This chapter consists of four major sections. The first section introduces the definition, context and providers of Internet banking, while the second section address the issue related to the key dependent variable of behavioural intention to use IB. The third section discusses the factors influencing intention to use IB. It also introduces four adoption theories which provide the theoretical factors required in this study, while the last three sub-sections attempt to address several types of factors influencing intention to use IB. In the fourth section, the researcher discusses the characteristics of IB adopters and the importance of those characteristics in the adoption research.

3.1.1 Definition of Internet Banking (IB)

Internet Banking (IB) at the basic level, according to Sathye (1999, p.324), is the "setting up of a Web page by a bank to give information about its product and services", while Pikkarainen et al. (2004, p.224) go beyond the Web page when they define IB as an "Internet portal, through which customers can use different kinds of banking services". Karjaluoto et al. (2002, p.261)'s study differentiated the terms Internet banking and electronic banking. They said that "IB means excluding non-Internet

electronic delivery channels" while electronic banking "is referring to an upper construct including also telephone banking, WAP-banking as well as iNet-television banking". Other scholars, Liao et al. (1999) point out that IB is defined as the conducting of banking transactions through the Internet without any proprietary software having to be installed for accessing the banking service over the Internet on the user's computer. Internet Banking (IB) at its advanced level defined by Sathye (1999, p.324) as "to involve provision of banking facilities such as accessing accounts, funds transfer, and buying financial products or services online". More precisely, the definition of IB provided by Chan and Ming-te (2004) and White & Nteli (2004) is that registered bank customers or Bank's account holders can perform a wide range of banking transactions such as inquiring about account balances, renewing time deposits, obtaining statements, paying utilities bills, transferring funds, and trading securities electronically via the bank's website by either wired devices (a personal computer with modem) or wireless devices such as Satellites and PDA devices).

On the other hand, Lee (2001, p.1) has defined the electronic banking technologies as the use of "all the financial activities involving electronic media such as Automated Teller Machines (ATMs), debit cards, direct deposit/payment, smart cards, and computer banking", without being presented to any physical bank branches. Similarly, Karjaluoto et al. (2001) defined e-banking as the "provision of information or services by a bank to its customers, via a computer, television or mobile phone" (page 348). Similarly, IB is defined by Furst et al. (2002) as the use of the Internet as a remote delivery channel for banking services both traditional ones, such as opening a deposit account or transferring funds among different accounts, and new banking services, such as electronic bill presentment and payment by which the customer can receive and pay bills on a bank's website. According to Bradley and Stewart (2003), online banking is an electronic customer interface form of electronic banking and alternative channel of

distribution whereby the consumer can perform and transact financial services in a virtual environment.

In terms of the definition, most authors agree that IB is self-service this addresses the similarities of the major IB definitions while the major differences found in these various definitions of the IB concept are the absence of an agreement on the standard definition of IB. For instance, IB has been defined as Self Service Based Web-Technology whereby a bank's services are delivered on the Internet (e.g. Sathye, 1999; Liao et al., 1999; Furst et al., 2002; White & Nteli, 2004). Authors like Sathye (1999) have conceptualized IB as an information service while some authors expressed the term IB using the word "online banking" like Bradley and Stewart (2003) whereby the meaning and the definition are expanded to include other channels like television and mobile phones as mentioned by Karjaluoto et al. (2001). This study defines Internet banking (IB) as "Web-Based Banking" whereby bank account holders can interact with and obtain a bank's financial services (both information and transactional) in a virtual environment using any device connected to the Internet.

3.1.2 Contexts of Internet Banking Adoption

In the age of IB, no matter how big or small banks are, currently both types of banks have equal and affordable chances. Thus, the Internet can offer people an equal business environment enabling equal gain access to the Internet, equal cost, and equal conditions for both to compete and be equally exposed to global customers. On the other hand, the individual receptivity to IB can play vital roles in the success of this innovation among society. Nowadays, banks are turning to ICT solutions as one way of cutting operational costs. Thornton and White (2001) pointed out that financial institutions recognized that one of the largest expenses incurred by financial institutions is the branch network and its associated staff and overhead costs. In this connection, the

banking sector has witnessed a huge development in the past three decades especially in the automation of the bank's services and utilizes banking technologies to achieve cost goals and best serve their customers. Banking technologies here refer to the "self-service technologies" which are defined by Meuter et al. (2000) as "technological interfaces that enable customers to produce a service independent of direct service employee involvement". Self-service banking technologies enable huge transformations in and of the retail banking core business to take place on the side of clients, face-to-interface, more mobility, access availability for 24/7, and change the mode of customer interaction with banks to get very speedy outcomes rather than by face-to-face mode. Prior to 1995, there were three key self-service technologies (SSTs) developed in the banking industry. They are, namely Automated Teller Machines (ATM) which were introduced in the late 1970s, Electronic Funds Transfers at Point of Sale (EFTPOS) terminals which were introduced in the early 1980s, and Tele-Banking which was introduced in the mid-1990s (Meuter et al,, 2000; Durkin, 2004 and Barbesino et al., 2005). In October 1995, a new SST, Internet Banking (IB), was intrduced by the Security First Network Bank who first offered checking current and savings accounts over the computer and a modem (Editorial, 1996). Increasingly, all the developed SSTs play an important role in the delivery of many core-banking services to customers (McPhail and Fogarty, 2004). Financial institutions and particularly retailing banks have been involved in hard competition to get a major share of the financial market.

3.1.3 Internet Banking Providers

Internet Banking (IB) is an emerging technology that allows customers to conduct banking transactions through the Internet. There are two types of banks, which can offer financial services over the Internet. Reviewing the literature, White and Nteli (2004) categorized the IB providers as "traditional banks", which they are physically existing

banks with offices and a website, which can offer their customers IB in addition to their traditional delivery channels. The second type is a "Virtual bank" or "branchless" or "Internet-only" banks. This virtual bank enables customers to make deposits and withdraw funds at automated teller machines (ATMs) or other remote delivery channels owned by other institutions. Bradley and Stewart (2003) said that the development of online banking has come about as part of the development in ICT offered via the Internet. Gerrard and Cunningham (2003) considered it as a form of self-service technology. One of the many benefits of IB is that customers can use bank services 24 hours a day from anywhere in the world.

3.2 Behavioural Intention to Use IB

For a further understanding of the IB adoption topic, this section now turns to the literature of research on behavioural and psychological constructs. The study aims in this section to discuss the research psychological constructs and the concept of behavioural intention in the literature review of Information System adoption. Measuring individuals' behavioural intention is a core dependent variable in the theories of adoption, which are used to study adoption in the Information System field. For instance, researchers have used the post-implementation phase as the basis for analysing a user's behaviour towards technology acceptance especially those worked on the TAM model as cited by Mathieson (1991). Therefore, surveying potential users of IB, users' willingness to adopt, the needs, and the user's expectation is an important means of understanding not only the diffusion steps but also of validating the timing for the decision makers when they should accept or reject the proposed innovation. Some authors on electronic banking believe that this step must be taken prior to implementing IB technology. For instance, Courter (1999) pointed out that implementing home banking via the Internet is a decision taking place after "You think there's an interest,

you survey members. If there's enough demand you try to do something about it". Therefore, bankers and financial institutions should firstly understand if there is customer interest in IB and when they feel the demand for IB is enough, then they proceed to the next step. Financial institutions should do prior surveys to determine customers' needs and intentions before setting up any banking strategies on IB. Chung and Paynter (2002), who pointed out that banks must understand important factors and the key drivers of customer retention to adopt IB, explained the necessity for prior investigation. Therefore, the success in predicting users' behavioural intention will be in a straight line contributing to the success of IB diffusion in the community. Briefly, customers' expectations, attitudes to the innovation and perception of being able to use it will directly influence their behaviour to adopt or reject it. The user's behavioural intention towards the adoption of the IB approach is a key issue in this study.

3.2.1 Behavioural Intention (BI)

The social psychology field provides the potential theoretical foundations for information systems researchers to work on the intention variables as determinants of users' behaviour (Davis et al., 1989). According to Triandis (1980), behavioural intention refers to "instructions that people give to themselves to behave in certain ways". Consequently, this paper deployed Fishbein and Ajzen (1975)'s conceptual definitions of "intention" and the "behavioural intention" concepts. Ajzen and Fishbein (1980, p.288) defined intention as the "person's location on a subjective probability dimension involving a relation between himself and some action". Meanwhile "behavioural intention" refers to a person's subjective probability that he will perform some behaviour. This behavioural intention (individual's intention) to perform a given behaviour, according to Ajzen (1991), is the central factor in the Theory of Reasoned Action (TRA) and the Theory of Planned Behaviour (TPB). In the TRA, a person's

performance of a specified behaviour is determined by his or her behavioural intention to perform the behaviour (Davis et al., 1989). Behavioural intention is a joint function of a person's Attitude (ATT) and Subjective Norm (SN), therefore, the BI equation estimated by regression based on the TRA is BI= A + SN. Similar to the TRA, the TAM postulates that computer usage is determined by behavioural intention (BI), but differs in that BI is viewed as being jointly determined by the person's attitude (A) and perceived usefulness (PU) (Davis et al., 1989). The BI equation's weight estimated by regression based on TAM is BI= A+PU. Similarly, the theory of planned behaviour (TPB) specifies intention as a direct predictor of behaviour but the TPB, according to Ajzen (1991), extends the TRA by including measures of PBC. Consequently, behavioural intention, according to the TPB, becomes a function of three determinants. These determinants are attitude towards the behaviour, the SN, and PBC. Rogers' (1983) Diffusion of Innovations (DOI) theory was also utilized to predict technology diffusion. Information about the existence of innovations, according to Rogers (1995), flows through social systems to the potential adopters then is processed by adopters to form perceptions about the innovation, such as characteristics, perceptions in relation with other contextual factors, which then serve as the drivers for innovation adoption decisions. As well as this, innovativeness has received attention, according to Rogers (1995)'s DOI theory, as a determinant of innovation adoption behaviour.

3.2.2 Behavioural Intentions (BI) and Actual Behaviour (AB)

The positive relationship between behavioural intention and actual behaviour is widely described in the Theory of Reasoned Action (TRA) by Fishbein and Ajzen, (1975) and in the Theory of Planned Behaviour (TPB) by Ajzen (1991). Indeed, the idea that intention always precedes an individual's behaviour is rooted in Islamic thought.

Moreover, the individual's intention comes in prior to behavioural action itself. This is inferred from what our prophet Mohammed, peace upon him, said:

On the authority of Omar bin Al-Khattab, who said: I heard the messenger of Allah Salla Allah u alihi Wa Sallam say:

"Actions are but by intention and every man shall have but that which he intended. Thus he whose migration was for Allah and His messenger, his migration was for Allah and His messenger, and he whose migration was to achieve some worldly benefit or to take some woman in marriage, his migration was for that for which he migrated." Related by Bukhari and Muslim

Intentions, according to Ajzen (1991), are assumed to capture the motivational factors that influence a behaviour; they are indications of how hard people are willing to try, of how much of an effort they are planning to exert, in order to perform the behaviour. Several correlation studies of IT adoption, which are discussed in the following paragraph, support the relationship between intentions and subsequent action behaviour (Ajzen, 2001 and Ajzen, 1985). Kim and Malhotra (2005) who posited a conceptual definition of "adoption intention" (BI), stated that BI refers to a user's intention to adopt the application. Similarly, Rawstorne et al. (2000) pointed out that performing activities by individuals is usually declared in the form of an intention that closely resembles the way they do behave. Davis (1986)'s Technology Acceptance Model considered the adoption behaviour, as a direct function of behavioural intention, which is the function of the user's attitude determined by two, beliefs of perceived usefulness (PU) and perceived ease of use (PEOU). In addition, behavioural intentions may be influenced indirectly by external variables through PU and PEOU. Rogers and Shoemaker (1971) and Rogers (1995) conceptualise this construct in terms of its operational definition in which they characterized individuals as "innovative" if they are quick to adopt an innovation. Agarwal and Prasad (1998) comment that this construct is used as a basis for segmenting consumer populations into "innovators" and "non-

innovators" and consequently, operationalized as the "time of adoption". Hence, the formation of intention as deliberated by Fishbein and Ajzen (1980) is regarded by this study as resembling a virtual marketplace for the innovation's characteristics (supply-side) and users' characteristics (demand-side) to meet and tailor a decision either to accept or to reject the innovation with or without influential presence of other external factors related to the IB. From the perspective of customer behaviour, it is customer intention to exchange information online, share confidential information, and engage in a transaction (Pavlou, 2003). Davies (1983) defined usage intention as an "individual's intention to perform a given behaviour is the immediate causal determinant of his or her overt performance of that behaviour". This definition implies a discrepancy between the expressed willingness to perform a behaviour and its actual performance (Ajzen et al., 2004). Formation of intention, according the TAM, also implies that users need to perceive the system as being useful or they will not attempt to use it regardless of how easy or difficult it is to use. According to Gardner and Amoroso (2004), ease of use is less important because difficulty in using a system can be overcome if the user thinks that the system will be useful to them. The behaviour that the researcher interested in for this study is the "individual's intention to adopt the IB". Based on the thorough discussion of the TPB, it was understood that an individual's action is influenced by three combined factors, which are attitude towards a behaviour, SN, and perception of behavioural control. These three factors lead to the formation of a behavioural intention (Ajzen, 1991). In addition, Ajzen et al. (2004) explain the relationship existing among these three combinations with the behavioural intention;

"The more favourable the attitude and subjective norm, and the greater the PBC, the stronger should be the person's intention to perform the behaviour in question" (Page5).

Table 3.1 presents examples of studies of Information System (IS) that use Intention as (DV).

Table 3.1 Intention as Key DV: Examples from Previous IS Studies

Models	Items	Scale
Mathieson, (1991), in comparing TAM & TPB	1-I would use {the spreadsheet} rather than my calculator to do the assignment. 2-My intention would be to use{the spreadsheet} rather than my calculator to do the assignment (INT3) 3-To do the assignment, I would use {the spreadsheet} rather than my calculator.	(strongly agree/ strongly disagree)
Agarwal and Prasad (1998)	UI1. I intend to increase my use of the WWW for work in the future.	Likert scales 1-7 disagree & agree
	UI2. For future work I would use the WWW	
Agarwal & Prasad, (1999)	I intend to completely switch over to {the target technology}	Likert scales 1-7 disagree & agree
	I intend to increase my use of {the target technology}in the future	
Venkatesh & Davis (2000)	Assuming I have access to the system I intend to use it	TAM scales
	Given that I have access to the system, I predict I would use it.	Likert scales 1-7 disagree & agree
Gagnon et al. (2003)	I estimate that my chances of using telemedicine in my practice are...”	Likert scales 1-7 disagree & agree
	If I have the opportunity, I will use telemedicine in my practice”	Likert scales 1-7 disagree & agree
	I intend to use telemedicine in my practice”	
Wang, et al. 2003	I have access to the Internet banking systems, I intend to use it	Likert scales 1-7 disagree & agree
	I intend to increase my use of the Internet banking systems in the future	
Lai and Li (2004)	I will use Internet Banking on a regular basis in the future.	Likert scales 1-7 disagree & agree
	I will frequently use Internet banking in the future.	
	I will strongly recommend others to use Internet banking.	
Shih & Fang (2004)	I plan to use Internet banking.	Likert scales 1-7 disagree & agree
	I intend to use Internet banking within the next 3 months.	
	I will add Internet banking to my favourite links.	
Gardner & Amoroso (2004)	I always try to use the Internet to do a task whenever it has a feature to help me perform it	Scales Derived for Modified TAM
	I always try to use the Internet in as many cases/ occasions as possible	
	I plan to use the Internet in the future (INT4)	
	I intend to continue using the Web in the future	
	I expect my use of the Web to continue in the future	

3.3 Factors Influencing Intention to Use IB

In order to look more closely into the factors determining intention to use IB, the researcher in this section is going to address some adoption theories found in the literature to serve the adoption studies in this field. Before analysing adoption theories or models and evaluating the significance of these issues in determining the success of

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adoption studies, it is useful to define some important terms. The word "adoption" refers to the stage in which a technology is chosen for use by individuals or an organization Davis (1985). Similarly, "Innovation" is used with the nuance of a new or "innovative" technology being adopted. "Diffusion" refers to the stage in which the technology spreads to general use and application (Rogers, 1995). This section deals with the adoption theories related to the diffusion of innovation and several technology adoption models. Taylor and Todd (1995a) pointed out that understanding the determinants of information technology usage should help to ensure the effective deployment of IT resources in an organization.

It is important that adoptions of a particular technology such as IB be approached from several perspectives. Some researchers have approached it from the macroeconomic perspective or viewed it within a community context at the country level (Chan and Ming-te 2004; Anandarajan et al., 2000; Sathye, 1999; Polatoglu and Ekin 2001; Guru etal.,2000; Suganthi et al., 2001; Gurau 2002; Gerrard and Cunningham, 2003; Brown et al., 2004; and Al-Sabbagh and Molla 2004). Other academic research has examined this issue at an organizational level (Daniel 1999; Jayawardhena and Foley, 2000; Liao and Jr, 2000; Gopalakrishnan et al., 2003; and Pikkarainen et al., 2004). A third approach is to look into this issue by investigating the determinants of adoption and usage by the individual users (Mathieson 1991; Tan and Teo 2000; Black et al., 2001; Chau and Lai 2003; and Wang et al., 2003).

3.3.1 Factors in the Theories of adoption

Exploring user adoption of new technology, according to Hu et al. (1999), has received considerable attention from information system (IS) researchers and practitioners. In addition, according to Venkatesh et al. (2003), it is often described as one of the most mature research areas in modern information systems (IS) research.

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These research output have resulted in several theoretical models, with roots in information systems that routinely explain over 40 percent of the variance in individual intention to use technology (e.g., Davis et al., 1989; Taylor and Todd, 1995; Venkatesh and Davis, 2000). Although there are several models of technology adoption developed and used in the IS literature, Taylor and Todd (1995) further differentiate the research on the determinants of IT usage into two approaches. The first approach employed intention-based models. The Theory of Reasoned Action (TRA), Theory of Planned Behaviour (TPB), Technology Acceptance Model (TAM) and the Triandis model, are examples of intention-based models. This approach uses behavioural intention to predict usage and focuses on the identification of the determinants of intention, such as attitude, subjective norms, perceived behaviour control, factors influences, and facilitation conditions. The technology adoption models proposed by aforementioned theories are examples of these studies which used the behavioural based-intention. The second approach examined the adoption and usage of IT from a diffusion of innovation perspective (Rogers, 1995). This perspective will be elaborated further in the following section. It is important to note that the adoption and use of IT at the organizational and individual levels have received a great deal of attention in recent information systems literature. Rogers (1995) also discussed the diffusion of innovation at these two levels. This study will approach the individual level by evaluating adoption factors. Adoption factors in this study are restricted to the scope of the research framework, which are derived from the Decomposed Theory of Planned Behaviour (DTPB) and Diffusion of Innovation (DOI) theories. For instance, innovation characteristics will be used to understand individuals' indirect attitude towards IB (Rogers, 1995; Moore and Benbasat, 1991), psychological factors (Agarwal and Prasad, 1999), and external factors (Davis, 1989). These three adoption constructs/dimensions are considered to be a rich source of several determinants of (IB) adoption by the mentioned studies. The study will

look at these two approaches because IB is considered as an innovation, which by nature has its own characteristics, and secondly it needs the user's intention to pave the way for the actual adoption.

3.3.1.1 Theory of Reasoned Action (TRA)

Ajzen and Fishbein developed the Theory of Reasoned Action (TRA) in 1967 and in 1980 it was used to study human behaviour. It is a model of the psychological processes that mediate observed relations between attitudes and behaviour. The Theory of Reasoned Action is composed of attitudinal, and social influences, and the intention variable to predict behaviour. According to Ajzen and Fishbein (1980), the structure of the TRA is divided into three main areas as depicted in Figure 3.1. The first area is intention, which is defined as the likelihood of doing something. The main premise of this theory is that a person's intention is the main predictor and influencer of attitude. The second area is attitude, which is defined as an individual's positive or negative feeling associated with performing a specific behaviour. The third area is the subjective norms, determined by an individual's normative beliefs, based on which others think he/she should or should not perform that particular behaviour.

```
┌──────────────┐      ┌──────────────┐
│ Behavioural  │─────▶│  Attitude    │─────┐
│ Beliefs      │      │              │     │
└──────────────┘      └──────────────┘     │     ┌──────────────┐      ┌──────────────┐
                                           └────▶│ Behavioural  │─────▶│   Actual     │
┌──────────────┐      ┌──────────────┐     ┌────▶│ Intention    │      │   Use        │
│ Normative    │─────▶│  Subjective  │─────┘     └──────────────┘      └──────────────┘
│ Beliefs      │      │  Norms       │
└──────────────┘      └──────────────┘
```
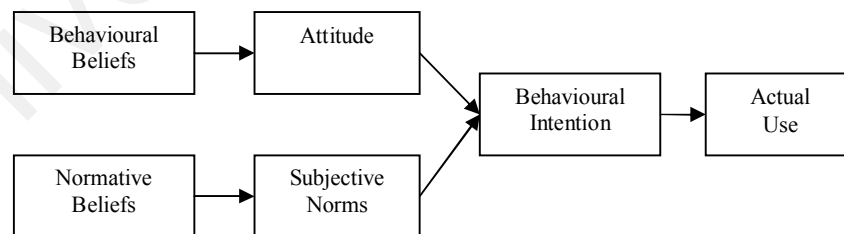
Figure (3.1) Theory of Reasoned Action

(Source: Ajzen and Fishbein, 1980)

Figure (3.1) depicts that the Theory of Reasoned Action (TRA) is "designed to explain human behaviour" (Ajzen and Fishbein, 1980) and consists of two factors that affect behavioural intentions; attitude towards behaviour and subjective norms. Attitude is defined as an individual's positive or negative feeling towards performing behaviour.

Subjective norm is the individual's perception of social pressure to perform the behaviour. The TRA has been applied in its original or extended form to predicting online grocery buying intention (Hansen et al., 2004), nursing (Ellison, 2003), the adoption of IT applications (Anandarajan et al., 2000 and Wu, 2003) and more recently, to investigate the factors which influence the consumer's intentions to purchase services over the Internet (Njite and Parsa 2005). Furthermore, the TRA was used as a basis to develop the theory of planned behaviour as well as for modifying the TAM model with SN as suggested by Venkatesh and Davis (2000) and Morris and Venkatesh (2000).

I. Internet Banking Studies Employing TRA

Internet banking studies that employed the Theory of Reasoned Action are not many. Karjaluoto et al. (2002) is the available paper that this study found infusing the TRA to explore how different factors influence attitudes towards IB and the use of IB in Finland. Attitudes are claimed to be influenced through a learning process affected by reference group influences, past experience and personality. It is important to note that the TRA presence in the IB context is still limited. Although Karjaluoto et al. (2002)'s study was grounded in TRA, the study mainly focused on measuring the attitudinal determinants towards IB. Table 3.2 provides an overview of adoption studies that used the TRA model.

Table 3.2 Overview of Key Studies in IB Adoption Using the TRA

Model Referenced		Others determinants	TRA IB adoption formation variables					
	Year		AB	NB	SN	ATT	BI	Actual usage
Karjaluoto, et al, TRA integrated with TAM	2002	Prior experience of computers Prior experience of technology Personal banking experience Reference group	xx	xx	xx	√	xx	√
SN=Subjective Norm , ATT = Attitude , BI= Behavioural Intention, AB= Attitudinal Belief NB= Normative Belief , √ = Included in Study's Model , √√= Included in Study's Model and has significant influence, √x = Included but it has no significant influence and xx = Not included								

3.3.1.2 Theory of Planned Behaviour (TPB)

The theory of planned behaviour was developed as an extension of the theory of reasoned action to justify conditions where individuals do not have complete control over their behaviour (Ajzen, 1991). This theory posits that behaviour is determined by the intention to perform the behaviour. The components of behavioural attitude and SN are the same in the TPB as in the TRA. In addition, the model includes behavioural control as a perceived construct. Therefore, in the TPB there are three constructs that determine the user's intention; which are attitude, SN and PBC. The TPB has been used to study the adoption of different information systems such as spreadsheets (Mathieson, 1991), computer resource centres (Taylor and Todd, 1995a), electronic brokerages by Battacherjee (2000), and negotiation support systems by Lim et al., (2002). Figure 3.2 presents the Theory of Planned Behaviour as follows;
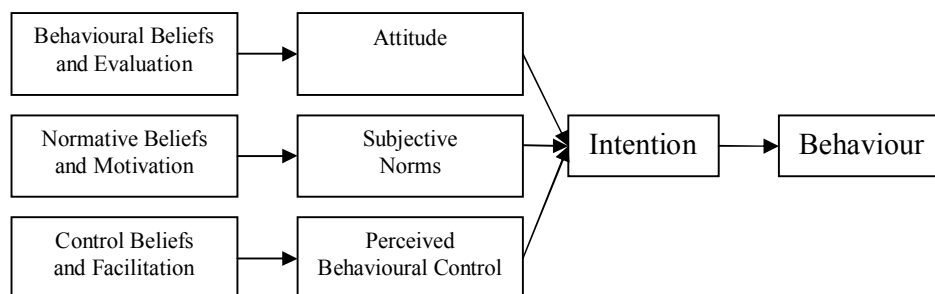
Figure 3.2 Theory of Planned Behaviour

(Source: Ajzen, 1991)

I. Internet Banking Studies Employing TPB

Although studies of adopting IB among the individuals using the TPB are rare, three studies used the theory of planned behaviour (TPB) to study intention toward adopting IB. Liao et al. (1999) provided an example from the context of Hong Kong and Shih and Fang (2004) in the Taiwanese context. Based on these two studies, the findings demonstrated that the TPB was only partially applicable in predicting the adoption intention of virtual banking (Liao et al., 1999 and Shih & Fang, 2004). They have proven that behavioural intention is significantly a function of attitude and PBC (PBC) while the SN was shown not to be a significant determiner in both studies. Table 3.3 summarizes and gives further details on what was discussed above.

Table 3.3 Overview of Key Studies in IB Adoption Using TPB

Variables			*IB Adoption Formation TPB Variables*				
Model	Year	**Others Determinants**	PBC	SN	ATT	INT	AB
Liao, S et al	1999	**Attitude toward IB depend upon behavioural beliefs of:** 1)Relative advantage 2) Ease of use 3) Compatibility 4) Results demonstrability 5) Perceived risk **IB normative beliefs dependent upon:** Normative beliefs of image Visibility Critical mass	√√	√x	√√	√	√
Tan and Teo	2000	Relative Advantages Complexity Compatibility Trialability Internet Experience Banking Needs Risk	√√	√ x	√√	√	xx
Shih & Fang	2004	**Sig. Attitude influenced by:** Relative Advantages Complexity **PBC influenced by:** Facilitating	√	√x	√√	√	√

PBC=Perceived Behavioural Control, SN= Subjective Norms, ATT=Attitude, INT=Intention, AB=Actual Behaviour, √ = Included in Study's Model , √√= Included in Study's Model and has significant influence, √x = Included but it has no significant influence and xx = not included

In addition, Brown et al. (2004), in a comparative study of IB adoption in Singapore and South Africa, demonstrated that SN showed no influence on the adoption

of IB in either Singapore or South Africa as hypothesised in their model. Shih and Fang (2004) compared the TRA to two versions of the TPB model. They demonstrated that intention to adopt IB can be explained by attitude in both models and only relative advantage and complexity are related to attitude.

II. Decomposed TPB Model

In the study of consumer adoption intentions, Taylor and Todd (1995b) suggested a new format of the TPB theory, which is considered as helpful for a better understanding of the relationships between the belief structures and the antecedents of intention. Several researchers have examined approaches to decomposing beliefs into multidimensional constructs. The decomposed TPB model is inspired by Taylor and Todd (1995a; 1995b). This model provides three sets of belief structures into a multi-dimensional belief construct. These beliefs, according to Taylor and Todd (1995b), can be referred to as attitudinal beliefs, normative beliefs, and control beliefs, which are related to Attitude, SN and PBC respectively. The decomposed TPB model has many valuable advantages such as it represents the TRA's core constructs. Also, it provides more attitudinal beliefs dimensions that are derived from Rogers (1995)'s five attributes of innovation, rather than the two factors of ease of use and usefulness which are proposed in the TAM model.

3.3.1.3 Technology Acceptance Model (TAM)

One of the most widely used and referenced theories in the context of technology adoption is the Technology Acceptance Model (Davis, 1989; Legris et al., 2003; Gefen et al., 2000). The TAM was inspired by Davis et al. (1989) and was first used to explain computer usage behaviour. Ajzen and Fishbein (1980) developed the TAM theory on

the platform of a previous and well-known theory of Reasoned Action (TRA). Briefly, the TAM, as shown in Figure 3.3, posits two specific variables, namely perceived ease of use (PEOU) and perceived usefulness (PU) that determine one's behavioural intention to use a technology, attitudes towards adopting IT, and the actual usage. Behavioural intention is a measure of the strength of one's intention to perform a specified behaviour. The TAM model has received extensive empirical support through validations, applications, and replications (e.g. Mathieson, 1991; Plouffe et al., 2001; Legris et al., 2003).
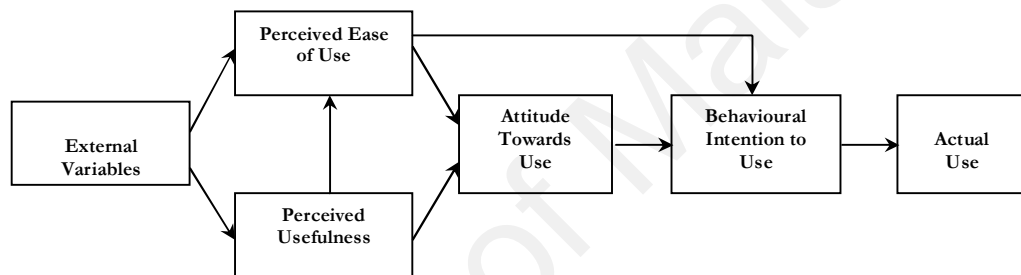
Figure (3.3) Technology Acceptance Model

(Source: Davis, 1989)

In Figure 3.3, the sequence of the adoption process path, according to the TAM, can be noted as an actual system use (actual behaviour) which is determined by perceived usefulness (PU) and perceived ease of use (PEOU). The PU and PEOU relate to the attitude towards using behaviour that leads to intention behaviour and, finally, to performing the behaviour. Perceived usefulness is defined as the "prospective user's subjective probability that using a specific application system will increase his or her job performance within an organizational context" (Davis, 1989). Further, the TAM assumes that perceived usefulness is influenced by perceived ease of use because, other things being equal, the easier a technology is to use, the more useful it can be. Perceived ease of use refers to "the degree to which the perspective user expects the target system to be free of effort" (Davis et al., 1989). The TAM suggests that the effect of external

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variables on intention is mediated by the key beliefs (i.e. perceived ease of use and perceived usefulness). These external variables might include system design characteristics, training, documentation and other types of support, as well as decision maker characteristics that might influence usage (Davis et al., 1989). On the other hand, external variables might manifest themselves in many different variables such as gender, past experience, transitional support, and SN (Legris et al., 2003).   In their comprehensive study on the TAM, Legris et al. (2003) found that among 38 studies, 16 showed there is a significant positive correlation between perceived usefulness and behavioural intention, while 10 revealed that perceived ease-of-use was a significant predictor of behavioural intention.   They also concluded that, overall, the TAM is proven to be a useful theoretical model in helping to understand and explain use behaviour in IS implementation. However, they also suggested that, because of its parsimonious nature, the TAM should be integrated into a broader model, which includes variables related to both human and social change processes and to the adoption of the innovation model. An example of a model that meets this call to some extent is the Perceived Characteristics of Innovating (PCI) model (Moore and Benbasat, 1991).

The TAM model has been extended and modified to the TAM2, which includes two concepts of social influence processes and cognitive instrumental processes as determinants of perceived usefulness (Venkatesh and Davis, 2000). The second TAM extension incorporated perceived resources which refers to the extent that an individual believes he or she has the personal and organizational resources needed to use an IS, such as skills, hardware, software, money, documentation, data, human assistance and time (Mathieson et al., 2001). The third extension proposed by Pikkarainen et al. (2004) included four constructs, namely; Perceived Enjoyment, Amount of information on online banking, Security and privacy and Quality of Internet connection. These could be

evidence of the flexibility of such extensions that the original TAM extended to, and also give evidence that studies based on the TAM theory have found that PU and PEOU are not the only predictors of technology acceptance. The TAM has been proposed to investigate different IS adoption. Some examples of these studies that used the TAM model exist in the literature in great abundance. For instance, research on the intention to adopt negotiation support systems by Lim et al., (2002), E-Commerce adoption by Gefen and Straub (2000), e-services adoption by Featherman and Pavlou (2003), predicting consumer intentions to use on-line shopping (e.g. Vijayasarathy 2004; Shih 2004), consumer acceptance of online banking (e.g. Pikkarainen et al., 2004) and recently, behavioural intention to use mobile banking (e.g. Luarn and Lin, 2005).

I. Internet Banking Research Using the TAM

The Technology Acceptance Model is the most widely used in the studies of IB adoption. A previous literature review of IB has shown that the TAM model had paved the way for the initial academic research to investigate IB adoption among users. Table 3.4 indicates several models of IB adoption that employed the TAM theory. It also shows that the TAM theory received greater attention than the TRA theory by IB researchers. Mathieson et al. (2001) indicated that the TRA is a general theory of human behaviour while the TAM is specific to IS usage. Comparing the existing research presented in Table 3.4 leads one to conclude that all the studies aimed to investigate the influence of different external factors on the TAM's two main variables PU and PEOU. Existing research using the TAM model took three forms in investigating the user's adoption of particular technology. In one of these, researchers designed their model to target the user's attitudinal behaviour towards IB adoption such as Chau and Lai (2003) and Lai and Li (2004). In the second form, researchers went further to investigate factors influencing users' intentions to use the IB such as Wang et al. (2003), Chan. and

Ming-te (2004) and Lai and Li (2004). In the third one, researchers were concerned with investigating factors influencing the actual use of IB such as Sathye (1999) and Pikkarainen et al. (2004). Table 3.4 shows that Sathye (1999) pioneered the studies of IB adoption.

Table 3.4 Overview of Key Studies in IB Adoption Using the TAM

Reference			IB adoption formation variables				
	Year	Others determinants	PEOU	PU	ATT	BI	AB
Sathye,	1999	Security of transactions Reasonable price Resistance to change Availability of infrastructure	√	√	xx	xx	√
Wang et al.	2003	Perceived credibility Computer self-efficacy(DV) Perceived trust , Perceived risk	√	√	xx	√	Xx
Chau, and Lai	2003	Personalization (PER) Alliance services (ALS) Task familiarity (TAF) Accessibility (ACC)	√	√	√	xx	Xx
Pikkarainen et al.,	2004	Perceived enjoyment Online banking Information Security and privacy Quality of Internet Connection	√	√	xx	xx	√
Chan, and Ming-te,	2004	Subjective norm , Image, Result demonstrability Perceived risk	√	√	xx	√	Xx
Lai and Li	2004	Gender, Age and IT Competency	√	√	√	√	Xx
PEOU= Perceived ease of use, PU= Perceived usefulness, ATT=Attitude, BI =Behavioural Intention, AB=Actual Behaviour √ = Included in Study's Model, √x= Included but it has no significant influence xx = Not included							

3.3.1.4 Diffusion of Innovation Theory (DOI)

Rogers (1983) defined innovation, as "an idea, practice, or object that is perceived as new by an individual or other unit of adoption," and diffusion as "the process by which an innovation spreads". Overall, the diffusion of innovation defined as "the process by which an innovation is communicated through certain channels over time among the members of a social system" (Rogers, 1995, p.5). Based on Rogers' definition, there are four main elements existing in the diffusion of innovation process: (1) The innovation's characteristics, (2) the communication channels used to

communicate the benefits of the innovation; (3) the time elapsed since the introduction of the innovation; and (4) the social system in which the innovation is to diffuse. Rogers (1995) explained the four main elements of diffusion of innovations as follows.

(1) *Innovation:* (innovation's characteristics) an idea, practices, or objects that are perceived as recognized by an individual or other unit of adoption (Rogers, 1995, p. 11). (2) *Communication channels:* the means by which messages get from one individual to another. (3) *Time:* the period gone since innovation commences has three time factors which are: (a) Innovation decision process, (b) Relative time with which an innovation is adopted by an individual or group, and (c) Innovation's rate of adoption. (4) *Social system* defined as "a set of interrelated units that are engaged in joint problem solving to accomplish a common goal".

The diffusion processes and determinants are two categories of the diffusion of innovation studies. Frambach et al. (1998) described two types of diffusion models as: the first types are models that aim to gain understanding of diffusion processes as a whole. These models are analytical representations of a diffusion process at the aggregate level. The second types are models having the objective of gaining an insight into the determinants of the individual adoption or non-adoption decision. These models take a disaggregate perspective and are generally referred to as adoption models. Based on Rogers' definition of the diffusion concept, diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system. This definition implies that diffusion works in a voluntary environment in which making decisions is not authoritative or collective. Each member of the social system faces his/her own innovation-decision toward the adoption of a specific innovation. The most remarkable feature of diffusion theory is that the innovation-decision depends greatly on the innovation-decisions of the other members of the system.

To diffuse an innovation there are five steps in the process which occur within the members of the social system. The first step is that individuals have a chance to know about the innovation's existence by means of exposure to the innovation's knowledge-awareness. This knowledge is defined as "a person becomes aware of an innovation, and has some idea of how it functions, through informational channel as mentioned by Aggarwal et al., (1998). The second stage is formation of the behavioural attitude by members that leads them to the persuasion level. The persuasion level is defined as "a person forms a favourable or unfavourable attitude toward the innovation. The third stage is decision making which is defined as "a person engages in activities that lead to a choice to adopt or reject the innovation". The fourth stage is implementation defined as "a person puts an innovation into use". Lastly, is the confirmation stage in which a "member evaluates the results of an innovation-decision already made" (Rogers 1995). According to Rogers and Sheomaker (1971), the five stages do not necessarily occur in sequential order and some of them could be skipped. In diffusion theory, several variables are identified as influencing the adoption and diffusion of innovations. Diffusion models, according to Frambach et al. (1998), are useful and can be used to investigate the role of both adopter-side and supply-side variables on the shape of the diffusion process as whole adoption models. Some models have exclusively focused on adopter-side variables in explaining individual adoption behaviour (Rogers, 1983, 1995). The study done by Frambach (1993), on the influence of supplier variables on the individual innovation adoption decision, supports the view that supply-side variables can play an important role in the individual adoption context.

I. Studies Used Rogers' DOI

The issue of IB adoption is a complex one as adopting a particular technology depends on many factors. Therefore, IB as a technological innovation has not been thoroughly studied from the perspective of diffusion. Based on the theory, there are four key elements in the IB diffusion process: the IB, channels of communications, time and people in the social system.

However, although the dominant, orthodox theories of the adoption of innovations stem from microeconomics, the theory of DOI has been widely applied to many health issues. It has been applied to AIDS research (e.g. Maguire, 2002), anti-smoking campaigns (e.g. McDonald, 2004; Pampel, 2001), paediatric primary care (e.g. Barth and Sherlock, 2003), applied nursing research (e.g. Lee, 2004), and anti-drug campaigns (e.g. Thomas, 2004), etc. Rural sociologists studied the diffusion of agricultural technologies in social systems. They used the model of diffusion and innovation such as the diffusion of palm oil by Chaudhuri (1994), the diffusion of innovation in the flour milling industry by Hayward (1972), etc. In addition, it has been successfully applied to specific information technology products such as Java software used in Internet and Intranet environments or hypertext environments (e.g. Burns, 1997; Zhang and Saboe, 2004).

Academic research conducted on IB is growing now and the previous research which completely employed the five formal variables of Rogers' DOI theory is not common. Therefore, in this section the researcher attempts to give a substantial overview of the current trend in studies on IB adoption that use Rogers' theory. Table 3.5 explains this view briefly. The researcher noted that quite a few studies avoid using the observability variable in their models. Examples of these studies are Tan and Teo (2000); Suganthi et al. (2001); Gerrard and Cunningham (2003); and Brown et al. (2004). On the other hand, Black et al. (2001), who investigated the adoption of Internet

financial services, demonstrated that using the Internet for financial services is not visible for other members of the society to observe. This study also found that all the five studies of IB based on the DOI pay much attention to employing the two variables of relative advantages and complexity. Table 3.5 highlights the key studies on IB Adoption, which employed the DOI Theory as follows;

Table 3.5 Overview of Key Studies in IB Adoption Using DOI Theory

Referenced	Year	Other Determinants	IB Adoption Formation Variables				
			RA	OBS	TR	COX	COT
Tan and Teo IB (Singapore)	2000	Internet Experience, Banking Needs Risk, Subjective Norms, and **PBC: 1-**Self-efficacy, **2-**Government Support and **3 -**Technology Support	√	xx	√	√	√
Suganthi, et al, (Malaysia) IB	2001	**Note:** In Suganthi, et al (2001)'s study, it is not clear which theory of adoption they adopt for the study	√	xx	xx	√	Xx
Black, et al	2001	Re-evaluate the applicability of Rogers' model in IB	√	√	√	√	√
Polatoglu & Ekin (Turkey)	2001	Perceived risk, Type of group, Type of decision, Marketing effort	√	√	√	√	√
Gerrard & Cunningham	2003	*risk: 1 confidentiality 2 accessibility*	√	xx	xx	√	√
Brown, et al south Africa IB	2004	Banking Needs, Risk, Internet Experience, Subjective Norm **PBC:** Self-Efficacy, Technology Support , Government Support	√	xx	√	√	√
Al-Sabbagh & Molla (Oman) IB	2004	Inhibitors , Drivers of IB Adoption and Demographic Profile	√	xx	√	√	√
Chang, (Korea)	2004	**Demographi**c Sex, Age, Nationality, Education, Marital Status, Type of Job, Personal Income, Household Income, Type of Housing, and Area of Residence **Aware of interest rate information Banking Behaviour** Frequent visitors to bank branches Frequent visitors to bank website	Xx	xx	xx	xx	Xx

RA=Relative Advantage, OBS =Observability, TR =Trialability, COX=Complexity, COT =Compatibility , √ = included in Study's Model , √x = Included but it has no significant influence xx = not included

Moreover, it is surprising to explore that many studies, which are based on the country level, had concentrated on those two variables, for example, Polatoglu and Ekin, (2001) from Turkey, Suganthi et al. (2001) from Malaysia, and Al-Sabbagh and Molla (2004) from Oman.

It is important to note that most of the studies do not entirely adopt the model variables but they add other variables and omit some. Chang (2004) investigates the technology diffusion as a social phenomenon and she believes that the nature of the social system determines the rate of adoption. She emphasized exploring the influences of the socio-economic variable on the adoption of IB. She used the logistic distribution and a duration model to detect the dynamics of the IB adoption process. The latter approach identifies the determinants of early adopters versus delayed adopters with the sequential information of adoption time. This study attempts to highlight the basic characteristics of an innovation using the TPB while using some of the DOI aspects, namely, Rogers (1995)'s five attributes of innovation and the norms of the two communication channels in the IB context.

3.3.2 Comparison of the Adoption Theories

Although social psychological models have been extensively used as a theoretical foundation in the study of technology and IS adoption studies, little attention has been given to the study of IB. Studies found in the literature of IB which attempted to predict the consumer's behaviour to adopt IB produced different models as well as different determinants that explain the adoption. It is important to note that the four theories of social psychology (the TRA, TPB, TAM, and Triandis) and the DOI, which is used to explore adoption, have some similarities and differences. Firstly, the researcher noted that the theory of TPB and the TAM are similarly stemmed and developed from the TRA theory. Secondly, all models that employed any of the 4T theories assume a consequent path of actions initiated by an attitude towards innovation then followed by intention formation that ends with the actual behaviour. Thirdly, the consequence relationship which occurs mainly among 4T constructs, ensures that there is either a cognitive, a normative or an affective belief form attitude which, in turn, has an

influence on behavioural intention and the actual adoption of IB. Fourthly, this study noted that the two TAM constructs (PU and PEOU) are similar to those two constructs in Rogers' theory of Relative Advantage (RA) and Complexity (COX), which both employed as predictors the user's attitude construct. Furthermore, the perceived usefulness (PU) in the TAM is similar, to a certain extent, to the perceived consequences in the Triandis model. Fifthly, the constructs of PU, relative advantage and perceived consequences are cognitive components of an individual's attitude. Similarly, the TRA and TPB have been used to predict intentions and behaviours from the measurement of attitudes and norms but Ajzen (1991) says, "TPB differs from the theory of reasoned action in its addition of PBC (PBC)". Ajzen (1991) reported that PBC in the TPB refers to an individual's perception that behaviour is under his control and that he has the availability of access to resources and opportunities, which, to some extent, facilitate the likelihood of behavioural achievement. In this connection, Ajzen (1991) views that the TPB's behavioural control construct has a similar function to the Triandis' construct, which is in the form of facilitating factors. The differences between the Triandis and TPB models is the construct of facilitating conditions which only affect the actual behaviour while the PBCs in the TPB, according to Ajzen (1991), impact both intentions and actions. The constructs such as compatibility, trialability, and observability drawn from social psychological models that are included in Rogers' DOI, are not constructed in the previous 4T of technology adoption theories. The multifaceted and complex processes of the diffusion and adoption of the IB require an integration of theories from diverse perspectives such as psychological theories and DOI. This paper attempts to fill the gap by integrating constructs from Rogers' (1995) theory with other adoption theories such as the TRA, TPB, TAM, and Triandis into a research model to fit for the study of IB.

3.3.3 Categorization of Internet Banking Drivers

Nowadays, a lot of businesses are moving towards digitised work. Financial organizations are interested in how certain clicks on the PC keyboard can make their work easy. Competition, according to Eriksson et al. (2005) forces banks to go for IB as a growing method in financial services. Consequently, Bradley and Stewart (2002) mentioned that IB has become one of the best competitive advantages in which a bank can show its ability to be among the first to master banking services-based Internet channels. Globally, the information technology revolution is considered by Bradley and Stewart (2002) as one of the most notable innovations to affect the banking industry because its activities are easy to digitise and automate. Furthermore, Karjaluoto et al. (2003) argued that not only is competition increasing but also the demand side is changing rapidly as the consumers are no longer behaving as they did in the last decade prior to the electronic stand-alone banking. Readability and the increase of financial customers' demands for cheap, fast convenient and mobile channels of delivery are among the drivers of IB. This study is going to provide further explanations on this issue and highlight the common drivers of IB found in the literature from both bank and customer level as follows.

3.3.3.1 Internet Banking Drivers at the Bank Level

The underlying factors driving IB diffusion, according to Bradley and Stewart (2002), are still not clear, but there are some efforts made to identify the foreseen drivers of Internet banking (IB) especially from marketing research. Marketing research considered IB as a new marketing channel. Accordingly, Nielsen et al. (2003) had generalized that all Internet-based marketing channels appear to offer better service to a quickly growing segment of customers, and to have lower marginal costs than traditional bricks-and-mortar channels. On the other hand, financial institutions have

embraced the Internet as a service delivery method demanded by customers as reported by the Bank News Journal (2003). In addition, Dabholkar (1996) says that increasing labour costs and advances in technology are encouraging service firms to consider offering technology based self-service options to consumers. Another driver of IB is market pressure. With respect to this, Liao and Cheung (2003) reported that competition is a driving force behind the introduction of IB as a competitive strategy to retain existing customers, attract additional business, increase market share, and support business re-engineering. Some financial organizations, according to Chau and Lai (2003), are moving towards "clicks and mortar" banks to sustain business competitiveness. Drivers of IB from the bank's side, as explained by Rotchanakitumnuai and Speece (2003), are such that banks expected IB to lead to cost reductions and improved competitiveness. Thereupon, the IB service delivery channel is seen as powerful because it can retain current Web-based customers who continue using banking services from any location. Moreover, IB provides opportunities for the bank to develop its market by attracting new customers from among existing Internet users (Suganthi et al., 2001; Dannenberg and Kellner, 1998; Zineldin, 1995). This implies that bank services can be made reachable in any region and remove the hurdle of policies by using IB. Evidence was found from the cases that faced US Banks as Pikkarainen et al. (2004) mentioned that US banks are not allowed to have a vast branches network covering the whole USA. Therefore, the IB services have fostered competition between banks in the USA. Briefly, Stafford (2001) points out that IB is one of today's hottest topics among bankers, and it is being driven by growing consumer demand, peer pressure and pressure to improve profits.

3.3.3.2 Internet Banking Drivers at the User Level

Although IB adopters are the main elements in the process of adoption and diffusion of IB, there are certain factors which direct their attitude and intention to adopt or not to adopt as well as to be innovators or laggards. Theories of adoption that will be elaborated in the following sections are looking into factors that drive the user's intentions to use IB or the diffusion of IB among society. This study believes that, "drivers of any distribution channel at the customer's level" are subjected to its ability to answer the three questions of the distribution channel theory as mentioned by Stern and Sturdivant (1987). The three questions of the distribution channel theory, according to them, are; what do consumers want? How do they want services to be provided? And, what are the costs of the alternative distribution channels? For instance, authors such as Mols (1999) emphasised investigating " What the customer wants" to determine which distribution channel of banking most efficiently can meets customer needs and interests. In connection with this, the existing IB literature review investigated IB's drivers at the individual level in different ways. The drivers of IB at the individual level are investigated through the DOI constructed variables of relative advantages, compatibility and complexity. Examples of IB adoption drivers from the customer perspective found in the literature are: convenience, economic gains (e.g. saving money, time and effort), accessibility, availability, and service improvement. With respect to the quality of the IB service, customers have identified quality as a key determinant of the intention to use a service (Jun and Shaohan, 2001). In a multi-channel context, Patricio et al. (2003) found that customer satisfaction with the Internet banking services depends not only on the performance of this channel in isolation, but also on how it contributes to the overall satisfaction compared to other services offered.

3.3.4 Categorization of IB Drivers at the User Level

The researcher in this study categorizes the factors influencing users' intention to use Internet banking into three types, namely direct, indirect and readiness factors. These factors will be elaborated and discussed in the following sections.

3.3.4.1 Direct Antecedents of Behavioural Intention

This section will discuss three variables used in the TPB as antecedents of the Behavioural Intention construct. These variables are attitude, SN, and PBC. According to Ajzen and Fishbein (1980), those three variables together can be the antecedents of behavioural intention (Ajzen 1991; Doll and Ajzen, 1992; Mathieson, 1991).

I. Attitude (ATT)

Special attention was paid to attitudes towards and expected benefits from information services and information technology. This is because nowadays the customers of banks differ more and more with regard to the amount of information needed for structuring their asset portfolios. In addition, there is greater flexibility and cost saving involved in using modern online banking services (Machauer and Morgner, 2001). Ajzen (2001) pointed out that most studies concerned with the prediction of behaviour from attitudinal variables were conducted in the framework of the Theory of Planned Behaviour (Ajzen 1991). To a lesser extent, it is a predecessor to the Theory of Reasoned Action (Ajzen and Fishbein 1980). Attitude is characterized as a person's inclination to exhibit a certain response towards a concept or object. Ajzen and Fishbein (1980) pointed out that, "The attitudinal component refers to the person's attitude towards performing the behaviour under consideration".

Attitude Definition: It is difficult to arrive at one definition of attitude because many authors have defined the concept of attitude from different angles (Walker and Johnson, 2005). Moreover, defining attitude according to Erwin (2001) was problematic because any definition must reflect the nature of the object being defined. Furthermore, there are major theoretical disagreements about the nature of attitude. What concerns us here are the definitions discussed in the review of adoption theories as well as definitions that are compatible with the interests of IS researchers. Ajzen and Fishbein (1980, p.54) defined attitude as "an attitude toward any concept is simply a person's general feeling of favourableness or un-favourableness for that concept". Similarly, Rogers (1995 p.167) refers to it as the "individual's forms favourable or unfavourable attitude toward innovation" but with much concern on the attitude formation which is equivalent to persuasion. The main outcome of the persuasion stage in the innovation-decision process is either a favourable or an unfavourable attitude towards the innovation. It is assumed that such persuasion would lead to a subsequent change in overt behaviour adoption/rejection consistent with the attitude held (Rogers 1995, p.169). According to Davis' (1993) TAM, attitude towards using the system is defined as "the degree of evaluative effect that an individual associates with using the target system in his/her job". Some researchers show an interest in the need to tailor the definition of attitude to information system research such as Melone (1990) who defined user attitude as "a predisposition to respond favourably or unfavourably to a computer system, application, system staff member, or a process related to the use of that system or application".

Attitude in IS, Fuhrman (2002) says that attitude might be one of the largest obstacles to e-banking adoption success in the new banking marketplace. In terms of the attitudes of bank customers towards objects, Machauer and Morgner (2001) described the formation of attitude as a customer-bank relationship as it is a product of two

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attributes, namely goals and the knowledge or experiences of customers. The Individual's attitudinal behavioural variable is used to investigate the adoption of many information systems, as well as it being utilized in the context of IB. Major IS adoption theories deployed the individual's attitude. For instance, in Davis' (1989) Technology Acceptance Model, the individual's attitude is considered as a passport to bring users from the demand side (innovation) to the supply side (intention and actual use). Furthermore, Rogers and Shoemaker (1972) pointed out that the individual's attitude has two levels; the specific attitude towards the innovation itself and the other one is the attitude towards change.

Attitude in Internet Banking, there are many studies on IB, which sought to investigate the adoption as a process passing through the person's attitude. Karjaluoto et al. (2002) attempted to investigate the adoption by determining those factors that influence the formation of attitude towards IB and their relation to the use of online banking services. Furthermore, studies, which utilized the TPB model such as Liao et al. (1999), and Shih & Fang (2004) demonstrated that an individual's attitude has significant influences on the user's intention to adopt IB as well as their actual behaviour.

Determinants of the attitude towards IB are viewed by Liao et al. (1999) as a result of behavioural beliefs of relative advantage, ease of use, compatibility, results demonstrability and the perceived risk, while Shih and Fang (2004) demonstrated that attitude is significantly influenced by relative advantages and complexity. IB studies, which applied the TAM, have exclusively utilized the PEOU and PU constructs as the determinants of an individual's attitude (see Table 3.4 in the adoption theories section). Moreover, Chau, and Lai's (2003) study posited two constructs with different variables projected to measure the individual's attitude. Their study refers the direct effects to the TAM's two variables, PEOU and PU, while the indirect effect refers to the influences of

another four determinants: personalization (PER), alliance services (ALS), task familiarity (TAF) and accessibility (ACC) (Chau and Lai, 2003). Similarly, another study of Lai and Li (2004) employed the TAM and utilized an additional attitude predictor that projected the invariant influence across different gender, age, and IT competence subgroups. In the TRA, a person's attitude towards behaviour is determined by his or her salient belief (b_1) about the consequences of performing the behaviour multiplied by the evaluation (e_i) of those consequences:

$$A = \sum b_1 \, e_i$$

Beliefs (b_1) are defined as the individual's subjective probability that performing the target behaviour will result in consequence $_i$, the evaluation term (e_i) refers to "an implicit evaluative response" to the consequence (Davis et al., 1989). The TAM theory views the attitude determinant differently with attitude being jointly determined by the usefulness construct and ease of use construct. The relation is statistically calculated based on linear regression as follows:

Attitude = Usefulness + Ease of use   or   (ATT= U + EOU).

In addition, Davis et al. (1989)'s TAM posits that usefulness has a direct effect on BI and influences attitude as well as ease of use being hypothesized to have a significant effect on attitude. It indicated a direct relationship between the ease of use (EOU) and attitude (ATT). Moreover, Davis et al. (1989) determined two mechanisms by which EOU influences attitudes and behaviour: Self-efficacy and instrumentality.

Rogers' (1995) model of diffusion of innovations is commonly used to measure consumer attitude towards new IS diffusion (consumer adoption rate) among selected groups in the community. The model has five dimensions that have been successfully used to explain problems concerning the diffusion and introduction of newly introduced technology and software development methods. As well as Davis (1985, p.24), it is proven empirically that "a potential user's overall attitude toward adoption of IS

technologies is a determent of the user's adoption behaviour". However, the Davis (1985) theory posited that attitude towards a particular system adoption is a function of PEU and PU, but work on online banking research based on those two functions empirically shows a gap as explained in the following section. The work needed to be upgraded to involve certain other functions such as perceived risk, perceived credibility, perceived enjoyment and perceived importance.

II. Subjective Norms (SN)

Subjective norm is the second component of behavioural intention in both models of TRA and TPB. It deals with the influence of the social environment. The Theory of Reasoned Action assumes that social pressure as embodied in the SN is one of the determinants of behavioural intention. Incorporating this variable into our research model shows that adopters' decisions may also be influenced by an important class of ``externalities'' (Candel and Pennings, 1999). Similarly, the Theory of Planned Behaviour considers the SN as one of the three determinants of the behavioural intention of users.

Norms, according to Roger (1995), are established behavioural patterns for the members of the social system and norms tell an individual what behaviour is expected. Subjective Norms will be indicated in this study by the symbol SN. The existing literature of IS shows the importance of the SN in predicting behavioural intention. For example, in a cross-sectional comparison of pre-adoption and post-adoption of information technology use, Karahanna et al. (1999) demonstrated that top management, supervisors, and peers significantly influenced adoption intention for both potential technology adopters and actual users. In addition, they found that MIS staff and friends were important influencers of potential adopters, while computer specialists played a significant role for actual users. The researcher in this study attempts to go

beyond Karahanna et al. (1999)'s referent group used to predict the SN. Furthermore, the study seeks to reshape the possible resource of the influence of this construct in such a way as to make it more compatible to the IB context. According to the TRA, the more a person perceives that others who are important to him think he should perform a behaviour, the more he will intend to do so.

Definition of Subjective Norms (SN), according to Warshaw (1980), SN is a function of a respondent's beliefs about the normative views and wishes of the referent about his/her behaviour, and each respondent's motivation to comply with the views and wishes of each particular referent. Ajzen and Fishbein (1980) defined SN as a "*person's perception that most people who are important to them desire the performance or non-performance of a specific behaviour*" (p.73). Matheison (1995) defined the SN as "the individual's perception of social pressure to perform the behaviour.

Subjective Norms in IS Literature, the interesting aspect of SN is its effect related to the behavioural intention, which is still unclear in the information system studies. The previous literature of IS shows that the influence of SN is not always in a significant relationship with the behavioural intention. For example, in a study to identify the individual determinants of behavioural intention (BI) to adopt computers Davis et al. (1989) concluded that the SN has a non-significant influence on the individual intention to accept computers. Two years later, research done by Mathieson (1991) demonstrated a non-significant relationship between SN and BI. Briefly, in previous IS literature the SN had either non-significant (Davis et al., 1989; Mathieson, 1991); or weak significant (Taylor and Todd, 1995a; Karahanna et al., 1999) effects on intention, and the explanatory power was shared between attitude and behavioural control (Mathieson, 1991). Recently, with two possible referents of the SN construct postulated as external

and interpersonal influence, Battacherjee (2000) empirically demonstrated that SN plays a very significant role in explaining intentions to accept e-commerce services.

In the context of Internet banking, there are two studies conducted by Liao et al. (1999) and Shih and Fang, (2004) on IB adoption, which exploited the TPB theory. Both studies demonstrated that "SN" had a non-significant influence on the intention to adopt IB. Similarly, another IB study conducted by Brown et al. (2004) provided the same result. The SN influences on IS adoption models are still unverified especially in the field of IB. Another explanation for the non-significant results of the SN is that people's behavioural intentions are less likely to be heavily influenced by family in the field of IB in some contexts. This study draws evidence from studies conducted in Taiwan, Singapore and South Africa (Shih and Fang 2004; Brown et al., 2004). In addition, they are less likely to be heavily influenced by friends, colleagues and peers in forming their intentions to adopt IB. The evidence came from Singapore and South Africa (Brown et al., 2004). For the time being, this study cannot generalize on the issue based on the few contexts but the researcher has to report the current trend of SN and its effects, which will assist this research in conducting further investigations and comparisons. Therefore, further studies from different contexts in our point of view will lead to more and better understanding of this issue. In this aspect, our study aims to understand who the "referent others" are who are important in influencing adopters. This will serve to discover the real function or role that SN could play in IB adoption. Ajzen and Fishbein (1980, p. 57) say "the more a person perceives that others who are important to him think he should perform behaviour, the more he will intend to do so". The study notes that the authors emphasized "people who are important to adopters themselves". The study's tool to identify the important people who can play a significant role in the formation of the adopter's intention will be derived from the function of the SN. Mathieson (1991) said that the SN function is to reflect the

perceived opinions of referent others and the "referent other" here refers to a person or group whose belief may be important to the individual. Therefore, these referents could be internal or external actors or might be persons or impersonals like the mass media.

***Determinants of the Subjective* Norm,** SN in the behavioural research, can be measured using two approaches; first, a traditional approach which measures SN utilizing a single-survey item asking respondents to indicate whether referents important to them desire them to perform a certain behaviour. The second approach is the theoretical approach by which measuring the SN is constructed by summing the products of normative belief and motivation to comply for all possible referents involved in the SN formation (Ajzen and Fishbein, 1980). Most likely, this research is going to use Ajzen and Fishbein's (1980) approach that is often termed a belief-based measure of SN. In this connection, Ajzen and Fishbein (1980) pointed out that the measure of SN has to correspond to the intention in action, context, and time elements. According to the TPB theory, the general SN is determined by the perceived expectations of specific referent individuals or groups, and by the person's motivation to comply with those expectations (Fishbein and Ajzen, 1975). For some behaviour, Ajzen and Fishbein's (1980) TRA theory gives prior importance to normative considerations (the perceived prescription of important others) in determining behavioural intentions. Fishbein and Ajzen's (1975) SN formulation is represented by this equation:

$$\left\{ SN = \sum_{i=1}^{n} b_i m_i \right\}^{1}$$

The potential reference groups or individual whose expectations are perceived to be relevant might vary accordingly to the behavioural situation and the context. Referents

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[1] b_i is the normative beliefs (the person's belief that a reference group or individual i thinks he should or should not perform behaviour b); m_i is the motivation to comply with referent I; and n is the number of relevant referents.

might include peers, colleagues, family, business leaders, business partners, political parties and professional associations, any person or group to which the adopter may refer in making a decision or deciding on behaviour. Identifying all possible referents and measurement of associated normative beliefs and motivations is impossible to do in practice. In the context of technology usage, the key factors underlying SN are peer influence and superior's influence (Mathieson, 1991; Taylor & Todd, 1995). Subjective norm can be decomposed into the motivation to comply with the relevant reference groups and the corresponding normative beliefs. According to the Decomposed Theory of Planning Behaviour (DTPB), the individual's normative belief (nb_i) concerns a particular referent weighted by the motivation to comply with that referent (mc_i). As is the case in previous models, $\sum \mathbf{nb_j mc_j}$ is significantly related to SN (Taylor and Todd, 1995).

III. Perceived Behavioural Control (PBC)

PBC, according to the Theory of Planned Behaviour and its decomposition model, is the third antecedent of behavioural intention. In an attempt to understand human behaviour, PBC, according to Venkatesh (2000), received greater interest from a psychological perspective than actual control. Specifically, control relates to an individual's perception of the availability of the knowledge, resources, and opportunities required to perform specific behaviour. Some authors such as Trafimow et al. (2002) debated the emerging role of PBC in the social psychology literature where they introduced the construct as a multi-dimensional one. Furthermore, they suggest the two dimensions of perceived control and perceived difficulty instead of Ajzen's (1991) PBC construct as proximal determinants of behavioural intentions and behaviours.

According to the Theory of Planned Behaviour, PBC, together with behavioural intention, can be used directly to predict behavioural achievement. Doll and Ajzen

(1992) posited that when the behaviour, or situation, affords a person complete control over behavioural performance, intention alone should be sufficient to predict behaviour, as specified in the Theory of Reasoned Action. This implies that PBC is a very important antecedent in predicting behavioural intention when people have no control over their behaviour. Evidence is drawn from Venkatesh (2000) who pointed out that PBC was demonstrated to have an effect on key dependent variables such as intention and behaviour in a variety of domains. The importance of PBC was drawn from the role that perception of control according to Pavlou (2002) would facilitate information acquisition since the consumer has the resources to manage such behavioural activities and would positively influence product purchase since consumers would not have fears of opportunistic behaviour from a Web retailer.

Definition of PBC, according to Ajzen (1991), it refers to people's perception of the ease or difficulty of performing the behaviour of interest. Similarly, Matheison's (1995) definition of the PBC "is the individual's perception of his or her control over performance of the behaviour". Moreover, it is the individual's perception of the presence or absence of requisite resources and opportunities (Ajzen and Madden, 1986) to engage in a behaviour. Consequently, the PBC is viewed by Doll and Ajzen (1992) as "the degree of PBC, which refers to the perceived ease or difficulty of performing the behaviour and assumed to reflect past experience as well as anticipated impediments and obstacles".

PBC in IS, previous studies in IS utilized the PBC construct and provided an explanation quite similar to the study's finding on the effect of PBC on the behavioural intention. For example, Mathieson (1991) demonstrated that behavioural control influences intention to use an information system. A positive relationship between PBC and intentions is also found in Taylor and Todd's (1995a)'s study which examines users in a computer resources centre. Meanwhile, Pavlou (2002)'s study investigates e-

commerce behaviour. Overall, there is strong theoretical and empirical support for the role of PBC on behavioural intentions. Applied to the context of online transaction intentions, behavioural control should have a positive effect on such intentions since consumers would have no fears of opportunistic behaviour from a web retailer. In sum, PBC is likely to reduce barriers to the adoption of B2C e-commerce (Pavlou, 2002). In a proposed model of e-commerce service acceptance, which is an adaptation of the Theory of Planned Behaviour (TPB), Battacherjee (2000) shows that behavioural control has a positive influence on acceptance intentions. From a different perspective, Taylor and Todd's (1995a) study on understanding information technology usage demonstrated that the PBC can reflect perceptions of internal and external constraints on behaviour. From the context of Internet banking, Tan and Teo (2000) demonstrated that the intention to adopt IB services can be predicted by PBC factors. Some studies of Internet Banking have utilized the PBC constructs; especially those which adapted the TPB and its decomposed models such as Liao et al. (1999) and Shih & Fang (2004).

Determinants of PBC, prior to discussing the determinants of PBC, Ajzen (1991) specified some conditions for accurate prediction. First, the measures of intention and of PBC must correspond to or be compatible with the behaviour that is to be predicted. The second condition is that intentions and PBC must remain stable in the interval between their assessment and observation of the behaviour. The third condition concerns the accuracy of PBC to guarantee that perceptions of behavioural control realistically reflect actual control (predictive validity). In broad terms, the PBC as a construct includes two dimensions of self-efficacy and facilitating conditions that reflect situational enablers or constraints to behaviour (Venkatesh, 2000).

From the perspective of e-commerce drivers, Pavlou (2002) defines the PBC as the consumer perception of control over a potential transaction, drawn from facilitating

conditions that render such control. The PBC could refer to the factors that may impede the performance of the behaviour (Tan and Teo, 2000).

In the psychology literature, behavioural control can be approached in several ways but Ajzen's (1991) idea of PBC built on behavioural achievement depends jointly on motivation (intention) and ability (behavioural control). The concept of PBC was expanded in Taylor and Todd's (1995b) decomposed TPB, which combined the self-efficacy, resource facilitating conditions and technology facilitating conditions as the most relevant determinants of behavioural control. In this connection, the PBC construct may include such components as "technology facilitating conditions", "resource facilitating conditions", "government support" and "self-efficacy" (Taylor and Todd, 1995).

3.3.4.2 Indirect Antecedents of Behavioural Intention

As discussed previously, direct antecedents of Behavioural Intention were attitude, SN, and PBC. These three antecedents, according to Ajzen and Fishbein (1980), are themselves determined by multiple salient behavioural beliefs towards the behaviour. For instance, according to Taylor & Todd (1995), while attitude directly influences behavioural intention, attitude itself is determined by multiple salient behavioural beliefs derived from the five attributes of innovation introduced by Rogers (1995) towards the behaviour. Also, Ajzen & Fishbein (1980) reported that while the subjective norm directly influences behavioural intention, subjective norm itself is determined by multiple salient behavioural beliefs based on personal referents towards the behaviour. With respect to this part, this study differs from previous IB adoption studies because it examines the effect of two types of salient normative beliefs; the personal and media salient beliefs. Also, According to Ajzen & Fishbein (1980) and

Taylor & Todd (1995), while PBC directly influences behavioural intention, PBC itself is determined by multiple salient Control beliefs towards the behaviour.

I. Behavioural Belief Components

During the past two decades, the rapid and growing advancement of technology provided the financial sector, especially banks, with many innovations. This creates the necessity to understand the characteristics of introduced innovation because Lockett and Littler (1997) said that the providers of the innovation will face the problem of how to be able to identify those users who are most likely to be the first to adopt the new services. A further question is which of the perceived attributes of an innovation are of most importance to the potential adopter who will be most receptive to the new service. Similarly, understanding the overall reasons behind an innovation which is adopted by some people and which fails to be adopted by others, together with an identification of the factors that may influence these decisions is likely to be of considerable practical value (Black et al., 2001). Along this line, Rogers (1983, 1995) suggested five attributes that are assumed to have an effect on the rate of the adoption of an innovation. They are: (1) Relative advantage, (2) Compatibility, (3) Complexity, (4) Trialability, and (5) Observability. With respect to those five innovation attributes, Kautz and Larsen (2000) say that the better the individual's perceptions of these attributes, the higher are the chances of a successful adoption of an innovation.

Innovation characteristics, according to Agarwal & Prasad (1997), do explain acceptance behaviour. In addition, they are important determinants of consumers' adoption decisions (Black et al., 2001). Moreover, Bradley and Stewart (2003) reported that the characteristics of innovation not only influence its diffusion but, its aspiration that includes achievement of competitive advantage, reducing cost and protecting the strategic position of an adopter. Moreover, the perceptions consumers have about the

characteristics of innovations, as reported by Gerrard and Cunningham (2003), are helpful in differentiating the adopters' and non-adopters' views, who are more innovative than the other, the adopters or the non-adopters. The study focuses on an individual's perceptions about the characteristics of innovation to technologies based self-service mainly (Internet banking) as exploratory and predictive variables for user acceptance behaviour. After reviewing a number of studies, Rogers (1983) indicates that the perceived innovation characteristics explained 49 percent to 87 percent of the variance in the rate of adoption of various innovations.

(1) Relative Advantage

Relative advantage is defined as the degree to which an innovation is subjectively perceived as better than the alternative methods available (Roger, 1995) in terms of price, convenience and performance based on Polatoglu & Ekin's (2001) findings. Here for this work, the relative advantages of the banking based self-service via the Internet are perceived to be better than interacting and acquiring the services physically from a bank branch. Relative advantages could be measured in economic, social prestige, and convenience terms. Some adoption research, which has been conducted on the different self-service technologies used in banking, has cited economic benefits (Kolodinsky & Hogarth, 2001; Suganthi et al., 2001; Lockett & Littler, 1997; and Polatoglu, & Ekin, 2001). On the other hand, researchers have cited and identified social prestige terms as relative advantages such as Gerrard & Cunningham (2003) and Rogers (1983). In general, studies in the diffusion of innovation have used the convenience attribute as one of the characteristics of innovation. The evidence is drawn from the IB research done by Kolodinsky and Hogarth, (2001), Suganthi et al, (2001) and Brown et al., (2004) while others utilized the satisfaction attribute of innovation (Brown et al., 2004). The relative advantage variable is positively related to the adoption of innovation, in

which the greater the perceived relative advantage of an innovation, the more rapid its rate of adoption is likely to be. Dimensions of the construct of relative advantage, according to Black et al., (2001)'s study, have some generality including reduced costs and greater convenience. Moreover, savings of time and money have been much cited as relative advantages in several studies such as Polatoglu & Ekin (2001), Suganthi et al. (2001) and Al-Sabbagh and Molla (2004). The innovation-decision is made through a cost-benefit analysis where people will adopt an innovation if they believe that it will, overall, enhance their utility. The economic benefits have been found as good predictors of the innovation's relative advantages, which have been cited by several researchers such as Kolodinsky and Hogarth (2001), Black et al. (2001), Polatoglu and Ekin (2001) and Gerrard and Cunningham (2003). The pricing and cost are the most notably investigated for the economical gain and benefit side of the innovation's relative advantages. For instance, from the Singaporean context, cost is demonstrated as the top-most reason for the non-adoption of IB. In addition, in Australia 55 percent of all respondents consider that unreasonable pricing was preventing them from adoption of IB. From the Malaysian context, Suganthi et al. (2001) found the cost factor of "computers and Internet access" would significantly stand in the way of consumer adoption of IB.

With respect to expected perceived convenience accessibility, Liao and Cheung (2002) demonstrated that the 24-hour access was singled out by 91 percent of Singaporean respondents to be an important factor. Image as an independent variable, was considered by Rogers (1983) as a dimension of relative advantages, which is defined as "the degree to which use of an innovation is perceived to enhance one's image or status in one social system" (Moore & Benbasat, 1991). Rogers (1983) viewed that "one of the most important motivations for almost any individual to adopt an innovation is the desire to gain social status". Image in the context of IB is very

exceptional. Chan and Ming-te (2004) demonstrated that image perceived by the potential adopters according to Hong Kong people was very important and found to be the most significant factor affecting the intention to adopt IB. Moreover, Al-Sabbagh and Molla (2004) were concerned about the image to influence IB where it was considered as a sign of modernity and lifestyle for Oman's respondents. Besides, a study by Brown et al. (2004) deployed terms such as lifestyle and work style. However, this study could not find any previous study of IB that can show the influence of image perception but it could be an interchangeable term between the two variables of relative advantages and compatibility. This matter will be elaborated further under the compatibility attribute.

Authors such as Agarwal and Prasad (1997) show that the advantages of an innovation weighted against another method are positively related to its rate of adoption. It could be possible to say that the advantages IB provides over and above of other banking methods would affect its rate of adoption. Brown et al., (2003) used this concept to explore cell phone banking predictors of adoption in South Africa. Therefore, it will be helpful to employ the same concept but, in the context of IB. Initially, and based on what is stated above, Roger's (1995, p.216) hypothetical proposition (see Hypothesis H4a in section 4.6.1) was used in this study to examine the contribution and linkages of relative advantage in the formation of IB-attitude.

However, relative advantage is one of Roger's five variables, demonstrated to have an influence on the diffusion of new technology but it might be used in another way to predict the adoption rate drivers of that particular innovation in society (Rogers, 1995, p.211). Therefore, the user's expectations of using IB build on its relative advantages dimensions as an independent variable expected to come out with certain factors that could be standing as drivers towards diffusion of IB among its users. In connection with this matter, the researcher took the example from the Oman context.

Surveying IB in Oman, Al-Sabbagh and Molla (2004) found relative advantage together with compatibility, and ease of use as the most important factors affecting IB adoption (intention to adopt). Moore and Benbasat (1991) paid attention to investigating users' perceptions of using an innovation rather than their perceptions of the innovation itself. Therefore, they suggested rewording Rogers' definition. Here, the definition of the attributes of relative advantage introduced by Moore and Benbasat (1991) could be "the degree to which *using* the innovation is perceived as being better than *using* its precursor". The authors also emphasized redefining all characteristics in terms of potential adopters' using trial and observation.

(2) Complexity (Ease of Use)

Kautz & Larsen (2000) define Complexity, as "the degree to which an innovation is perceived as difficult to understand and use". In the context of IB, complexity has been measured in relation to several perceptions. Al-Sabbagh and Molla (2004); Brown et al. (2004); Suganthi et al. (2001) and Kolodinsky and Hogarth, (2001) have cited the user's perception of the difficulty of doing banking over the Internet. However, the authors used different expressions to identify the complexity but quite a number of authors intend to utilize the term of perceived ease of use (PEOU), which Rogers (1995) considered to be a measure of complexity. Subsequently, authors such as Al-Sabbagh and Molla (2004), in the Omani context, Suganthi et al. (2001) in the Malaysian context and Kolodinsky and Hogarth (2000) in the Turkish context, exploited the (PEOU) to predict the extent of simplicity or vice versa (complexity) of a particular innovation tested. Suganthi et al. (2001) empirically considered the user's perception of the ease of performing IB transactions and the ease of navigating the bank's site to be pertinent factors that affect the adoption of IB. Moreover, Suganthi et al. (2001) employed two other dimension of complexity, which are accessibility and reluctance.

With respect to accessibility and in the IB context, Chau & Lai (2003) described accessibility as the physical accessibility of Internet connections, and the global accessibility of the nature of IB round-the-clock. Accessibility, for Chau and Lai (2003), is found to be a significant factor influencing the intention to adopt IB over influencing the perceived ease of use. Thus, if a user finds IB services difficult to access, he or she might be very frustrated and will, therefore, form a negative perception of IB as a complex service. Similarly, Kolodinsky and Hogarth (2001) have demonstrated the difficulty of using and fixing errors as a form of complexity that significantly influenced e-banking adoption. Polatoglu and Ekin (2001) reported no more complexity in IB with well-educated people, who are familiar with the Internet and e-mail. Black et al. (2001) found that complexity in conducting financial transactions over the Internet was inversely related to a user's experience of computers. Reviewing the literature, complexity as an independent variable and in the context of IB, was first used as a predictor for inhibitors of innovation by Al-Sabbagh and Molla (2004). Sathye (1999) used another dimension of the construct of complexity, which is "respondents' reluctant to change". The resistance to change dimension, according to Sathye (1999), shows that only 32 percent of the respondents consider it as the reason for non-adoption but the resistance to change was found to be much higher in the case of personal customers than in the case of business customers. Similarly, this study expects that the complexity variable to predict IB adoption is applicable in the Yemeni context and to Yemeni banking users. Therefore; this study guided by Roger's (1995, p.242) hypothetical proposition, examines the contribution and linkages of complexity (ease of use) to the formation of IB-attitude to use of IB (see hypothesis H4b in section 4.5.1).

(3) Compatibility

Compatibility is defined, according to Rogers (1995, p.224), as "the degree to which an innovation is perceived as being consistent with the existing values, past

experiences and the needs of potential adopters". Hence, compatibility refers to how well a technology fits an individual's working and lifestyle, values and needs. Recently in the context of IB, IB is considered as being consistent with the individual's existing values and needs. A few researchers have cited the issue, for instance, Brown et al. (2004) demonstrated that trialability is a major factor and significantly influenced both Singaporean and South African consumer adoption. The authors Brown et al. (2004) looked into the extent to which using IB fits with working style, with the way preferred to manage financial affairs and lifestyle in the two contexts. In terms of using compatibility as a measure of the values or beliefs of consumers, the ideas they have adopted in the past, and the ability of an innovation to meet their needs, Internet experience according to Brown et al. (2004) showed a greater influence on adoption in Singapore than in South Africa. In addition, Black et al. (2001) conclude that experiences and the values of consumers in the British context appear to have a significant impact on their intention to adopt IB. On the other hand, reviewing the Turkish context and Polatoglu and Ekin's (2001) findings, it is shown that respondents viewed IB as being incompatible due to respondents' preference for using traditional banking channels at bank branches and low levels of e-mail usage. Therefore, lack of compatibility may be a factor hindering the adoption of IB (Polatoglu & Ekin, 2001) and it could be applicable that those who indicated they were comfortable with the Internet were more positive about IB. Thus, a better understanding of innovation allows the consumer to appreciate the benefits brought by new improvements and compatibility. In this connection, this study exploited Roger's (1995, p.234) hypothetical proposition to examine the contribution and linkages of compatibility with the formation of IB-attitude to use of IB (hypothesis H4a in section 4.6.1). Reviewing previous studies of IB with a major focus on compatibility resulted in facilitating the task for us to determine major compatibility dimensions. The existing studies on the

diffusion of IB showed four attributes for compatibility. The attributes proposed to measure to what extent IB fits potential adopters are Banking needs (Polatoglu & Ekin, 2001; Al-Sabbagh & Molla, 2004), Lifestyle (Brown et al., 2004; Al-Sabbagh & Molla 2004), User preferences (Polatoglu & Ekin, 2001), and working style (Kolodinsky & Hogarth, 2000). Some of those mentioned attributes deployed to investigate the influence of compatibility on the IB adoption are used in this study.

(4) Trialability

Trialability is defined as "the degree to which an innovation may be experimented with on a limited basis" (Rogers & Shoemaker, 1971). Enabling users to try out IB services beforehand might suit certain customer's needs toward exploring that particular innovation (i.e. Internet banking). In that way they can test out the system before adoption. Enabling users to trial will perhaps prove how easy it is to use IB compared to traditional methods. It might remove certain perceptions of its complexity. In addition, for those who are hesitant and worried about the service, it may give them the necessary confidence. Brown (2004) elaborated Roger's definition of trialability "as the extent to which users would like an opportunity to experiment with the innovation prior to committing to its usage". From the context of IB innovation, it was found there are two views for trial enabling. The first view studied by some authors who emphasise giving the chance for the potential users to perform a trial by themselves. Those with this view are Brown et al. (2004), Polatoglu and Ekin (2001) and Kolodinsky and Hogarth (2000). Customers who demand to be able to use IB services on a trial basis first, at least for a month, found a major influence on IB adoption in South Africa and in Singapore (Brown et al., 2004). The second view is noted by Al-Sabbagh and Molla (2004) who emphasise enabling customers to note the success of IB by others (influence of user group). However, Al-Sabbagh and Molla's (2004) findings show that the adopter's group of IB was much concerned about how they were influenced by their colleagues to

use IB rather than the group who intend to use it. The research findings of Black et al. (2001) demonstrated that those potential adopters who like the facility but could not find out how to do it are seeking such trials made available and that Web-based demonstrations are helpful. Such care needed in enabling potential users for a secure trial at low cost had been stressed by Polatoglu and Ekin (2001) from the Turkish context. They demonstrated that more rapid diffusion occurs when consumers can have low-cost or low-risk trials of the service. Anyhow, according to Gerrard and Cunningham (2003), banks are responsible for how they can shift the perceptions of customers relating to the characteristics of IB which are viewed in a negative or neutral way, thereby enabling IB to be viewed more favourably. In connection with this, Gerrard and Cunningham (2003) reported that some banks in the US and EU countries have responded to this need by developing Websites, which allow potential users to do practice trials of IB (Black et al., 2001). Therefore, in this study Roger's (1995, p.243) hypothetical proposition was used to scrutinize the contribution and linkages of trialability with the formation of IB-attitude to use of IB (see hypothesis H4c in section 4.6.1).

(5) Observability

In Rogers' (1995) context, observability is the degree to which the results of an innovation are visible to others. Rogers (1995, p.13) pointed out that some innovations only have a software component, and they have a relatively lower degree of observability. Black et al. (2001) have defined the characteristic of observability as the extent to which an innovation is visible to other members in a social system. Polatoglu and Ekin (2001) demonstrated that the more easily consumers can observe the positive effects of adoption, the greater are its chances of success. Meanwhile, Black et al. (2001) conducted a qualitative study of the adoption of Internet financial services found using the Internet for financial transactions, which appears to have little associated

social esteem, therefore, the extent to which others can observe its use does not appear to be a contributor to adoption. Based on Rogers' definition, which includes the word "results", it could be concluded that it is not possible for others to view the results of using IB through customers who use IB unless, as adopters, they are prepared to show the results of their financial dealings to third parties. This is most unlikely to happen.

Chan and Ming-te (2004) argued that IB is less observable than IT innovations because banking and finance are a very sensitive affairs that require an individual's privacy. Also very few people use IB facilities in front of others. Generally speaking, it is possible for individuals once they feel that IB is common among system members to perceive themselves as being left behind if they have not yet adopted it and to have many perceptions of it either positive or negative. The hypothetical proposition provided by Roger's (1995, p.243) was useful to study the involvement of observability in the formation of IB-attitude to the use of IB (see hypothesis H4d in section 4.6.1). In this connection, Moore and Benbasat (1991) viewed the issue of the observability variable within an alternative instrument to measure the perception of adopting IT innovation. According to Moore and Benbasat (1991), the observability variable can be substituted by demonstrability and visibility. Furthermore, Moore and Benbasat (1991) pointed out that potential adopters' mere exposure to objects is capable of making an individual's attitude towards these objects more positive. The main point of concern here is that users' exposure could influence their attitude towards adoption. It was difficult for this research to find literature that addresses the relationship between observability and intention as direct effect. Therefore, this study is going to identify this relationship in the field of Internet banking adoption. Table 3.6 highlights the Key Variables used in IB Adoption Based on the perceived characteristics of innovation (PCI) as follows;

Table 3.6 Overview of PCI Variables Used in Previous Adoption Studies

Variables	Dimensions Description	References
Relative Advantage	Using IB will:	
	1) Enable me to accomplish my banking transactions quickly. (save time) 2)Allow me to manage my finances more efficiently.(quality of work) 3) Make it easier for me to conduct my banking transactions. (ease of use) 4) Allow me to manage my finances more effectively. (effectiveness) 5) Give me greater control over my finances. (control work) 6) Be convenient way to manage my finances. (convenience) 7) Be useful for managing my financial resources. (usefulness) 8) Be a cheaper way to do banking (save cost)	{Moore & Benbasat (1991) 5 items 1-5}, {Tan & Teo, (2000) 6 items 2-7} , {Al-Sabbagh & Molla, (2004) 5 items 3, 5-8}, {Brown et al. (2004) 5 items 3-7}, { Lai and Li (2004) 6 items 1-5 and7}, { Polatoglu & Ekin (2001) and Suganthi et al. (2001) 3 items 1, 6, 8} and {Gerrard & Cunningham. (2003), 6, 8,}
Compatibility	Using IB	{Moore & Benbasat (1991) and Tan & Teo (2000); Brown et al. (2004) 3 items 1-3},{Al-Sabbagh & Molla, (2004) 2 items 1, 2 }, { Polatoglu, & Ekin, (2001)}, {Gerrard, & Cunningham, (2003)}as well as the 3 used by Agarwal, & Prasad,(1998) for measuring compatibility of WWW
	1) Is compatible with my lifestyle. 2) Fits well with the way I like to manage my finances. 3) Using the Internet to conduct banking transactions fits into my working style	
Complexity (Ease of Use)	1) Using IB requires a lot of mental effort. 2) Using IB can be frustrating. 3) IB is an easy way to conduct banking transactions. (R)	Moore & Benbasat (1991), Tan, & Teo (2000)}and {Gerrard, & Cunningham (2003)}
Trialability	1) I want to be able to try IB for at least one month. 2) I want to be able to use IB on a trial basis to see what it can do.	{Moore &Benbasat (1991)}, {Tan & Teo (2000)}and { Polatoglu,& Ekin (2001)}
Observability	Moore & Benbasat (1991) argued that observability has ambiguity problem, as well as Tan & Teo (2000) who did not include the observability on their models.	

II. Normative Belief Components

SN reflects the individual's perception of social support for or opposition to his or her performance of the behaviour (Ajzen & Fishbein, 1980). Mainly, subjective norms have two separate components. The first component is normative beliefs, which are actors' perceptions that certain individuals want them to perform the behaviour. The second component is motivation to comply, which represents the relative importance of the referent persons to the actor. These two elements of behavioural intentions are determined by the extent to which the actor believes the behaviour is desired by significant referent others, multiplied by the actor's motivation to comply with those

referents. Again, all subjective norms are added together to determine the overall position of salient others toward the behaviour (Ajzen & Fishbein, 1980). In connection with this, Rogers' (1995) DOI posited that any individual's decisions to adopt or reject an innovation is independent but, may still be influenced by the norms of the system and by interpersonal network.

Bearden et al. (1986) and Karahanna et al. (1999) categorized social influence (normative belief) into two types, which are informational-based influence and normative influence. According to Bearden et al. (1986) and Kelman (1961), both forms of social influence are thought to operate through the processes of internalisation, identification, and compliance. Bearden (1986) posited that the normative component does not discriminate adequately between informational-based social influence and influence that is truly normative in nature. Rogers (1995) pointed out that information about innovation can be actively sought by individuals after they are aware that the innovation exists and also when they know which source or channel can provide further information about the innovation. Rogers (1995, p.192) said that the importance of different channels or information sources about the innovation is determined by their availability to the audience of the potential adopter.

Informational influence, according to Bearden et al. (1986), occurs when individuals accept information as evidence of reality. In the diffusion of innovation literature, some researchers have focused on the process by which adoption occurs (Rogers, 1995). This approach, according to Rogers (1995) and Liao et al. (1997), asserts that the adoption of an innovation is primarily the outcome of a learning or communications process. The outcome of a communication process in this study refers to an individual's awareness-knowledge of innovation existence and its attributes (Aggarwal et al., 1998). In the two early stages of the adoption process, communication channels, according to Rogers' (1995), play different roles in creating knowledge versus

persuading individuals to change their attitude towards an innovation. Here, it becomes clear that many potential adopters form their opinions of an innovation based on the information conveyed via the mass media and impersonal channels. Furthermore, Rogers (1995) and Aggarwal et al., (1998) posited that one method to speed up the process by which innovations are adopted is to communicate the information about the innovations more rapidly. These two fundamental sources of information will be discussed in the following sections.

(1) Norms of Mass Media Channels

The mass media are often the most rapid and efficient means of informing an audience of potential adopters about the existence of an innovation, that is, to create awareness-knowledge (Rogers, 1995, p.18). The mass media include all those media of transmitting messages such as the radio, television, newspapers, the Internet and so on. The influence in this channel is "informational" in character as inferred from Aggarwal et al., (1998). In a study of electronic commerce adoption, Battacherjee (2000) utilized a similar construct called the external influence which is best exemplified by the influence of the mass media. The mass media have some advantages represented by their ability to reach a large audience rapidly, create knowledge, spread information and lead to changes in weakly held attitudes. Furthermore, the expected effects of mass media channels were generalized by Rogers (1995) as more relatively important at the knowledge stage of the innovation-decision process.

(2) Norms of Interpersonal Channel

Interpersonal channels involve face-to-face contact. Rogers (1995) pointed out that interpersonal channels are more effective in persuading an individual to accept a new idea, especially if the interpersonal channel links two or more individuals who are similar. Battacherjee (2000) demonstrated that the SN is determined by interpersonal influence (e.g. word of mouth). The effects of Interpersonal channels are generalized by Rogers (1995) as more relatively important at the persuasion stage of the innovation-decision process. Interpersonal channels provide "a two-way exchange of information" enabling greater and more effects on individuals at the persuasion stage. This study suggests three types of interpersonal referents that might have an influence on the individual's behaviour toward the use of IB. These referents are opinion leaders, closer persons (friends, family, colleagues and peers), and the people of the bank with whom users have interaction when they need bank services. In line with Burnkrant and Cousineau, (1975) this study reserve the term normative social influence for these credible sources which believed to be an expert or very knowledgeable persons on the topic under discussion.

In previous studies of IB adoption, researchers such as Brown et al. (2004) and Shih and Fang (2004) investigated the influences of some referents like friends, family, colleagues and peers but no one had considered the possible influence of opinion leaders as well as the referent that is relevant to banks' employees. Opinion leaders are individual members of the social system in which they exert their influence and lead in influencing others' opinions about innovation (Rogers, 1995). In connection with this, our study introduces these new referents because it is a useful and very important point of view. For instance, the study has several reasons to consider bank's employees as important people that customers may refer to in deciding on a behaviour. The reasons are that potential adopters of IB might be subjected to the influences of a bank's

employees rather than their friends and family in adopting new technology related to their financial affairs. The second reason is that the bank's staffs interact most frequently with customers in their financial life or when they come to transact or use the bank's service. The third reason is that a customer might perceive that the bank's staff are knowledgeable, have expertise in banking affairs and want customers to interact with the bank electronically. Prior research on the adoption of computers in Saudi Arabia conducted by Yavas et al. (1992) point out that when opinion recipients turn to leaders for advice and information, they usually do so because of their belief that opinion leaders are knowledgeable about the subject matter (Rogers, 1995). Furthermore, Yavas et al. (1992) posited the view that when opinion leaders disseminate information about computers, the word-of-mouth communications will be favourable. Although the adoption of IB technologies is a voluntary decision, the normative pressure from superiors and peers during the early stages of behaviour is expected to weigh heavily on individual intent. In other words, the direct relationship between SN and intention can be explained as compliance where an individual accepts influence in order to gain a favourable reaction from another person or group (Warshaw 1980; Venkatesh & Davis, 2000).

III. Control Belief Components

The existing literature review related to the PBC construct has identified three antecedents, which contribute in forming the influence of the PBC construct. Some of these predictors go beyond the motivational factors such as availability of requisite opportunities and resources (Ajzen 1991).

The proposed antecedents of PBC to investigate the IB adoption here will be adapted and drawn from the decomposing control belief structure inspired by Taylor and Todd's (1995a) DTPB Model. The study projected this structure because it

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combined the control of internal and external beliefs. The following diagram explains the variables of the PBC construct.
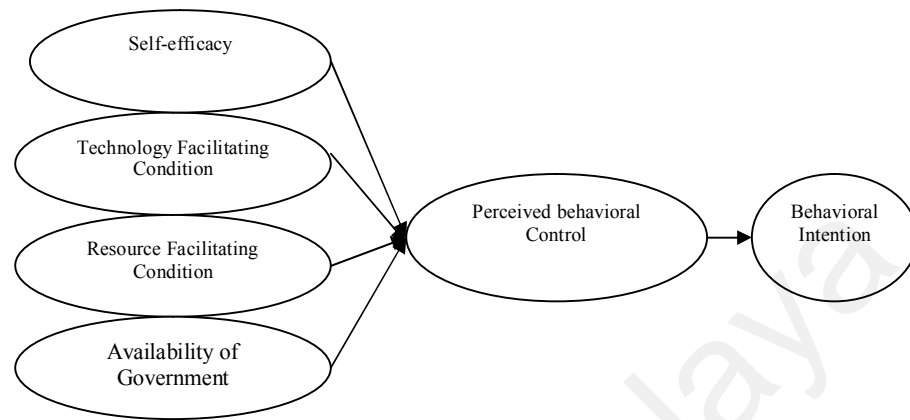
Figure (3.4) PBC Antecedents
(Source: Taylor and Todd's (1995a)'s DTPB**)**

According to Taylor and Todd (1995a), the decomposed model has advantages similar to the TAM and incorporates additional important determinants of behaviour that are not present in the TAM such as perceived ability and control.

The formal PBC determinants in the DTPB are self-efficacy, the technology facilitating condition, and the resource facilitating condition. The following sections are going to elaborate those determinants in further detail.

(1) Self-Efficacy (SE)

Self-efficacy is a construct derived from social cognitive theory. Gist and Mitchell (1992), in their literature review of (SE) provided the three definitions. First, self-efficacy is a comprehensive summary or judgment of perceived capability for performing a specific task. Second, self-efficacy is a dynamic construct. Third, efficacy beliefs involve a mobilization component; self-efficacy reflects "a more complex and generative process involving the construction and orchestration of adaptive performance to fit changing circumstances" (Gist & Mitchell, 1992). From the IT perspective

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computer self-efficacy is defined as "the judgment of one's ability to use a computer" (Compeau & Higgins, 1995). Applied to IB, SE describes consumers' judgments of their own capabilities to use the Internet to get access to the bank's information, financial services and transactions online. Hartzel (2003) points out that self-efficacy is the measure of one's confidence in mastering a new challenge. Recent studies of (IS) have provided empirical support for the relationship between self-efficacy and outcome expectations. For instance, Hartzel (2003) showed that computer self-efficacy is an important determinant of an individual's decision for software adoption and use. In a different study, Compeau and Higgins (1995) found self-efficacy to play an important role in determining computer usage, both directly and through outcome expectations. In contrast, Igbaria and Iivari's (1995) study reported that self-efficacy has an insignificant direct effect on perceived usefulness. Recent studies of IB have provided empirical support for the relationship between self-efficacy and IB adoption. The existing studies of Tan and Teo (2000), Lai and Li (2004), and Brown et al. (2004) showed that computer self-efficacy is an important determinant of an individual's decision to adopt IB and significantly influences its adoption. In this connection, self-efficacy, according to Davis et al. (1989), is one of the two mechanisms by which EOU influences attitudes.

Lopez and Manson (1997) argued that the constructs of computer self-efficacy must be directed towards improving the perceived usefulness of an Information System (IS). This is in line with the Theory of Reasoned Action (TRA) in that individuals would use computers if they could see that there would be positive benefits (outcomes) associated with using them (Fishbein & Ajzen, 1975). Compeau and Higgins' (1995) efforts attempted to develop a measure and initial test of computer self-efficacy.

(2) Facilitation Conditions (FC)

The facilitating conditions (FC) construct was originally viewed as an external control related to the environment (Triandis, 1980; Taylor & Todd, 1995a), therefore, understanding the anticipated influence of facilitating conditions is very important in studying human behaviour in IS and especially in studies like the "adoption of IB". The proposed framework of this study concerns the facilitating condition as one of the external factors that is theoretically proposed in Taylor and Todd's (1995a) DTPB to influence the users' behavioural intention towards adoption of IB. The inclusion of facilitating conditions means that behaviour cannot occur if objective conditions in the environment prevent it (Triandis, 1980), or if the facilitating conditions make the behaviour difficult (Thompson et al., 1994). Similarly, in Thompson et al. (1991)'s review, it was pointed out that behaviour cannot occur if objective conditions in the environment prevent it. Furthermore, facilitating conditions, according to Ratnasingam et al. (2005), contribute to an orderly manner of transacting electronically and abiding by certain procedures that contribute to best business practices for e-marketplace participation.

Facilitating conditions originally have two dimensions: resource factors (such as time and money needed) and technology factors regarding compatibility issues that may constrain usage (Taylor & Todd, 1995a). In this connection, adoption of new technology related to the field of information systems requires service providers to make sure of the availability of an adequate and fertilized environment that facilitates the adoption. In this scope, the facilitating conditions are defined in Thompson et al. (1991)'s review as "objective factors, `out there` in the environment, that several judges or observers can agree make an act easy to do". With respect to the facilitating condition, Taylor and Todd, (1995a) argued that when all other things are equal,

behavioural intention and IT usage would be expected to be less likely as less time and money are available and as technical compatibility decreases (Taylor & Todd, 1995a).

Investigating the possible influence or impact of facilitating conditions on the user's behavioural intention toward adopting IB, as well as the control belief of adopting IB cannot be neglected. However, facilitating conditions in the Triandis model (1980) only affect the actual behaviour, but the modified model inspired by Chang & Cheung (2001) postulates that facilitating conditions can have significant impacts on the intention to use Internet and WWW. Similarly, Venkatesh et al., (2003) pointed out that the facilitating conditions construct is similar to PBC, which affects both the behavioural intention and actual usage. Furthermore, Venkatesh et al. (2003) suggest that the relationships between each of the constructs (PBC, facilitating conditions, and compatibility) and intention are similar.

In the IS literature, the facilitating conditions variable is utilized in the prediction adoption of new technology. For example, Cheung et al., (2000) predicted Internet and World Wide Web usage, and Cho and Cheung (2003)[2] predict online legal service adoption in Hong Kong. Hung et al., (2003) utilized this variable to study factors of WAP services adoption. Venkatesh (2000) also highlighted it as perceptions of external control that are expected to exert its influence in the form of individual perceptions of technology. Recently, Venkatesh et al. (2003) found that it predicts user acceptance of information technology.

Early studies of IB adoption look into factors that influence its adoption. For example, Tan and Teo's (2000) framework investigates facilitating conditions within two dimensions. The two dimensions are availability of government support and availability of technology support. More recently, a study on IB conducted by Shih and Fang (2004) in Taiwan found that facilitating conditions did not influence PBC.

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[2] www.sba.muohio.edu/abas/2003/vancouver/cho_on_line_legal_service_adoption.pdf

However, Wang et al. (2003) investigated the determinants of user acceptance of IB based on the TAM model. Their findings recommended adding such variables related to social factors like SN, and facilitating conditions similar to PBC to predict usage intentions more accurately. The researchers believe that "the more success in adoption or diffusion of new technologies in the field of information system reflects, the more conditions have been facilitated. In the field of adoption and diffusion technology, the set of conditions can be named either as drivers or as challenges, sometimes called inhibitors, factors that delay, and perhaps prevent the adoption or motivators that speed up the adoption. This study suggests three types of conditions to be examined. These types are technology, resources and government support. The evidence of their relevant importance to IB adoption will be highlighted in the following sections.

(A) Technology Facilitating Conditions

Users' perceptions of technology support for providing IB services in developed countries such as Singapore might not be important as reported by Tan and Teo (1999), but this case might be different and not applicable to the developing countries where technology infrastructure is not that advanced as it is in Singapore or in Western countries like the USA and UK. In a similar case, Shih and Fang (2004) demonstrated the absent influence of the technology facilitating conditions (latent) on the PBC construct because most respondents were familiar with the Internet and thus they had easy access to technological resources and infrastructure. In a study to investigate barriers to IB adoption among corporate customers in Thailand, Rotchanakitumnuai and Speece (2003) pointed out that the technology readiness of corporate customers plays a role in their attitudes toward technology. Prior research (e.g. Dabholkar, 1996) similarly indicated that customers' attitudes and beliefs about technology are correlated with their intentions to use it. Similarly, Thompson et al. (1991) pointed out that the provision of

support for users of PCs may be one type of facilitating condition that can influence system utilization.

Prior research discussed technology facilitating from the perspective of IT infrastructure. For example, facilitating conditions, according to Venkatesh, et al. (2003), refer to the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of the system. Ratnasingam et al. (2005) utilized the concept of IT connectivity. They identified three dimensions of IT connectivity, namely IT compatibility, IS telecommunication infrastructure, and internal integration. IT connectivity, according to them, refers to the technological mechanisms that enable banks to be IT connected in order to undertake transaction exchanges. In the context of information system use, availability of training and provision of support are considered as a form of facilitating conditions because by training users and assisting them when they encounter difficulties, according to Thompson et al. (1991), some of the potential barriers to use are reduced or eliminated. This variable was tested in a number of technology acceptance studies, and empirical support was found for the proposed effect on perceived usefulness or perceived ease of use (Thompson et al., 1994; Taylor & Todd, 1995; Jiang et al., 2000 and Venkatesh, 2000). In this study, technology facilitating conditions include accessibility to the Internet, hardware, software, network connections, etc. that allow individuals to access the Internet when they want to, as well as the support provided by banks to facilitate the use of IB.

(B) Resources Facilitating Conditions

The second component in "facilitating conditions" is the resources required to use a specific system. Examples of such resources are time, financial resources or other ICT-related resources. Lu et al. (2003) pointed out that policies, regulations, and the legal environment are, therefore, all conditions critical to technology acceptance.

Furthermore, Cheung et al. (2000) pointed out that people require not only necessary resources but also the support to perform a behaviour. In this connection, such training programmes combined with the appropriate resources as highlighted by Venkatesh (2000) should pave the way for the acceptance and usage of new systems.

(C) Facilitating Government Support

Government can play an intervention and leadership role in the diffusion of innovation (Gurbaxani et al. 1990 and Tan & Teo, 2000). In Yemen, it has been recognized that the local government agencies such as the PTC, TeleYemen, and the Ministry of Information Technology are major driving forces in the diffusion of information technology (refer to sections on the country background in chapter 2 for further explanations). Specific government support for IB diffusion is still not recognized as the efforts exerted in this field are still not documented. It is not within the scope of this study to measure the level of support from the Yemeni government, but the research attempts to measure the perceptions of Yemeni users with regard to the government's supportive role for IB adoption. Government support, according to Tan and Teo (2000), is an important factor in the adoption of IB by Singaporeans. Such a case may apply to countries like the Yemen where the government's role in encouraging innovation adoption is still unknown. Government support to facilitate the diffusion of innovation can take several forms. For instance, Lee-Partridge and Ho (2003) suggested some kinds of support that governments can provide such as "setting regulations that minimize security risks" and "taking more specific actions to encourage a higher level of online trading to complement its emphasis on e-lifestyle". Furthermore, when the government gives support to e-commerce, it is also one form of support to the diffusion of IB (Tan & Teo, 2000). From our point of view, "the greater the level of government support perceived by potential users, the more likely they would be to adopt IB.

3.3.4.3 User's Informational-Based Readiness Factor

The user's readiness for IB is a proposed construct developed to undertake the informational aspects related to the user's behavioural intention that may affect adopters' decision to accept or reject the introduced innovation. This construct attempts to capture potential adopters' status in term of maintaining the required informational knowledge, experience and exposure to IB. In addition, the construct seeks to examine the possible influences of UIBR's attributes on the attitude and behavioural intention of potential adopters. This study introduces the UIBR construct, which involves four latent dimensions proposed to influence potential adopters' behavioural intention to adopt IB.

I. Concept of User's Informational-Based Readiness

This study's framework proposed four dimensions of the "User's Informational-Based Readiness" construct. These exogenous variables are "awareness knowledge" (e.g. Rogers, 1995; Hall et al., 1977)", "How-to use knowledge (e.g. Rogers, 1995; Hall et al., 1977), "Experience" (e.g. Karjaluoto et al., 2002) and "Exposure" (e.g. Chang, 2004). The concept of User's Informational-Based Readiness (UIBR) related to the innovation has received limited attention in the previous literature on IB. This study postulates the construct with its four attributes, which are proposed to capture the potential adopters' level of IB readiness. The study defines UIBR as the potential adopters' assessment of their awareness, knowledge, experience and exposure to the related technologies available or recommended by referents, which reflect their informational abilities to adopt or reject the innovation.

This study attempts to investigate users' readiness within three major themes. The first theme is the potential adopters' prior knowledge and its influence on predicting IB adoption. This theme has been divided into the two dimensions of

"awareness" and "Knowledge". The second theme is the potential adopters' prior experience and its influence on predicting the adoption of IB. Lastly, the third theme is the potential adopters' exposure to IB, recommendations of its related technologies and its influence on predicting IB adoption. These three themes provide four variables which are projected to capture the readiness of potential adopters in the aspects in order to examine in what directions these variables collectively influence in predicting IB adoption. The user's prior knowledge and experience of IT and IB exposure aspects are important factors proposed to contribute in predicting the behavioural intention towards IB adoption. These attributes have been discussed separately in the literature of Information System (IS). Some of these attributes are examined as a single variable in the emerging field of IB. For instance, Chang's (2004) study undertook the exposure attribute while Karjaluoto et al. (2002) sought consumers' experiences. The way this study utilizes these attributes differs from the previous studies by integrating the two attributes with another additional two attributes not sought yet in the field of IB. In addition, these proposed variables that are categorized in this study as user's informational-based readiness are going to be examined in this study for the first time in the context of IB. The following sections will give the necessary details about these themes.

(A) Prior Knowledge Theme

Bierly-III et al. (2000) utilized Webster's definition of knowledge as a clear and certain perception of something; the act, fact, or state of understanding. In addition, they said that knowledge involves both knowing how and knowing about the object. Knowledge functions in the innovation-decision are discussed in Rogers' (1995) Theory of Diffusion of Innovation, which projected that knowledge of innovation can create motivation for their adoption (Rogers, 1995). Therefore, our study presumes that

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knowledge in all its forms is an obvious resource in the process of IB adoption**.** Three types of knowledge, according to Rogers (1995, p.165), can assist individuals to understand innovation and reduce uncertainty about its advantages and disadvantages. Similarly, it is important to the innovation providers too. Guerrero et al. (2005) pointed out that the knowledge of current financial customers' Internet-related behaviour will help to identify those most likely to adopt IB services. Accordingly, this study projected that the informational approach could serve hand-in-hand with the attitudinal approach in order to assess potential adopters' readiness for IB adoption. Awareness-knowledge is the first type of knowledge under this theme while the other two additional types of knowledge are "How-to"-Knowledge and principle-knowledge (Rogers & Shoemaker, 1972 p.106). The following sections elaborate on knowledge types in more detail but the focus of this section is to assess potential adopter readiness by measuring their awareness and knowledge of IB.

How-to Knowledge, according to Rogers (1995 p.165), refers to the "information necessary to use an innovation properly". It implies from the result of past studies, as Rogers & Shoemaker (1972, p.104) mentioned, that individuals who became aware of the innovation late were more likely to learn (seek how-to knowledge) about the innovation. With respect to our topic, Mattila et al. (2003) pointed out that banks need to pay more attention to educating customers on how to use IB, and integrating personal services with the Internet bank interface. Since learning how to use IB by observing other users is difficult because of privacy and other users' considerations, training potential users is the alternative option for diffusing the adoption. Even the expert IB users, as mentioned by Mattila et al. (2003), complained at the very beginning that nobody had trained them or even showed them how to use IB in practice. In connection with this, low levels of knowledge of how to use IB might influence a potential adopter's attitude and willingness or ability to use it. This study hypothetically proposed

that potential adopters who are aware of IB would be more likely to adopt it if they were given more opportunity to learn how to use it and have more understanding of the advantages of IB. In addition, potential adopters' prior knowledge can play a role in the formation of the choice process as indicated by Bettman and Park (1980).

Principle-Knowledge is the third type of knowledge introduced by Rogers (1995), which consists of information dealing with the functioning principles underlying how the innovation works. This stage of knowledge is not included in this study since our respondents are potential adopters and the major concern of this part is to undertake the "Awareness" and "Informational" approach.

(B) Awareness Theme

One type of knowledge is the potential adopter's awareness that an innovation exists (Rogers, 1995). This type of knowledge is described in the adoption process by Rogers and Shoemaker (1972, p.105) as commencing when the individual is exposed to the innovation's existence and gains some understanding of how it functions. Awareness-knowledge is conceptualised as occurring due to random or non-purposive activities by the individual (Rogers & Shoemaker, 1972, p.106). Therefore, awareness of IB as defined by Sathye (1999) is to understand whether the customer is aware ore not aware of the service itself and its benefits. In this manner, a customer's awareness-knowledge of new technology is one of the more important factors influencing the adoption or acceptance of any innovative service or product. Awareness-knowledge based on Rogers and Shoemaker, (1972, p.106) is a selective exposure in which individuals tend to expose themselves to those ideas, which are in accord with their interest, needs or existing attitudes. Consequently, it implies that if individuals have the capabilities needed for selective IT exposures, they will be more ready for implementing Internet-based systems.

In this connection, Sathye's (1999) findings show that lack of awareness of IB and its benefits stands out as being an obstacle to the adoption of IB in Australia. Therefore, creating awareness is an important characteristic for any innovative service adoption (Sathye, 1999). In this connection, Tan and Teo (2000) and Cheung (2001) suggested that banks offering IB could play a role to direct potential adopters' awareness by launching promotional campaigns on IB. In addition, Sathye (1999) says that bank managements could build awareness by emphasising the benefits of IB in comparison with telephone and branch banking. Furthermore, according to Tan and Teo (2000), banks have to educate potential customers about security issues such as fears of privacy and security risks together with the relative advantages of using IB services. Suganthi et al. (2001) assert that several authors emphasised the importance of awareness for the adoption of any innovation. Furthermore, increasing the levels of awareness of innovation of e-commerce among users has been identified as a major catalyst to encourage the adoption of online technologies and is necessary to develop expertise in online technologies to become `smart' communities and be more competitive in the global marketplace (Goldsworthy, 1998).

In addition, Rogers (1995) highlighted that an individual or other decision-making unit first becomes aware of the existence of an innovation (knowledge stage). More interestingly on this topic is that Rogers (1995, p.142) views knowledge as a way of technology transfer by which the receptor gets to know about technological innovation as the result of mass communication messages about the new idea.

(C) Prior Experience Theme

In this section, the study attempts to investigate the influence of potential adopters' prior experience on their intention of the adoption of IB. When someone read about computing technology, individuals often come across the word experience.

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Furthermore, Wang et al. (2003) pointed out that previous research has suggested a positive relationship between experience and computing technology. Experience that an individual has gained over years of educational learning systems is important because it contributes to understanding at least some innovation attributes. For instance, Sundarraj and Wu (2005) linked the level of education with experience and observe that graduate students have more experience and can, therefore, see the increased benefits of online banking compared to undergraduate students. Rotchanakitumnuai and Speece (2003) pointed out that a simple lack of experience can inhibit IB adoption among corporate customers in Thailand.

Studies Employed Experience: The empirical part of this section focuses attention on the impact of customer experience in determining the adoption of new banking service delivery systems. According to Dickerson and Gentry (1983), experience is defined as a psychological construct. This variable has been utilized in major areas of IS adoption research but very few have used it in the area of IB. A customer's Internet experience is a new variable recommended by Wang et al. (2003) to be investigated in future research. In this connection, researchers believe that maintaining experience of the Internet by bank customers could be very important at least with some segments of bank customers who need more Internet's experience before using online banking (Aladwani, 2001). Similarly, maintaining experience in computers on the part of bank customers could be a requirement of successful adoption as Igbaria et al. (1995) found that computer experience would affect adoption through beliefs both directly and indirectly. Computer experience, expressed as computer self-efficacy in a study by Wang et al. (2003), was found to be an important determinant of perceived ease of use, perceived usefulness, and perceived credibility of IB

In previous research, Dickerson and Gentry (1983) indicated that adopters of home computers are likely to be more active information searchers and have more

previous experience in the use of computers and other related technologies. In Finland, Karjaluoto et al. (2002) found that attitude towards IB and actual behaviour were both influenced by prior experience of computers and technology as well as attitudes towards computers. Furthermore, Sarel and Marmorstein (2003) pointed out that prior experience with computers and technology seems to be a key correlate of early adoption. Similarly, Black et al. (2001) concluded that previous computer experience is the main factor positively influencing the adoption of e-banking services. However, Feldman and Jr (1988) pointed out that people are more likely to form an attitude towards an object spontaneously if they have direct experience of it than if they simply read information about it. Some authors such as Taylor and Todd (1995b) pointed out that exposure to and experience of related products may increase perceived compatibility. Conceptually, prior experience of technology refers to consumers' experiences associated with the use of different technologies while computer experience is associated with the use of PCs, the Internet, and e-mail. Venkatesh et al. (2003) pointed out that experience was not included in the original TPB or DTPB but some authors like Karjaluoto et al. (2002) made a contribution to this topic.

Igbaria et al. (1995) pointed out that acceptance of computer technology depends on the technology itself and the level of skill or expertise of the individual using the technology. On the other hand, Agarwal and Prasad, (1999) found that those who have greater prior experience of similar technologies are likely to have positive beliefs about new technologies. Surprisingly, in a study conducted by Liao and Cheung (2002) it was found that expected perceived user experience is not a significant determinant of willingness to use Internet-based e-retail banking. In contrast, in a study of customer adoption of Tele-banking, Al-Ashban and Burney's (2001) findings reveal that customers tend to increase their usage of Tele-banking services as a function of their

past experience. This implies that perceived user experience is still a debatable issue especially in such different contexts.

(D) Exposure Theme

The level of IT exposure is an important and emerging attribute and may influence the potential adopters' behavioural intention to adopt IB. The individual exposure not only to IB but also to other related products is important as Taylor and Todd (1995b) claimed that exposure to related innovative products may increase perceived compatibility. A number of authors have reported on some of the related innovations such as IB exposure (e.g. Chang, 2004), PC ownership and PC experience (e.g. Seyal et al., 2002). The term exposure has been cited in the literature of IS adoption (e.g. Khalifa & Cheng 2002; Lim et al., 2002; Karjaluoto et al., 2002; Sathye 1999). Al-Ashban and Burney's (2001) findings on telephone-based banking show that adoption is a process in which the more exposed a customer is to innovation, the more the customer develops his/her understanding and trust of the service and consequently, the greater the increase in his/her usage frequency of that innovation. Khalifa and Cheng (2002) point out that observation may be the most common source of exposure.

Importance of Exposure, Authors such as Lim et al. (2002) postulated that low levels of exposure may lead to the absence of attitudinal effects, as the lack of knowledge and experience may prevent the formation of attitudes. Similarly, Patten et al. (2003) hypothesized that exposure to the technology will increase both users' perceived ease of use (reduce user's perception complexity) and perceived usefulness (relative advantages) as well as decreasing users' perceived risk. Consequently, Khalifa and Cheng's (2002) findings revealed that the effects of exposure on intention are not direct but rather mediated or moderating. Very recently, Chang (2004) pointed out that exposure to the new technology plays an important role in IB adoption decisions. For

instance, Khalifa and Cheng (2002) found that the relationship between attitude and intention is strengthened by the effect of exposure.

II. UIBR Dimensions and Innovation's Related Products

Banking transactions through the Internet and its related products, as Liao et al. (1999) highlighted, are developing now and promising enormous opportunities to the banking industry. From the organisational context, Davis' (1989) TAM that was developed to explain why people accept or reject new technologies was specifically designed while keeping in mind the adoption of information-technology related products (Eriksson et al., 2005 & Ba-Alawi, 2003). Innovation related products mentioned in this study mean technological products that are very close or similar to innovation or the first part of the innovation components. In previous research, Tan and Teo (2000) had linked the definition of "Internet experience" to the related products when they defined it as the "prior experience of using a similar class or type of technology". In terms of cell phone banking, Brown et al. (2003) pointed out that those with greater cell phone experience are more likely to use cell phone banking. Since the researcher is concerned with studying the adoption of IB innovation, the related products covered by our study are limited to the main three objects of the computer, the Internet, and personal banking experience. Generally speaking, when a customer gains awareness, knowledge, prior experience, and exposure to related products of innovation, those objects may contribute in predicting the behavioural intention to adopt it. The researcher notes that investigations into the related products' role in influencing the adoption are growing. For instance, Mattila (2003) pointed out that the adoption of mobile banking services depends on the adopter's ability to develop new knowledge and new patterns of experience. According to Mattila (2003), this ability can be enhanced by the knowledge gained from related products. On the other hand, Lim et al. (2002)

postulated that high exposure to IB and its related innovation products may enhance one's knowledge and experience and help to shape one's attitude. Furthermore, Taylor and Todd (1995b) reported that exposure to and experience of related products may increase innovation's perceived compatibility.

III.   UIBR & Dimensions Relations

Prior IS adoption research, which utilized any of the UIBR dimensions, used to come with huge correlations either with the main construct or entirely among them. For instance, there are integrated relationships between the two UIBR attributes of knowledge and experience. Evidence is drawn from Prescott and Conger (1995) who pointed out that innovation's value increases with experience because initial knowledge requirements act as barriers to adoption. Also, authors such as Fishbein and Ajzen (1975), Taylor and Todd (1995) and Lim et al. (2002) postulated that prior knowledge gained from past behaviour would help to shape intention because experience makes knowledge more accessible in the memory by which it is easier to remember. Acquiring knowledge may also make low probability events more salient. This implies that experience and knowledge are also integrated in a way themselves ensuring their consideration in the formation of intentions (Ajzen & Fishbein, 1980). This implied that intention and usage may be more effectively modelled for experienced users. More recently, Moon (2004) pointed out that consumers' prior knowledge and experience influence the information processing modes and inferences.

Furthermore, several studies examined the relationship between experience and some of the DTPB constructs. For instance, Taylor and Todd (1995) found that SN predicted intention better when users had no prior experience than when they did. At the same line, Karahanna et al. (1999) demonstrated that attitude becomes more important with increasing experience, while SN becomes less important with increasing

experience. In addition, Kerem (2003) pointed out that prior web experience has an impact on the persons' beliefs about computers and technology. Therefore, he considers it as quite obvious that the same also applies to IB. In this aspect, this study proposes that the more informational-based ready an individual is, the more likely he is to translate favourable attitudes into intentions to adopt IB.

3.4 Characteristics of IB Adopters

Recently, authors of online banking studies have given factors of the user's characteristics, lifestyle and demographics considerable attention in their studies of IB adoption (e.g. Chang 2004; Brown et al., 2004; Lai and Li, 2004; Polatoglu & Ekin, 2001; Kolodinsky & Hogarth, 2001; Tan & Teo, 2000 etc). The effects of demographic variables and other user characteristics on the adoption of IB still need more studies in different contexts especially from the non-western context such as Yemen. In general, a user's characteristics are part of this study's framework. Therefore, the researcher has strong motivation to discuss the issue in depth as well as to look into the relationships demonstrated between users' characteristics and the adoption of IB in the earlier IB literature.

3.4.1 Importance of Adopters' Characteristics

Understanding user characteristics is very important to (IB) service suppliers, and domestic banks which plan to offer IB because the bank's decision to adopt IB technologies depends "at least or in part" on the characteristics of users whom banks are serving. In connection with this, McPhail and Fogarty (2004) pointed out that the rate of diffusion of Self-Service Banking Technologies (SSBT) is more determined by a customer's acceptance than by the seller's offerings. Past research on IB has shown that

the demographic characteristics of a bank's potential customers are important factors that a bank should consider when they decide to offer IB services. For the past six years, demographic variables themselves have been a primary focus in previous IB implementation research. More specifically, authors have paid attention to users' characteristic variables in their research to understand how a user's adoption rate and behavioural intention are affected by demographic variables. For example, in the Australian context, Mattila et al. (2003) pointed out that some demographic variables are good predictors of adoption rates. Earlier, Rogers & Shoemaker (1972) demonstrated that early adopters of innovation can be distinguished from later adopters according to their personal characteristics.

3.4.2 Adopters' Characteristics

Adopters' characteristics in the previous Information System and IB adoption studies were drawn from individuals' demographic factors. Information System (IS) studies have many demographic variables which were empirically tested and reviewed in different contexts. For instance, in the Korean context, Chang's (2004) study employed ten demographic variables to identify Korean IB adopters and understand their behaviour. Kaynak and Kara (2001) pointed out that demographic dimensions have received wide acceptance, and lend themselves easily to quantification and are readily available for consumer classification. Reviewing the existing research on IB resulted in many demographic variables, which were empirically used to evaluate users' behavioural usage of IB such as age, gender, and marital status. Moreover, Kaynak and Kara (2001) argued that the use of demographics is insufficient because they often need to be supplemented with additional behavioural constructs, therefore, authors such as Chang (2004) add the socio-economic characteristics like education, profession, income, size of household, degree of exposure, residential area, property ownership, and

Internet usage. Lockett and Littler's (1997) study of direct banking services adoption incorporated some of the socio-economic variables such as income, education level, length of working per week and house removed. Also, in the literature review, the study found three empirical studies which mainly sought to study the influences of user characteristics on the adoption of electronic banking. The first study conducted by Kolodinsky and Hogarth (2001) sought to investigate the user's demographic variables influences on the adoption of four electronic banking technologies: phone banking, direct bill payment, electronic funds transfer, and PC banking. The second study conducted by Chang (2004) sought to look at the influence of the user's characteristics specifically in the context of IB. The demographic attributes of adopters found in Chang's (2004) study are gender, age, marital status, degree of exposure to IB, characteristics of the banks, education, income, residential property ownership, and residential area. The third study carried out by Mattila et al. (2003) sought to investigate the relationship between usage of IB and mature customers' demographic characteristics. The adopters' demographic attributes that Mattila et al. (2003) deployed are computer attitude, marital status, gender, education, income, profession, and household size. In connection with this, Black et al. (2001) reported that research relating to customer adoption of innovations has tended to concentrate on identifying the characteristics of innovators. The researcher observed that age, income and gender are common attributes of the user's demographic variables, which are used by major studies of IB (Chang, 2004; Al-Sabbagh & Molla, 2004; McPhail & Fogarty, 2004). An academic study conducted by Chang (2004) found evidence that the adoption of IB is significantly influenced by gender, age, marital status, degree of exposure to IB, and the characteristics of the banks. Liao and Cheung, (2003) foresaw some features of IB adopters, as they are most likely to be "computer-literate, Internet users, generally young and well educated". This study is going to employ the demographic variables

proposed by Chang (2004) as a platform. Besides that, this work is going to look into how to extend Chang's demographic variables to include another two variables suitable to the current study context

I. Sex

Human differentiation based on gender is a fundamental phenomenon that affects virtually every aspect of people's daily lives. Tracy[3] describes online banking by saying "Men see it as a toy; women see it as a tool" (Power, 1997). From the perspective of social cognitive theory, Bandura and Bussey (1999) say that gender is the primary basis on which people get differentiated. Although some gender differences are biologically inborn in their nature, most of the stereotypic attributes and roles linked to gender arise more from cultural design than from biological endowment (Bandura & Bussey, 1999). Gefen and Straub (1997) studied the role of gender within the IT context and empirically demonstrated that IT theories should attempt to account for gender effects on the IT construct. In addition, the authors posit that women and men attribute a different social presence to the same mode of communication and they may have different perceptions of the usefulness of a medium. Power's (1997) early prediction on IB expected that women users are likely to be the driving force and be the dominant users of IB. Tracy, a specialist and president of NetSmart said, "Women have a time problem, with 64% in the survey working and 56% having children". In addition, she said that women "are joint partners in financial decisions, being the bill-payers, and they are also the information-gatherers". In contrast, Chang (2004) practically demonstrated that the male group is more likely to be early adopters than the female group as the core of the banking network in Korea tends to be male since they are the ones who make key financial decisions for the household. In a similar situation, this study believes and proposes that the male group is the dominant adopter in the Yemeni context.

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[3] Bernadette Tracy, president of NetSmart, is a motivational psychologist who has experience in banking research. She conducted a study for Citicorp about consumer opinions of automated teller machines.

II. Age

A customer's life is divided into several stages, each stage having different factors that might influence a person of this stage, which may or may not influence him/her in the next stage. Moreover, the person's requirements of each stage are changing over time. Analyses of research publications in the diffusion of innovation conducted by Rogers and Shoemaker (1971, p.185) resulted in a general conclusion that, "earlier adopters are no different from later adopters in age". Their study also concluded that 30 percent of the 228 studies that employed the age variable indicate that earlier adopters are older while 20 percent show they are younger. In contrast, Chang (2004) suggests the younger generation is more likely to adopt IB due to their familiarity with new technology. The effects of age on adoption were considered by Kolodinsky and Hogarth (2001) who verified that persons over 65 are more likely to use direct bill payment than young persons, as well as being less likely to use or adopt the other technologies of financial transactions. Meanwhile, the findings by Polatoglu and Ekin (2001) "concerning the Turkish context" demonstrated that 83 percent are young and in the 20 to 39 years of age groups who are generally favourable to IB services. However, Rogers and Shoemaker (1972, P.185) pointed out that there is "no relationship between age and innovativeness". In the Yemeni context, the influence of the age variable may differ due to certain conditions that Yemen historically went through. For instance, there are two generations in Yemen, namely the pre-revolution generation and the post-revolution generation. There is a big gap between these two generations. For example, the post-revolution generation has greater access to mass education, higher exposure to the mass media, ICT, and better living conditions as well as more opportunity to get various professional careers etc. Thereupon, Chang's (2004) proposition on age is good to hypothesize that there is a relationship between age and the intention to adopt IB. There are several studies that have demonstrated that a user's

age has a significant influence on the adoption of IB (e.g. Chang, 2004; Lai and Li, 2004; Chung & Paynter, 2002; Tan & Teo, 2000 etc). The strength of the relationship between age and other factors will be somehow different, as well as individuals within different age groups might have different factors, which significantly influence each group. For instance, Morris et al. (2000)'s study concluded that younger workers' technology adoption decisions were more strongly influenced by attitude towards using the technology than older workers. In contrast, older workers were more strongly influenced by SN and PBC than younger workers were.

III. Nationality

Nationality is one of the demographic variables used to understand the characteristics of respondents (adopters, potential adopter or users of any particular technology) in information systems research. For instance, Chang (2004) employed this variable in the field of IB adoption. In the Arab context, Kassim (2005) employed nationality to examine the e-banking service quality in the Qatari banking industry. Not far away, Al-Gahtani (2003) employed this variable to examine the adoption rate of computer technology in Saudi Arabia. Unfortunately, the influence of nationality on technology adoption is still not understood because some IS studies did not specify whether the influence is positive or negative (Chang 2004; and Al-Gahtani, 2003).

IV. Education

Rogers and Shoemaker (1972) generalize that earlier adopters have more years of education and are more likely to be literate than later adopters. Similarly, Liao and Cheung's (2003) findings supported the view that IB users are literate and well educated. In the Korean context, IB adopters investigated by Chang (2004) reflect a

relatively high level of education. Highly educated groups of whom "82 percent are university graduates", as reported by Polatoglu and Ekin (2001), are most likely to accept changes and are more ready for IB in Turkey. Theoretically, Chang (2004) points out that education would enhance the proficiency in network technology and communications, which would increase the probability of IB adoption. Users with higher proficiency in computer, Internet, and web application technology would have a positive impact on IB adoption. McPhail and Fogarty (2004) demonstrated that users of self-service banking technologies (SSBT) tend to be better educated. Chung and Paynter (2002) also demonstrated that IB adoption in New Zealand has a significant relationship with the individual's education level. In contrast, education level in the Malaysian context, according to Sohail and Shanmugham's (2003) study, shows the same percentage and there is no significant difference between the educational levels of respondents in terms of their adoption. Along the same lines, Chang (2004) demonstrated that people with higher education are less likely to adopt IB than those with less education, which indicates cautious behaviour towards IB.

V. Marital Status (MS)

Recently, a study conducted by Chang, (2004) found evidence that the adoption of IB is influenced by marital status. Chang's (2004) study demonstrated that the responses received from married participants are more than half of the total respondents. Similarly, Polatoglu and Ekin (2001) stated that the majority of their respondents were married (55 percent). In the Australian context, McPhail and Fogarty's (2004) findings show that married people are leading self-service banking technologies (SSBT) adoption with a higher proportion of 71 percent falling in the category of Med–high users of SSBT. Chang (2004) argues that stably married people are relatively conservative compared to those who choose alternative marital status. Due to Islamic

teachings, co-habiting does not exist in Yemeni society; therefore, the martial status attributes will be narrowed down to include only the formal Islamic categories of martial status.

VI. Type of Job

This study views profession, career, job, occupation, and vocation as synonyms regardless of their specification, description and differences. The important thing this study wants to clarify is individuals who hold jobs in the academic field might not be equal to those who have administrative jobs in terms of their monthly payment. In addition, those holding a job with the public sector might not earn as much as those holding jobs in the private sector. Similarly, those specialized in the accounting and financial area may not have the same interest in IB as those working in the agriculture area. With respect to the influence of an individual's job, the literature on IB adoption did not provide a causal relationship on this variable. For instance, IB studies conducted by authors such as Tan and Teo, (2000), Polatoglu and Ekin, (2001), Mattila et al. (2003), Al-Sabbagh and Molla (2004) and Brown et al. (2004) only provided descriptive statistics on the job variable. There are two studies, which investigated the influence of an individual's profession based on the area adopters used to work in (e.g. Tan & Teo, 2000 and Brown et al., 2004). These two studies demonstrated that most adopters are students followed by professionals. Exceptionally, Al-Sabbagh and Molla, (2004) posit three characteristics of profession based on the sector that adopters and non-adopters are affiliated with; the public sector (45%), the private sector (35%) and 20 % for others. A categorization of the respondents of IB based on their position in the investigated organization was also used by Polatoglu and Ekin (2001) whose study found that the majority are in a managerial position (36.2 percent), are technical/computer staff (17.1 percent), or small business owners (15.9 percent). Profession correlates positively with

the mature customers' use of IB. According to Mattila et al. (2003), mature customers with higher positions in working life tend to use IB as well as customers in leading positions. Meanwhile, for those who are out of work, over 90 percent of mature customers, have never used IB.

VII. Personal and Household Income

Before the researcher begins to discuss the influences of income in the literature of IB adoption, this study must first examine what is meant by the income that the study is trying to investigate and what types of income the study is going to use. However, there are several types of income categories highlighted by Park, (2000). This study will consider two types of income; household income and personal income. There is a wide range of definitions of household income in the literature but Eisner (1989) defined the concept "as the maximum amount that can be consumed in a given period while keeping real wealth unchanged". Park (2000) points out that the BEA[4] defined Personal income as "current income received by persons from all sources that is, from participation in current production and from government and business transfer payments… and is calculated as the sum of wage and salary disbursements". The two categories of income are widely used as predictor factors in the IB adoption and diffusion of innovation studies. Rogers and Shoemaker (1972, p.187) said of the earlier adopter that "they are wealthier...wealth and innovativeness appear to go hand-in-hand". Household income and education are demonstrated empirically by Mattila et al. (2003) to have a significant effect on the adoption of the IB channel by mature consumers (over 65 years). Studies such as Suganthi et al. (2001) and Tan and Teo (2000) demonstrated empirically that income has a significant influence among both IB users and non-IB users. Sohail and Shanmugham (2003) argue that the more affluent people are the more likely they are to

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[4] Bureau of Economic Analysis (BEA)

possess modern technology such as computers and e-banking. According to Sohail and Shanmugham's (2003) findings, only one of the demographic characteristics, monthly income was found to be significant in influencing Malaysian user preferences to adopt e-banking. In the context of IB, some authors used the income construct at the personnel level such as Tan and Teo (2000), Suganthi et al., (2001) and Al-Sabbagh and Molla (2004) and others at the household level such as Chang (2004), and Mattila et al. (2003). More recently, Chang's (2004) study investigated the income construct at both levels.

Users' income is the most widely used variable in the existing literature on (IB). This study believes that questioning individuals about their income is a very sensitive task, therefore, researchers have to exercise great care in choosing the proper and accurate measurement to get reliable data that represents the true effects of income. Ruser (2004) highlighted that an important issue in this aspect is whether certain income types should be captured when accrued or when disbursed. The researcher utilized the conceptual definitions of personal income and household income discussed previously to develop an operational measure based on the ranking of the group's income options to encourage the respondent to place himself or herself freely in one option.

VIII.   Type of housing,

In the literature review of IB, this study found two main studies which paid attention to the housing type (property ownership) of the individuals in studying the adoption of IB. The first study was conducted by Chang (2004) who considered that owners of residential properties tend to be in less complex banking than those who are in key money or monthly rental schemes and therefore, would have less incentive to adopt IB. This could be true for Korean society but it might be a challenge to get the same results in other contexts like Yemen. With the exception of Chang's (2004) study, "owners of residential properties" are not studied much in Internet banking research.

IX. Area of Residence

An individual's residential location could simply be classified into the two categories of rural and urban regions. Urban regions are somehow known to be better developed than rural areas in terms of infrastructure facilities and ICT. Chang (2004) proposes that the easier access to computers and Internet facilities in the urban area, would provide better grounds for people to adopt IB. In addition, major cities form a major marketplace for banking operations to occur, offering multiple financial services opportunities as well as the greater supply and demand functions among multiple business parties. Table 3.7 summarizes demographic variables appeared in previous IB adoption studies.

Table 3.7 Demographic Variables Used in Previous IB Adoption Studies

Author /year /Model	Chang Key Demographic Variables on IB										Others Demographic					Overall Scores
	Age	P. Income	Sex	Education	Marital Status	Property Owner	H. Income	Resident Area	Job	Nationality	Degree of Exposure	IT Competency	Household Size	Characteristics of the Banks	Race	
Chang (2004) Rogers	SN	NS	SN	NS	SN	Y	Y	Y	0	Y	SN	0	0	Y	0	9
Lai and Li , (2004/	SN	0	1	0	0	0	0	0	0	0	0	SN	0	0	0	3
Tan&Teo, (2000) Rogers	SN	SN	SN	SN	0	0	0	0	SN	0	0	SN	0	0	0	6
Suganthi, et al (2001)	NS	SN	0	NS	0	0	0	0	0	0	0	0	0	0	0	3
Gerrard, & Cunningham, 2003 Rogers	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	5
Al-Sabbagh & Molla (2004) Roger	1	1	1	1	0	0	0	0	1	0	0	0	0	0	0	5
Brown, et al., (2004), Roger	1	1	1	1	0	0	0	0	1	0	0	SN	0	0	0	6
Black, et al (2001)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polatoglu& Ekin, (2001)	1	1	1	1	1	1	0	0	1	0	0	0	0	0	0	7
Mattila, et al (2003)	1	1	1	1	1	0	1	0	1	0	0	1	1	0	0	9
Sathye, M. (1999)	1	1	0	1	0	0	0	1	1	0	0	0	0	0	0	6
TOTAL	9	9	8	9	3	2	2	2	6	1	1	3	2	1	1	

1= variable employed in the study , 0= not employed in the study, SN= Significantly influence, NS = insignificantly influence,

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CHAPTER SUMMARY

The literature has verified that IB is an emerging technology which allows customers to transact via the Internet whereas there are two types of banks which can offer financial services over the Internet; Traditional banks, which exist both physically and online, while the second type are the "branchless" or "Internet-only" banks. The definition of IB is still being debated and this study has attempted to produce its own definition which says that IB is "Web-Based Banking, whereby users can interact with and obtain a bank's financial services in a virtual environment using any device connected to the Internet". The literature explained that "Intention" refers to a person's subjective probability that he will perform some behaviour and the individual's intention comes prior to the actual behavioural itself. Also, it is the central factor in this study to understand a person's performance of a specified behaviour. The TRA, TPB, TAM and the Triandis models discussed in this chapter are examples of intention-based models and they are the most widely used and referenced theories in the context of technology adoption. The adoption models proposed by them are found useful in this study to examine the adoption factors from the individual's approach. From the existing literature on IB adoption, it seem that factors are classified into two categories; factors which seek what makes an organization or bank adopt IB (i.e. competitive advantage, demand, cheap, fast, convenient and mobile channels of delivery). This type of factor is beyond the scope of this study. The second type of factor considers an individual's adoption (attitudes, norms, controls, and readiness) and is considered by this study. Therefore, the factors influencing users' intention to use Internet banking is classified by this study into three types, namely direct, indirect and readiness factors. Also, the literature showed that there are some empirical studies which mainly sought to study the influences of user characteristics on the adoption of electronic banking. The next chapter will present the comprehensive research methodology followed by this study.

CHAPTER FOUR: RESEARCH METHODOLOGY

Several papers have investigated the growth of online banking in specific regions such as Sathye (1999) in Australia and Anandarajan et al. (2000) generally in the context of less developed countries (in sub-Saharan Africa- Nigeria). Guraäu (2002) investigated the issue in Romania, Karjaluoto et al. (2002) in Finland and Chanand Ming-te (2004) in Hong Kong. Furthermore, several studies attempted to give an insight into and discussed in general the adoption of electronic banking. Studies conducted by Featherman and Pavlou (2003), Wang et al. (2003) and Pikkarainen et al. (2004) are examples of those studies conducted in this area. Several authors utilized one of the established adoption theories as discussed in the literature review in Chapter 3. In the IS field, major empirical studies of adoption have been led by research methodology which adopts surveys and questionnaires to examine the relationships among of the variables proposed by an initial study framework to construct a model of the study based on statistical findings. The questionnaire was the instrument used for data collection and the major items of the survey were adapted from the prior literature using a 7-point Likert scale ranging from strongly agree to strongly disagree. The following sections will outline and explain in detail the research method followed by this study.

4.1 Research Background

The literature review of electronic banking supports the inference that consumer adoption of IB has been researched from three perspectives. These three perspectives are the User's Characteristics (UC), Innovation Characteristics (IC), and External Factors (EF). Generally speaking, these three factors have been utilized in many previous studies in information systems. For instance, some adoption studies focus on

UC factors best exemplified by the research conducted by Agarwal and Prasad (1999) who sought UC's influences on the acceptance of new information technologies. More recently, Chang (2004) utilized ten UC factors to investigate the adoption of IB. On the other hand, authors such as Agarwal and Prasad (1997) mainly researched the role of IC in the acceptance of information technologies. Some studies such as Gopalakrishnan et al., (2003), Bradley and Stewart (2003), and Akinci et al. (2004) paid attention to the influence of external factors (EF) on the adoption of IB. The three perspectives have been utilized in major IS adoption studies but, of course, it is logically difficult to have a study with comprehensive sets of antecedents specified to each perspective. For instance, in this study the external factor perspective is represented by subjective norms and facilitating conditions (e.g. resources, technology and government support) which are indeed part of the TPB construct. In addition, two types of external factors are proposed by this study framework which they are four variables proposed to examine the user's informational based readiness (UIBR) to adopt IB technology and the second type is demographic factors. The perspective of innovation characteristics is represented by users' perceptions of using the innovation investigated (Internet Banking). Respectively, users' perceptions of IB are limited to Rogers' (1995) five attributes of innovation. Then again, the characteristics of potential adopters are represented by several demographic variables, which are adopted from Chang's (2004) study.

From the theoretical perspective, external factors selected to the TAM model have a direct influence on perceived usefulness (PU), and perceived ease of use (PEOU). The TRA model and TPB model included the influence of external factors, which are represented in the models of both theories by the construct named SN of referents. Furthermore, the TPB uses one more external factor influence, which is the form of control behaviour (perceived behaviour control).

4.2 Research Framework

As described in the literature, behavioural intention is derived from the social psychology theories, which was discussed previously in Chapter 3, and characteristics of innovation, discussed in the theory of diffusion of innovation, together with external factors (e.g. subjective norms and facilitating conditions) provide the theoretical framework needed for this study. Figure 4.1 shows the research framework used for this research on the adoption of IB services.
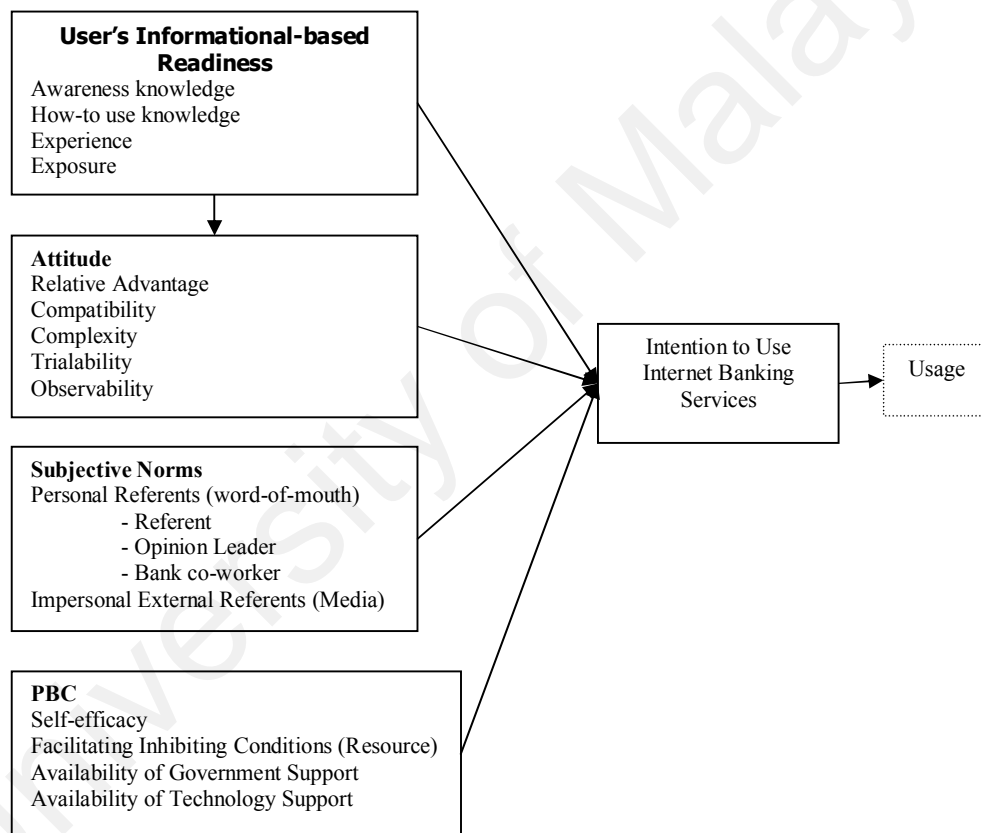
Figure 4.1 Research Framework (Derived from the DTPB)

(Source: Taylor & Todd, 1995b, a)

This study works at the potential users' level to define the linkages between such beliefs about adopting IB (e.g. behavioural attitude, normative belief, control belief and

users' informational-based readiness[1]) with behavioural intention to use IB and the individual's characteristics.

The framework shown in Figure 4.1 was developed based on the guidelines derived from the Decomposed Theory of Planned Behaviour (DTPB). This study's framework combines aspects of the Theory of Planned Behaviour (TPB) (Ajzen, 1991) and its decomposed DTPB (Taylor & Todd, 1995a) with the aspects of Rogers' (1983, 1995) Theory of Diffusion of Innovation (DOI) in an integrated view. In this framework, the individual's perceptions of the characteristics of innovation are considered as one of the determinants for the construct of attitude towards the adoption of IB. In other words, the study emphasises that the innovation decision process involves individuals' evaluation of using IB, and then based upon the evaluation the potential adopter moves toward the persuasion stage. The most important aspect of this stage is the attitudes of the potential adopters. According to Rogers (1995), the decision whether to use (adopt) or reject an innovation should be a direct result of the potential adopter's opinions as to its perceived attributes. Individuals may also choose not to adopt (reject) the innovation. It is important to note that the five attributes of innovation are perceived attributes of the innovation, not the actual attributes of an innovation that also predicts the rate of innovation adoption. Doll and Ajzen (1992) said that individuals form beliefs about an object by associating it with certain attributes, that is, with other objects, characteristics or events.

The second major component in the framework is the SN, an external factor, proposed to have an influence on the behavioural intention to use IB. Theoretically, subjective norms are placed to undertake the possible influence that members of a social network (normative based) may cause. This study viewed subjective norms particularly within the two possible attributes of normative influence, interpersonal versus external

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[1] User's Informational based readiness is a concept developed by this study basically to abbreviate the user's readiness in terms of awareness, knowledge, experience and exposure to IB.

influence or as was highlighted by Rogers' (1983 p. 98) (personal versus impersonal influence). The personal dimension is placed to undertake the influence of an opinion leader, referent, and co-worker. Meanwhile, the impersonal dimension is placed to undertake the influence of the mass media as a non word-of-mouth referent on the potential adopters' behavioural intention to use IB.

The framework's third major component is the PBC. This part undertakes the control beliefs over four dimensions identified as self-efficacy, facilitating resources conditions, availability of government support, and availability of technology support.

The User's Informational-Based Readiness (UIBR) is an additional construct with which this study has proposed to investigate the potential adopter's readiness, as well as to what extent UIBR can contribute in predicting the adoption of IB. The user's informational-based readiness construct in this study has four dimensions; awareness, knowledge, experience and exposure. The key dependent variable in our model is the behavioural intention. There are three reasons why this study focuses on behavioural intention as the key research dependent variable. The first reason refers to the social psychology field. Along these lines, information systems researchers are advised by Davis et al. (1989), to work on intention variables as the determinants of users' actual behaviour because they provide the potential theoretical foundations.

Secondly, the path from intention to actual usage behaviour had been widely validated in many prior studies in different contexts and information systems/technologies; therefore, a positive and direct relationship between intention and actual usage behaviour of IB is expected. In the literature review and under the section of "intentions and actual behaviour", this study has discussed this aspect in detail (Ajzen et al., 2004) in the literature review in Chapter 3 (see section 3.2.2).

Prior condition
Awareness
Knowledge
Experience of related technology
Exposure to recommendation
Facilitating Conditions

Characteristic of potential users
1- Characteristics

Perceived characteristic of IB
1. Relative Advantage
2. Compatibility
3. Complexity
4. Trialability
5. Observability
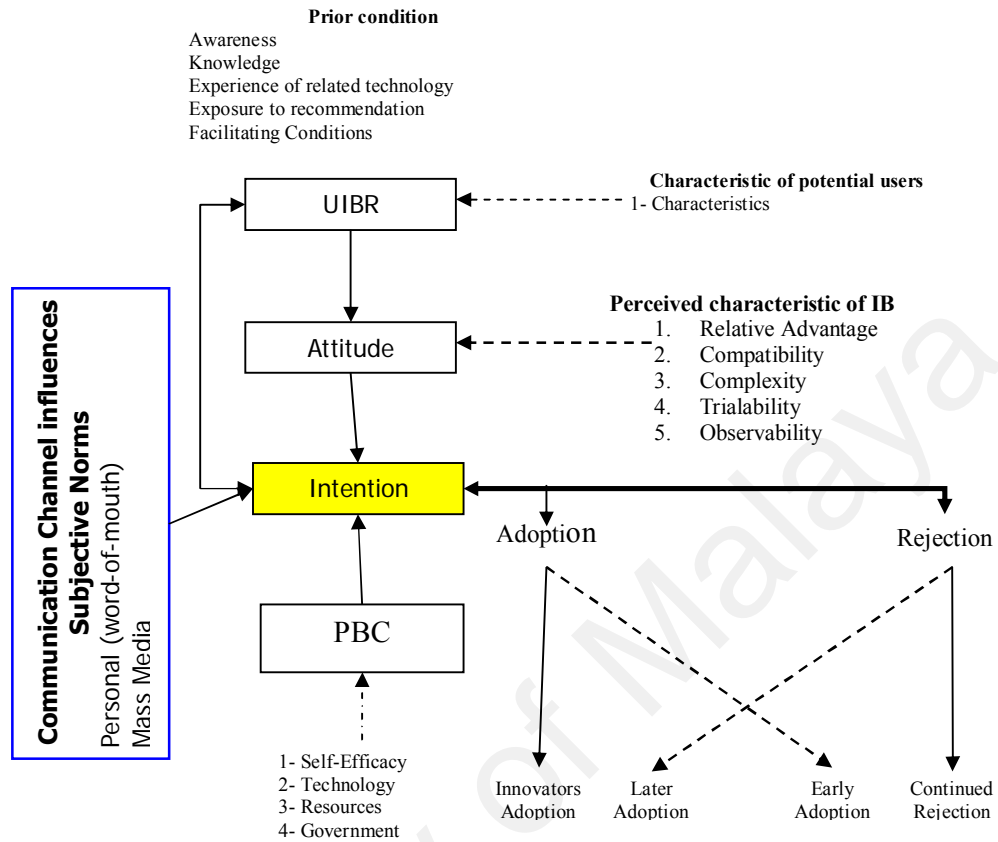
Figure 4.2 Stages of Innovation Process

(Source: Rogers, 1995)

The third reason is that IB in the Republic of Yemen is still in its introductory stage where numbers of IB adopters have not yet reached a critical mass and thus it is difficult to measure usage behaviour. The last part of the framework concerns the potential users' characteristics. This research has not attempted to gather information on all of the characteristics discussed in Rogers' (1995) work. In this study, the individual's characteristics will be limited to the 10 demographic variables introduced by Chang (2004).

4.3 Research Philosophical Stance and Paradigm.

Epistemology refers to the underling assumptions about knowledge and how valid knowledge can be obtained. There are two terms the researchers have to distinguish; epistemology and methodology. Epistemology is explained by Orlikowski & Baroudi 1991) as criteria for constructing and evaluating knowledge while methodology is concerned with which research methods are appropriate for generating valid evidence. In line with this, Chua (1986) categorized epistemologies into three types: positivist, interpretive, and critical studies. The distinction between these three philosophical stances (approaches) will be explained based on Orlikowski and Baroudi's (1991) words;

*"**Positivist studies** are premised on the existence of a priori fixed relationships within phenomena which are typically investigated with structured instrumentation… **interpretive studies** assume that people create and associate their own subjective and intersubjective meanings as they interact with the world around them… **Critical studies** aim to critique the status quo, through the exposure of what are believed to be deep-seated, structural contradictions within social systems, and thereby to transform these alienating and restrictive social conditions." (Orlikowski & Baroudi, 1991) Page 5.*

The overview of the literature on IS in Yemen and the neighbouring countries such as Oman, Saudi Arabia, and UAE showed that the IS literature, more generally, is predominantly positivistic in its epistemology, seeking to establish general patterns and rules which may be used to predict and prescribe behaviour. This research strategy can be broadly classified as a positivist philosophy to investigate empirically a series of theoretical and external as well as human, social and innovation factors that influence the use of IB among the bank customers based in Yemen. It is important to mention at the start that the views expressed in this thesis take a positivist approach. The reasons for choosing this approach are that the positivist research approach is dominant in information systems which account for 96.8% of the studies and reflects the precept informing the study of natural phenomena (Orlikowski & Baroudi, 1991). Furthermore,

positivist researchers, for example, believe that large-scale sample surveys and controlled laboratory experiments are suitable research methods, as they allow researchers a certain amount of control over data collection and analysis through manipulation of research design parameters and statistical procedures (Chua, 1986). In addition, positivist studies serve primarily to test theory, in an attempt to increase predictive understanding of phenomena (Orlikowski and Baroudi, 1991). The criteria adopted by Orlikowski & Baroudi (1991, p.5) in classifying IS studies as positivist were the evidence of formal propositions, quantifiable measures of variables, hypothesis testing, and the drawing of inferences about a phenomenon from the sample to a stated population. Weber (2004) believed that the differences between positivism and interpretivism lie more in the choice of research methods rather than any substantive differences at a metatheoretical level. For further details on the distinctions made by Weber see Appendix X-A. To come back to Chua's (1986) range of philosophical assumptions, it was also utilized by Orlikowski and Baroudi (1991) to study information systems phenomena. This study addresses this issue briefly using Webber words;

"Positivists supposedly try to build knowledge of a reality that exists beyond the human mind…believe that the objects they research have qualities that exist independent of the researcher,….tend to use…surveys as their preferred research methods... believe that a statement made by a researcher is true when it has a one-to-one mapping to…a correspondence theory of truth…., strive to collect data that are true measures of reality…., a one-to-one mapping exists between the measures and the phenomena…are deemed valid…,believe that research is reliable if results can be replicated by the researcher…Lack of reliability usually is attributed to factors such as researcher biases, inconsistencies in the research processes used, differences in the context in which the research was conducted, and measurement errors". Weber, 2004 page iv-ix)

4.4 Research Paradigm and Theory Orientation

There are two paradigms IS researchers utilize which are the behavioural science and the design science paradigms. These two paradigms, according to Hevner et al., (2004) represent much of the research in the Information Systems discipline. In the

behavioural science paradigm adopted by this study, the researcher seeks to develop and verify theories that explain or predict human behaviour. Meanwhile those researchers using the design-science paradigm, seek to extend the boundaries of human and organizational capabilities by creating new and innovative artifacts (Hevner et al., 2004).

"Hypothetico-Deductive methods" proposed a set of rules of scientific methodology used as a means of testing the validity of knowledge. This method is starting with a theoretical framework, formulating hypotheses and logically deducing from the results. According to Sekaran (2003, p. 27), it is one of the primary methods of scientific[2] investigation. "Hypothetico" means "based on hypotheses" and the Hypothetico-Deductive method suggests the various steps the researcher need to follow in order to do research and, as such, helps this study to organize the research process. According to Sekaran (2003), there are two types of processes the researcher can use to find answers to issues; these are either by the process of deduction or the process of induction, or by a combination of the two. Sekaran (2003) pointed out that theories based on deduction and induction help the researcher to understand and predict phenomena. According to Gregor (2006) he do mentioned that Popper described theory as follows,

Scientific theories are universal statements. Like all linguistic representations they are systems of signs or symbols. Theories are nets cast to catch what we call "the world"; to rationalize, to explain and to master it. We endeavour to make the mesh even finer and finer. (p. 615)

Gregor (2006) Classified theory in Information Systems based on the primary goals into, "Analysis and description", "Explanation", "Prediction", and "Prescription". The current study adapted the Type 3 "Theory for Predicting" and in the line with Gregor

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[2] Scientific methods refer to "techniques or procedures used to analyze empirical evidence in an attempt to confirm or disprove prior conception (Zikmund, 2004 p.43).

(2006) the study's aims at prediction is "say what will be but not why; parts of the system remain a "black box." These theories are able to predict outcomes from a set of explanatory factors, without explaining the underlying causal connections between the dependent and independent variables in any detail.

4.5 Research Instrument Development

In this section, the researcher would like to highlight the conceptual definitions of all the constructs included in the research framework. In this study, the model's major constructs are defined by combining such definitions allocated to the same construct in the literature. The four constructs identified in the research, which are represented as the main variables, exist in Taylor and Todd's (1995a, b) DTPB. Mainly, these constructs are Behavioural Intention (BI), Attitude (ATT), Subjective Norm (SN), and PBC. All the presented constructs can have different dimensions. Some indicators introduced in the formal Taylor and Todd (1995a, b) DTPB model were utilized in our study framework to investigate the determinants of IB. Furthermore, the researcher noted that some attitudinal, normative and control variables are still needed in such cases to investigate determinants of IB adoption specifically when investigating the potential adopters of IB. For instance, attitudinal variables such as trialability, and observability or normative belief variables such as personal and mass media interaction norms have not explicitly been used in the original TPB and DTPB models. The User's informational-based readiness is a newly proposed concept not yet studied academically. Therefore, this aspect deserves some effort to shed light on the UIBR influence on an individual's behavioural intention to adopt IB.

4.5.1 Research Constructs Operational Definition

In this section, the researcher's point of view is that defining and further explaining the research constructs is very important to the success of this work. Practically, one way to make this task easy is to interpret and postulate a clear definition for each variable. In the literature review, researchers had found many conceptual definitions of the same variables but this study selected the definitions most relevant to our study and which are appropriate to serve for a further understanding of our research constructs.

Ajzen and Fishbein (1980, p.34) pointed out that once a researcher has decided on the behaviour of interest, it is important to consider the action, the target at which the action is directed, the context in which it occurs, and the time at which it is performed. Consequently, in this study, the target was "Internet Banking (IB)," the action was "Adopting IB", the context was "Yemen" and the time is the "time services are available". As a result, the specific behaviour in this study is, "Bank account holders' intention to use IB in managing their banking affairs in Yemen in the future".

This section is designed specifically to give information on the development of the research constructs as well as their operational definitions. For example, issues on variables such as behavioural intention, attitude, SN, and perceived behaviour control will be highlighted.

Construct name: Behavioural Intention (BI)

Construct definition: Refers to a person's subjective probability that he will perform some behaviour (Fishbein & Ajzen, 1975). User intends to use IB when available.

4.5.2 Operational Definition of Behavioural Intention

There is a diversity of theoretical models deployed to provide an understanding of the determinants of the IT usage. Taylor and Todd (1995a) identified three collections of models; the first models sought and designed to investigate "determinants of intention" which employed intention-based models that use behavioural intention to predict usage. These types of studies relied on models from social psychology such as the TRA, TAM, TPB and its decomposition, which investigate attitudes, social influences and facilitating conditions. The second collection of models examined the "determinants of the adoption and usage" of IT from the diffusion of innovation perspective in which researchers examine factors such as the user's characteristics, the innovation's characteristics and external factors. The third models introduced by Taylor and Todd (1995a) are the decomposed TPB models which deployed constructs from the innovation characteristics literature, the dimension of SN and PBC by decomposing them in specific belief dimensions.

There are some intention-based models, which were developed by well-established theories that consider behavioural intention as a key dependent variable such as those presented by Davis et al. (1989), Davis (1989), Ajzen & Fishbein (1980) and Ajzen (1991) among others. There are several models of IS adoption developed to facilitate the understanding of the "adoption intention" of technology. In the IB context, there are some studies, which rely on behavioural intention as dependent variables such as Liao et al. (1999), Wang et al. (2003), Featherman and Pavlou (2003), Chan and Ming-te (2004), Lai and Li (2004) and Shih and Fang (2004). However, two studies (Liao et al., 1999 and Shih & Fang, 2004) made use of BI but they also investigated the Actual Behaviour (AB). This type of variable might have several operational measures but the researcher noted that Fishbein and Ajzen's (1972) means are best to describe the way researchers can operationalized "Behavioural intention". Fishbein and Ajzen

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(1972) highlighted that BI can be viewed as "usually presenting the subject with a stimulus person or object and with one or more behaviours that could perform the behaviour(s) on scales like would-would not, willing-unwilling, intend-not intend and will try- will not try". Agarwal & Prasad (1998) pointed out that adoption of new information technologies by their intended users persists as an important issue for researchers and practitioners of information systems. There is no standard operational definition for the variable of "User's intention to adopt" therefore, items selected for this construct are mainly adapted from prior studies of "Internet banking" to ensure content validity. The existing literature of IB reveals that authors of IB studies exploited two approaches of operational definitions to measure the dependent variable of an individual's intention to adopt IB. The first definition sought to measure the behavioural intention via a dimension(s) constructed to consider "timing", the time that the actual behaviour (adoption) will occur. Examples of studies which utilized this definition are Chan (2004) and Shih and Fang (2004). The second definition gave emphasis to an individual's willingness to take action on the adoption regardless of what time the adoption will occur in the future (e.g. Lai & Li, 2004; Agarwal & Prasad, 1998; Wang, et al., 2003; and Luarn & Lin, 2005). Mathieson's (1991) study attempted to compare two models (the TAM and TPB) that predict an individual's intention to use IS. Through this comparison, Mathieson (1991) attempted to investigate: (1) how well they predict the user's intention to use an IS; (2) how models are valuable to provide the information; and (3) the difficulties in applying the model to. However, this study illustrated that those models can predict intention but there are some differences between the TAM and TPB as highlighted in the following paragraph.

First, they vary in their degree of generality. In this aspect, Mathieson (1991) demonstrated that the TAM explained more variance than the TPB. However, these results were not significant enough statistically to consider that one model is better than

the other is. Second, the TAM does not explicitly include any social variables. Third, both models treat behavioural control differently. Mathieson (1991) also concludes that the TAM explained attitude much better than the TPB. The TAM is easier to apply, quick and inexpensive, but provides more general information, while the TPB provides information that is more specific. Similarly, Taylor and Todd (1995a) compared the technology acceptance model and two variations of the Theory of Planned Behaviour to assess which model better helps in understanding information technology usage. Taylor and Todd (1995a) pointed out that the Decomposed Theory of Planned Behaviour (DTPB) has advantages similar to the TAM in that it identifies specific salient beliefs that may influence IT usage and have been shown to be important determinants of behaviour. Gagnon et al. (2003) placed an operational definition to measure the intention to use telemedicine based on the means of three items. Table 3.1 specifies those three items and the scale utilized by the researchers. More recently, Kim and Malhotra's (2005) findings suggest that an accurate prediction of system usage requires a more rigorous approach than that often applied in information systems research. In addition, Kim and Malhotra (2005) argued that some intentional measures may be more effective than others in the prediction of use. Taylor and Todd (1995a) indicated that the Decomposed Theory of Planned Behaviour provides a full understanding of behavioural intention by focusing on the factor that is likely to influence systems use. There are some authors in the context of IB who used the TPB and the decomposed TPB measuring techniques to predict the behavioural intention of IB such as Shih and Fang (2004), Tan and Teo (2000) and Liao et al., (1999) among others. An instrument to measure the behavioural intention to use the Internet was developed recently by Gardner and Amoroso (2004). They postulated a construct with five items, which proposed to measure Behavioural Intention. The items are listed in Table 3.1. Agarwal and Prasad's (1998) construct was developed and validated in the context of the innovation

represented by the World-Wide Web in which two items were used ; firstly "I intend to increase my use of the WWW for work in the future" and the secondly, " For future work I would use the WWW.

In this study, the researcher utilized the "Intention to adopt IB" as the core key dependent variable. Furthermore, the behavioural intention construct has been developed based on the previous research of Information system (IS) and specifically the literature review of IB. There are some useful notes researchers want to list prior to commencing a discussion of the intention's construct development as follows:

A) The timing of the behaviour measurement in relation to the intention measurement is important (Bernadette, 1996).

B) In technology acceptance, measuring the intention to use is quite different from the actual usage (Vijayan et al., 2005).

C) Some of the TPB items on the intention's construct as recommended by Mathieson (1991) require an explicit behavioural alternative so that the basis for comparison is clear when the researcher intends to measure an individual's intention.

D) From previous research, there is considerable evidence that intention to perform behaviour predicts actual behaviour (Mathieson, 1991 and Pavlou, 2003).

User acceptance of an Information System is measured in terms of whether people repeatedly decide to make frequent use of a system or not. The construct 'intention to use' refers to the intention of the user to make use of the system in the future. Such research placed more emphasis on the construct 'intention to use' than on the factor 'actual system use'. Most researchers in previous studies of IB adoption preferred to investigate adoption via the intention construct rather than the construct of actual use. Preferring the intention is driven by two main factors. Firstly, the "actual use" construct is not considered to be consistent as change might occur to any of the adoption's partners. Secondly, pre-implementation studies sought to explore determinants of

adoption that reshaped the behavioural intention. Mathieson (1991) mentioned that over time there will be changes either in the systems or in the user's expectations or maybe in the environment. Thereupon, measuring user acceptance based on the "intention to use" before the system implementation is quite ready will be required especially when the system does not yet exist. Venkatesh and Davis (2000) found a strong connection between the constructs 'intention to use' and 'actual system usage'. The strong empirical basis for the connection between 'intention to use' and 'actual system usage' thus validates the current focus of attention in adoption research. Overall, variables of behavioural intention are used to describe the model construct: frequency of system use in the completion of specific tasks, intended future frequency of use of the IB, and the future importance of the IB in the case of banking service provision. In this study, the respondent's behavioural intention to perform the focal behaviour in the near future will be measured through a construct consisting of six items. The developed construct used a seven-point Likert scale, which is utilized to measure respondents' intention to use IB. Likert scales were chosen as they are easy to administer and the respondents merely indicate their degree of agreement or disagreement (Malhotra, 2004, p.255). In addition, major researchers either in IS or IB have used this kind of scale as indicated in Table 4.1. Since this study is not sure that most of the respondents do not have prior experience in using IB services, combinations of questions are incorporated to probe respondents' intention towards IB usage. The researcher examined the behavioural intention to use IB as a combination of respondents' planned utilization in the future (Gardner & Amoroso, 2004 and Shih & Fang, 2004) and recommend it to others (Lai & Li, 2004). The researcher also used Venkatesh and Davis' (2000) measures to examine behavioural inclinations now (INT5) and in the future (INT1). The researcher modified selected items to suit the context of this study. For instance, the first item is adapted from Venkatesh & Davis (2000) and Pavlou's (2003) construct which is "Given the

chance, I predict that I should use the bank's website in the future to achieve my banking activities". The second item is adapted from Lai and Li. (2004), which stated "I will strongly recommend others to use IB". The third item is adapted from Mathieson (1991) and Agarwal and Prasad (1999) which stated "My favourable intention would be to use {Internet banking} rather than the {traditional banking channel} to do my banking practice". The fourth item is adopted from Gardner and Amoroso (2004) and Shih & Fang (2004) which stated "I plan to use the Internet banking". The fifth item is mostly cited in major behavioural intention constructs, which is stated as "when I have access to the Internet banking systems, I intend to use it" (Venkatesh & Davis, 2000; Wang et al., 2003; Pavlou, 2003; Gagnon, et al., 2003; Shih & Fang, 2004; Luarn & Lin, 2005). Table 4.1 explains the constructs designed to measure the behavioural intention of respondents to a particular information system. The sixth question is designed to consider timing and is stated as "If Internet banking is made available to you, when do you intend to use it", then respondents are given six options to chose; soon, 6 months,12 months, 18 months, 24 months and will not use. This last question is adopted from Brown et al. (2004)'s study.

Table 4.1 Items Selected and Operationalized BI Construct

Q. No.	Items In A 1-7 Likert scales Strongly disagree (1) & Strongly agree (7)	Models References
4-5(INT1)	Given the chance, I predict that I would use Internet banking in the future to achieve my banking activities.	Venkatesh, & Davis (2000)
4-6(INT2)	I will strongly recommend others to use Internet banking.	Lai & Li., (2004)
4-7(INT3)	My favourable intention would be to use {Internet Banking} rather than my (traditional banking) for my banking practice.	Mathieson, (1991),
4-8(INT4)	I plan to use Internet banking.	Shih & Fang (2004) , Gardner & Amoroso (2004)
4-9(INT5)	When I have access to the Internet Banking systems, I intend to use it.	Wang, et al. (2003)

Construct name: Attitude (ATT)

Construct definition: Refers to a person's perception or general feeling of favourableness or unfavourableness towards Internet banking (Ajzen & Fishbein, 1980; Rogers 1995; Tan & Todd, 2000)

4.5.3 Operational Definition of Attitude

Measuring an individual's attitude is a difficult task. Henerson et al. (1987) argued that "an attitude is not something this study can measure in the same way this study measure the rate of a person's heartbeat, this study can only infer that a person has attitudes by his/her words and actions". Machauer and Morgner (2001) pointed out that attitudinal variables are an expression of the customers' expected benefits from bank relationships, and according to that a bank's customers can be characterised by a combination of attitudes and expected benefits. Several studies have measured attitude and used a variety of measurement methodologies, and have observed a significant link between attitude and usage (Davis et al., 1989). In this connection, this study is going to use different attitudinal dimensions concerning the customer-bank relationship to measure attitude towards IB. Some of these attitudinal dimensions are directly linked to expected benefits, others result in expected benefits. This study utilizes two constructs. One of the constructs is an adapted construct used as a direct measure of the respondent's attitude towards IB adoption. The second attitudinal construct predicts the indirect effect derived from proposed theories' constructs.

I. Direct Measures of Individuals' Attitude towards IB

In order to understand the consumer's attitude in detail, this study utilized direct instruments that proposed to measure the respondent's attitude towards the idea of using

IB services in general. Here, four items were selected based on the guidelines from Taylor and Todd (1995a) and Ajzen and Fishbein's (1980, p.265) sample questionnaire. The wording of selected items of the attitude construct was adapted from previous IB studies, which are quite similar to Lai and Li (2004), Shih and Fang (2004) and Chau and Lai (2003). A 7-point Likert Scale was used ranging from (1) strongly disagree to (7) strongly agree. Table 4.2 presents the selected items suggested by our study to measure potential users' attitudes toward using IB services.

Table 4.2 Items Selected and Operationalized Attitude Construct

No	Items	7-point Likert Scale
1 2 3 4	In my opinion, using the Internet banking services is a good idea. I think it is a wise idea for me to use the Internet banking services. I like the idea of using the Internet banking services. Using the Internet banking services would be a pleasant experience.	1 - Strongly Disagree . . . . 7 - Strongly Agree

II. Measures of Respondents' Attitude towards IB Attributes

The TAM posits that attitude towards an innovation is determined by two salient beliefs: perceptions of usefulness of the innovation and perceptions of ease of use. The former belief, perceived usefulness, in the TAM is similar to Rogers' conceptualisation of the relative advantage of an innovation: the extent to which the innovation offers better ways of performing a task than existing means of performance. Similarly, the former belief, perceived ease of use, in the TAM is similar to Rogers' conceptualisation of the complexity of an innovation: the extent to which an innovation is perceived to be difficult to understand, learn or operate (Rogers, 1983). Following Ajzen's (1991) suggestion that attitude should be predicted from a person's salient beliefs; five attributes with their relevant item scale are adopted from Moore and Benbasat, (1991) among others as shown in Table 4.4, to measure the respondent's attitude towards using

IB services. In innovation diffusion theory, attitudinal beliefs come through the perceived attributes of an innovation (Rogers, 1995).

This study attempts to explore the attitudinal effect based on the attitudinal beliefs. Therefore, this study integrates the individual's beliefs based on Rogers' (1995) innovation theory and the five attributes of the innovation will be used. The following Figure 4.3 explains the sequence of the attitudinal path.
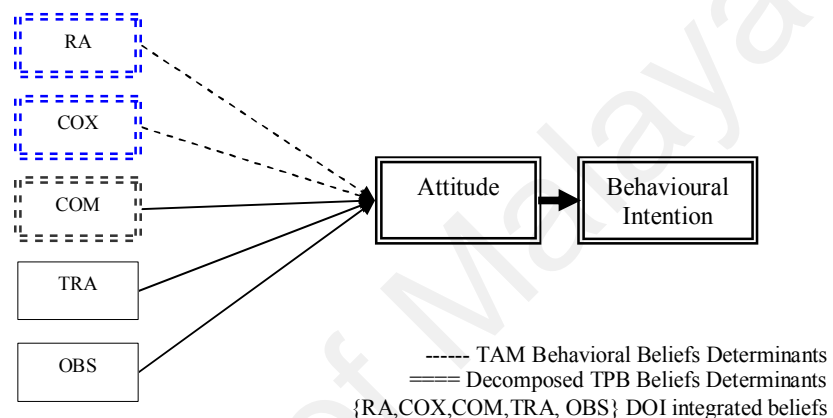
Figure 4.3 Attitudinal Path integrated TPB and DOI
(Source: Mattila, 2003)

The proposed attitudinal path is already used in the pure TPB model and specifically in its decomposed model. In a study to determine the factors affecting the adoption of mobile banking services, Mattila (2003) attempted to structure the attitudinal beliefs based on Rogers' five innovation attributes. In the pure TPB and DTPB, attitude is equated with the attitudinal belief (b_i) that performing a behaviour will lead to a particular outcome, weighted by an evaluation of the desirability of that outcome (e_l) (Taylor & Todd, 1995b).

In terms of attitudinal belief components for consumer adoption of IB, this study suggests that a set of attitudinal belief dimensions can be adapted from the literature describing the perceived characteristics of using an innovation (Rogers, 1995). The five

dimensions of beliefs derived from Rogers' (1995) innovation characteristics are relative advantage, complexity, compatibility, trialability and observability.

A. Definition of the Dimensions of Attitude

Table 4.3 Conceptual Definition of the Attributes of Attitude

Attributes	Definition	Reference
Relative Advantage (RA)	The degree to which an innovation is subjectively perceived as better than its alternatives methods available.	Roger (1995)
Complexity (PEOU)	The degree to which an innovation is perceived as difficult to understand and use.	Kautz &Larsen (2000)
Compatibility (COT)	The degree to which IB is perceived as being consistent with the existing values, past experiences and the needs of potential adopters.	Rogers (1995, p.224)
Trialability (TR)	The extent to which users would like an opportunity to experiment with IB prior to committing to its usage.	Brown (2004)
Observability (OBS)	Refers to the degree to which the results of IB are visible to others and the extent to which users would like an opportunity to observe others with IB prior to committing to its usage.	Roger (1995)

B. Operational Definition of Attitude Dimensions

Taylor and Todd (1995b) pointed out that the first three salient characteristics of an innovation in a Meta analysis by Tornatzky and Klein (1982) demonstrated that these three factors are consistently related to adoption decisions because they influence attitude formation during the persuasion stage of the adoption decision process (Rogers, 1983). In a cross-sectional comparison of pre- and post-adoption of IT use, Karahanna et al. (1999) demonstrated that behavioural beliefs of PU are the only belief underlying attitude for both potential users and users while visibility, demonstrability, ease of use and trialability are significant for potential adopters. The innovation diffusion literature provides these sets of innovation characteristics which, according to Karahanna et al. (1999), may affect an individual's opinion of the innovation prior to adoption and may affect the rate at which innovations are adopted. Also, these attributes provide a

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theoretically based set of behavioural beliefs. Table 4.4 shows items used to measure

behavioural belief in this study.

Table 4.4 Items Developed to Measure Behavioural Beliefs

Item/ reference	Reference
Relative Advantage (RA) RA1: If I were to use Internet banking, it would enable me to accomplish my tasks more quickly RA2: If I were to use Internet banking, the quality of my work would improve RA3: If I were to use Internet banking, it would enhance my effectiveness on the job RA4: If I were to use Internet banking, it would make my job easier RA5: Using internet banking gives me greater control over my work	(Moore &Benbasat, 1991; Karahanna et al. (1999)
Complexity (PEOU) COX1: Learning to operate Internet banking would be easy for me COX2: Overall, If I were to use Internet banking, it would be easy to use COX3: It would be easy for me to become skilful at using Internet banking. COX4: I believe that it is easy to get Internet banking to do what I want it to do. COX5: If I were to use Internet banking, it would be (not available) difficult to use. COX6: Using Internet banking requires a lot of mental effort.	(Moore & Benbasat, 1991; Karahanna et al., 1999; Tan & Teo, 2000; Wang et al., 2003)
Compatibility (COMPT) COM1: If I were to use Internet banking, it would be compatible with most aspects of my work. COM2: If I were to use Internet banking, it would fit my work style COM3: If I were to use Internet banking, it would fit well with the way I like to work.	(Moore & Benbasat, 1991; Karahanna et al., 1999; Tan &Teo, 2000)
Trialability (TR) TRIAL1: Before deciding on whether or not to use Internet banking, I want to be able to use it on a trial basis . TRIAL2: Before deciding on whether or not to use Internet banking, I want to be able to properly try it out. TRIAL3: I want to be permitted to use Internet banking, on a trial basis long enough to see what it can do.	Moore & Benbasat, 1991; Karahanna et al. 1999; Tan&Teo 2000; Brown, et al. (2004)
Observability (OBSRV) If the bank introduces Internet Banking service; OBS1: I will use it when it is used by many. OBS2: I will use it when I have seen others using Internet banking. OBS3: I will use it as soon as I get to know about it. OBS4: I will use it if this service becomes popular. OBS5: I will wait until other customers start to use it. OBS6: I will use it when other people have successful experience of using it. OBS7: If internet banking is unknown to me, I will not use it.	Karahann, et al., (1999)

However, this study focuses on the intention of consumers who may now be the

non-users of IB. Visibility or observability might not readily apply to the context of this

study, since it requires familiarity and prior interaction. In this case, the target beliefs

that will be considered are individuals' perceptions of the observability construct either

on their visibility expectation or on the nature of the benefit that respondents expect

from bank service as a whole.   Along the same lines as Tan and Teo's (2000)

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suggestion, non-Internet users will be included in this study. From our point of view, Rogers' construct of observability is still needed here because observability may be regarded by potential users who are not currently IB users as an important factor, which drives them to have more intention to adopt IB services. Also, it could be a requirement by a group of respondents like non-internet users. In this study, availability and possibility of observing innovation functioning might have an influence on the attitude towards the adoption. The feasibility of the Internet as a channel for banking would depend on the state of Internet diffusion in a country (Wolcott et al., 2001).

Construct name: Subjective Norm (SN)

Construct definition: Refers to a person's perception that most referents who are important to them desire the performance or non-performance of IB and their motivation to comply with the views and wishes of referents (Warshaw, 1980; Ajzen & Fishbein, 1980 and Matheison, 1995)

4.5.4 Operational Definition of Subjective Norm Measure

As discussed in the framework, to measure the SN influence within the three constructs, respondents will be asked to indicate their normative beliefs for each referent. The normative influence, according to Bearden et al. (1986), occurs when individuals conform to the expectations of others. They also pointed out that normative social influence might also occur if the individual is motivated to realize a reward or avoid a punishment. Compliance in this situation would occur if the individual believes the behaviour is visible or known to others. Similarly, the informational-based normative influence, according to Rogers (1995, p.199), occurs when potential adopters are aware of an innovation and are motivated to try it. Empirically, in this study,

normative beliefs are determined by indicating "the extent to which a referent would expect a potential adopter to adopt IB."

SN has become the alternative for measuring social influence but this has not resulted in a consistently significant measure of social influence. SN is usually measured by identifying the degree to which "referents" think that bank account holders should or should not perform the behaviour (Ajzen & Fishbein, 1980). Referents here could be any people or any mass media that are important to the respondent. Thereupon, subjective norms are predicted by normative beliefs about whether significant 'referents' proposed in this study (e.g. peer/family/bank staff/opinion leader or mass media) would approve of the respondent (bank account holder) performing the use of IB in question, weighted by the respondent's motivation to comply to behave in a manner which would meet each referent's approval. In this connection, this study attempts to examine the direct and indirect influences of SN in predicting behavioural intention of bank account holders towards use of IB.

I. Direct SN Operational Definition

In general, the operational definition is defined here by four selected items borrowed from Taylor and Todd (1995b) and two items adapted from Shih and Fang (2004). Using these items, the study attempts to find out the nature of the relationship between subjective norms and the behavioural intention of potential adopters based in Yemen. Taylor and Todd's (1995b) items are widely used in studies of IB such as Shih and Fang (2004). Table 4.5 presents key items used to operationalize SN. The scale used for selected items has been explained in the previous section.

Table 4.5 Items Developed to Measure SN

Items	References
1 Most people who are important to me would think that I should use Internet banking to get bank services	Taylor & Todd (1995b)
2 The people who influence my decisions would think that I should use Internet banking.	
3 Most people who are important to me would think that I should try out the bank's website to get access to the bank internet banking.	
4 The people who influence my decisions would think that I should try out the bank's website to get access to the bank	
5 Most people who are important to me would think that using Internet banking is a good idea.	Shih & Fang (2004)
6 Most people who are important to me would think I should use Internet banking.	

II. Operationalizing the Normative Belief Measure

The normative belief here will be operationalized based on two different categories of referents. These two referents are personal and mass media. The two types use different channels to communicate with respondents. Regardless of the amount of the influences or how fast each category's influence reaches the respondent, this study seeks to investigate which one may have a significant influence on the potential adopter of IB based in the Republic of Yemen. This study develops two variables underlying the SN construct (indicators) and which are proposed to play a role in determining the normative belief of the respondents. These two indicators are; personal and mass media (Interpersonal Influencer / External Influencer). The study presents the conceptual definition of the SN variable and its antecedents as follows;

A. Operational Personal Referents Measure

Construct name: Personal Influencer: (Personal communication)

Construct definition: Identifies to what extent personal communications are perceived as an important factor in influencing the adoption of IB services (Rogers, 1995).

The personal channel influence is expanded from the "peers influence" scale of Taylor and Todd (1995b). Personal Referents are divided into three groups, which are

peers/colleagues/friends/family, opinion leaders, and bank staff. Table 4.6 depicts items

operationalized in Personal Referents (PR).

Table 4.6 Items Developed to Measure Personal Referents (word-of-mouth)

Items
Nb1- My Referent (peers/colleagues/friends/family) would think that I should use Internet banking
Nb2- My Referent (peers/colleagues/friends/family) would think that I should try out Internet banking to manage my bank accounts.
Mc 1,2 Generally speaking, I want to do what my referent (peers /colleagues /friends/ family) thinks I should do
Nb3- My opinion leaders would think that I should use Internet banking
Nb4- My opinion leaders would think that I should try out Internet banking to manage my bank accounts.
Mc 3,4 Generally speaking, I want to do what my opinion leaders think I should do
Nb 5- Bank's employees I deal with would think that I should use internet banking
Nb 6- Bank's employees I deal with would think that I should try out Internet banking to manage my bank accounts.
Mc5,6 Generally speaking, I want to do what my bank's employees think I should

B. Operational Mass Media Measure

Construct name: Mass media (External Influencer)

Construct definition: Identifies to what extent mass media communications are

perceived an important factor in influencing the adoption of IB services (Rogers, 1995).

Table 4.7 presents the items used to measure Mass Media Referents (MM) as fellows;

Table 4.7 Items Developed to Measure Mass Media Referents

Items	Reference
Nb1 - the media are full of reports, articles and news suggesting that using Internet banking services is a good idea	Pedersen (2005)
Nb2 – the media and advertising consistently recommend using Internet Banking services	
Nb3 - In my profession, it is advisable to use Internet Banking services	
Nb4 - I read/saw news reports that using Internet Banking was a good way of managing my bank account.	Battacherjee (2000)
Mc (1, 2, 3, 4) I want to do what the media and profession think I should do.	Pedersen (2005)

Mass Media is the other type of referent in the social system. The mass media

referent is used here to operationalize to what extent the mass media exert an effect on

the potential adopters of IB. This latent variable is operationalized through selected

items, which are adapted from Pedersen (2005) and Battacherjee (2000).

4.5.5 Operational Perceived Behaviour Control Measure

Construct name: PBC (PBC)

Construct definition: Refers to person's perception of the ease or difficulty of performing IB, as well as the beliefs about having the necessary resources and opportunities to adopt IB (Ajzen, 1991 and Pavlou, 2002).

This section discusses the development of the instrument that will be utilized to measure PBC and PBC Beliefs. Theoretically, Taylor and Todd, (1995a) proposed that PBC is "the sum of the control beliefs (cb_k) weighted by the perceived facilitation (pf_k) of the control belief in either inhibiting or facilitating the behaviour". A control belief, according to Mathieson (1991), is an individual's perception of the availability of skills, resources, and opportunities" while perceived facilitation is "the individual's assessment of the importance of those resources to the achievement of the outcome". The proposed PBC's equation is:

$$\textbf{PBC} = \sum_{i=1}^{n_i} \textbf{cb}_k \, \textbf{pf}_k \qquad \text{(Taylor and Todd, 1995a; Mathieson, 1991)}$$

In general, Mathieson, (1991) pointed out that the weights of evaluation of desirable outcome (e_i), motivation to comply (mc), perceived facilitation (pf_k) have two approaches by which the study can measure them. First, is direct assessment by which the individual can be asked to specify them using a Likert-scale, while the second approach is indirect assessment by which the weights can be estimated as coefficients in regression equations.

Measuring the perceived behaviour control construct and its relevant control beliefs constructs in this study will be based on combinations of several items adapted from the theory of TPB itself, empirical research on IB adoption such as Shih and Fang (2004), Al-Sabbagh and Molla (2004) and Tan and Teo (2000), and IS literature such as Venkatesh (2000). In this case, this study will explain the PBC measurement items first,

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then the researcher will move on to identify those items, which operationalize the other

PBC belief components of self-efficacy and facilitating conditions.

I. Direct Measure of PBC

Five items were selected to operationalize the PBC constructs, which were adapted from

Taylor and Todd (1995a). The third item in Taylor and Todd (1995a) lends itself to

different possible answers to its subparts (double-barrelled question). Therefore,

according to Sekaran (2003, p.240) the researcher needs to separate the PBC_3 question

subparts into three specific questions to avoid respondent bias. Table 4.8 shows the

items selected to measure PBC.

Table 4.8 Items Developed to Measure PBC

Items to Operationalize PBC
PBC1 = I would be able to use Internet banking.
PBC2 = I have the resources necessary to make use of Internet banking.
PBC3 = I have the knowledge necessary to make use of Internet banking.
PBC4 = I have the ability to make use of Internet banking.
PBC5 = Using Internet Banking would be entirely within my control.

Source: Taylor & Todd (1995a)

II. Indirect Measure of PBC

The indirect measure of the PBC construct depends on four control belief

dimensions that are suggested by Taylor and Todd (1995a) and Tan and Teo (2000).

These are self-efficacy, facilitate technology, facilitate resources, and facilitate

government support. The following sections explain each component in further and

greater detail.

A. Self-Efficacy (SE)

Construct Definition: A potential adopter's judgments of their own capabilities to use

IB to get access to a bank's information, financial services and transactions online

(Compeau & Higgins, 1995).

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Gist and Mitchell (1992) point out that the traditional measurement of self-efficacy uses a nominal scale (yes or no). In this scale, an individual's sum of positive responses is the magnitude of self-efficacy...while on some occasions, Likert-type scales have been used, which simply ask how well the person thinks he or she can do on the task, and then carry out the statistical correlation between *scale score* and *performance*. Igbaria and Iivari (1995) reported that self-efficacy had both direct and indirect effects on usage, demonstrating its importance in the decision to use computer technology. There are some self-efficacy models which are helpful tools in guiding the researcher to identify the self-efficacy attributes of the current study. For example, Lopez and Manson's (1997) proposed model depicted that computer self-efficacy (CSE) is a function of the two determinants of social pressure and organizational support. Another model proposed by Igbaria and Iivari (1995) viewed the CSE as a function that can be predicted by the two variables of "computer experience" as well as "organizational support". Compeau and Higgins' (1995) model identifies two new constructs; "encouragement by others" and "others' use" in addition to "support" which is demonstrated to have an influence on the (CSE). In this matter, the self-efficacy construct will be measured using five items on a 7-point Likert Scale. Two items were adapted from Igbaria and Iivari (1995) and Hill et al. (1987) by which individuals will be asked to indicate the extent of their disagreement or agreement with the two statements on a 7-point scale. The scale ranges from (1) strongly disagree to (7) strongly agree. These statements are "I will understand how IB works"; and "I am confident that I could learn Internet Banking applications." The other three items are adapted from Lassar et al. (2005)'s instrument. These items are "I feel comfortable using computers in general", "I feel comfortable using the Internet" and "my current skills in using the Internet, enable me to do everything that I want to do" (Lassar et al., 2005). Computer experience, according to Igbaria and Iivari (1995), has a strong positive direct effect on

self-efficacy. The self-efficacy decomposed belief items are presented in Table 4.9 as follows;

Table 4.9 Items Developed to Measure Self-Efficacy Decomposed Belief

Cb$_1$: I would feel comfortable using Internet banking on my own
pf$_1$: For me , feeling comfortable using Internet banking on my own is important
Cb2: If I wanted to, I could easily operate (application/software) for Internet banking from the bank portal (website) on my own.
Pf2: For me, being able to easily operate (application/software) for Internet banking From the bank (portal /website) on my own is important.
Cb3: I would be able to use the (application/software) for Internet banking even if there was no one around to show me how to use it.
Pf$_3$: For me, being able to use the (application/software) for Internet banking even if there is no one around to show me how to use it is important.

With respect to the salient belief of the self-efficacy construct, this study will adapt it from Taylor and Todd (1995a) and the items selected will be rephrased to suit the study context. Decomposing the belief of self-efficacy structures, according to Taylor and Todd (1995a), somewhat increases the explanatory power of the model for behavioural intention. Furthermore, the decomposed TPB model suggests specific beliefs that can be targeted by a designer or manager interested in influencing system usage.

B. Technology Facilitating Conditions (FT)

Construct definition: Refers to users' perceptions of the necessary technology support and assisting them when they encounter difficulties, also enabling easy accessibility to the Internet, hardware, software, and network connections etc., for IB services (Thompson et al., 1991 and Tan & Teo, 2000).

One of PBC components is the belief in the facilitating technology condition. This variable is operationalized by asking respondents some questions to account for technological situations in which an individual lacks substantial control over the targeted behaviour (Ajzen, 1991). The study has eight items, which ask respondents about technology control and their perceptions of the importance of this technology to be facilitative and maintained. Five items were adapted from Taylor and Todd (1995a),

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Tan and Teo (2000), Shih and Fang (2004) and Brown et al. (2004) Table 4.10 shows

the items developed to measure the facilitating technology construct.

Table 4.10 Items Developed to Measure Technology Facilitating Conditions

	item statement	Reference
Cb1	I have the computers, Internet access and applications which I need to use Internet banking.	Taylor & Todd (1995a) Shih & Fang.(2004),
Pf1	For me, availability of the computers, Internet access and applications to use Internet banking is important.	Taylor &Todd (1995a) Shih & Fang.(2004),
Cb2	Internet banking application "software" might not be compatible with the current system I use.	Taylor &Todd (1995a)
Pf2	For me, a service having software that is compatible with the current system I use is important.	Taylor & Todd (1995a)
Cb3	I will have trouble accessing bank's website/ application when I want to use Internet banking to manage my account online.	Taylor & Todd (1995a)
Pf3	For me, whether or not I have trouble using Internet banking is not important.	Taylor & Todd (1995a)
Cb4	I am concerned about the security of Internet banking services.	Tan & Teo (2000) and Brown et al. (2004),
Pf 4	For me, advances in Internet security, which provide a safer Internet banking, are important.	
Cb5	I would have Internet access speed problems when I want to make use of the Internet Banking services.	Tan & Teo (2000) and Brown et al. (2004)
Pf 5	For me, faster Internet access speed is important for Internet banking.	
Cb6	Banks' transactional websites are available to use Internet banking.	Sciglimpaglia & Ely (2002) and Malhotra & Singh (2004)
Pf 6	For me, the availability of the bank's transactional websites is very important to use Internet banking.	
Cb7	A reliable Internet connection is available when I want to use Internet banking.	Sciglimpaglia& Ely (2002) **and**
Pf 7	For me, reliability of Internet connection services is very important to use Internet banking.	**WSIS(2003)***
Cb8	Wireless connection with high quality of Internet is available to use Internet banking.	Suoranta & Mattila (2004)
Pf 8	For me, availability of wireless connection with high quality Internet is very important to use Internet banking.	

*WSIS(2003) IT Master plan for Yemen , World Summit on the Information Society (WSIS) Beirut, 4-6 February 2003

C. Development of Facilitating Resources Measure

Construct Definition: Refers to an individual's perceptions of their ability to gain

access to resources and opportunities required to facilitate IB adoption behaviour

(Ajzen, 1991).

The belief construct of facilitating resources is operationalized by asking the

respondents five questions. All the five control beliefs (cb) and their perceived

facilitating questions were adapted from Taylor and Todd (1995a, b). Table 4.11 indicates the items developed to measure the facilitating resources construct as follows.

Table 4.11 Items Developed to Measure Facilitating Resources
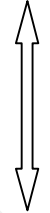
	Items	**References**
Cb1	There will not be enough computers for everyone to use Internet banking services.	Taylor & Todd (1995a)
Pf1	For me, having computers for everyone is important.	
Cb2	Being connected to the Internet will be too expensive.	
Pf2	For me, being able to accessing Internet at a low price is important.	
Cb3	I would not be able to use Internet banking when I need it.	
Pf3	For me, being able to use Internet banking when I need it is important.	
Cb4	I have the time to set up Internet banking services.	Taylor & Todd (1995b)
Pf4	Having the time to set up Internet banking services is important to me.	
Cb5	I have enough money to use Internet banking services.	
Pf5	Having enough money to use Internet banking services is important to me	

D. Government Facilitating Condition (GFC)

Construct definition: Refers to users' perceptions of government support for Internet commerce (Tan & Teo, 2000).

In the literature review, government support belief is a new construct, which is recommended by Tan and Teo (2000). However, the government support variable is regarded as very important to examine IB in an advanced environment (Singapore) but this variable is still not utilized widely in studies of IB in less advanced environments. In our study, the researcher believes that investigating the effect of this variable will not be fruitless, therefore, this study has adapted Tan and Teo's (2000) instrument to measure the construct. Four items were selected to account for measuring the respondents' control beliefs (cb) as well as respondents' perceptions of government support (pf). Table 4.12 shows the developed items that will be used to measure the construct of government support belief.

Table 4.12 Items Developed to Measure Government Support

Belief vs. Comply	Items	Scale 7-point Likert
Cb1	The government gives support for electronic commerce.	(1) Strongly Disagree
Pf 1	For me, government support for electronic commerce is important to use Internet banking services.	
Cb2	The government endorses Internet commerce in Yemen.	
Pf 2	For me, the government endorsing electronic commerce is important to use Internet banking services.	
Cb3	The government is active in setting up the facilities to enable Internet commerce.	
Pf 3	For me, setting up the facilities to enable Internet commerce is important to use Internet banking services.	
Cb4	The government promotes the use of the Internet for commerce	(7) Strongly Agree
Pf 4	For me, the government promotes the use of the Internet for commerce is important.	

Reference : (Tan & Teo, 2000)

4.5.6 Operationalizing User Informational-Based Readiness (UIBR)

Construct name: User's Informational-based Readiness (UIBR)

Construct definition: Refers to the potential adopters' assessment of their awareness, information, experience and exposure to the related technologies available or recommended by referents, which reflect their informational abilities to adopt or reject the innovation. (Awareness, information: Rogers, 1995; Hall et al., 1977; Exposure: Khalifa & Cheng 2002; experience: Taylor & Todd, 1995).

The construct aims to probe the potential adopters in terms of their informational capability and readiness for IB. In order to understand the potential adopters' readiness, this study suggests specific elements, namely awareness, knowledge, experience and exposure. In this study, the operational definition of UIBR is limited to those specified attributes.

A. Attribute Name: Awareness (AW)

Attribute definition: Refers to the potential adopter's awareness that an innovation (IB services) exists (Rogers,1995).

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In order to measure the potential adopter's awareness and knowledge of the use of IB, the study is going to utilize Hall et al. (1977)'s instrument of "Stages of Concern Questionnaire" (SoCQ). Whilst their instrument includes seven stages to measure respondents' levels of concern about innovation, this study is concerned only with the awareness and knowledge stages, which could be applicable to the study context. Theoretically, this study is going to utilize Hall et al. (1977)'s definition of the two stages of awareness and informational knowledge in the context of IB. Hence, the Awareness stage refers to the stage at which potential adopter's of IB show little concern about IB. Consequently, the how-to or "Informational" stage refers to the potential adopters' interest in a selfless manner in obtaining more information regarding IB (general characteristics, effects, requirements of use, learning how computers can be used and how they function etc.). Table 4.13 below depicts the items selected to measure the concepts as proposed by Hall's model.

Table 4.13 Items Developed to Measure Awareness

attribute	Item Statement	Scale
Awareness	I do not even know what Internet banking is.	7-point likert (1)strongly disagree
	I am not concerned about Internet banking.	.
	I am completely occupied with other things.	.
	Although I do not know about Internet banking, I am concerned about things in the area.	. . .
	At this time, I am not interested in learning about Internet Banking.	(7) strongly agree

(**Source**: Hall et al., 1977)

B. Attribute name: Knowledge

Attribute definition: The Information necessary to use an innovation "IB" properly, briefly, refers to what extent individuals are capable of using it (Rogers, 1995).

Table 4.14 displays the items developed to measure knowledge.

Table 4.14 Items Developed to Measure Knowledge

attribute	Item Statement	Scale
Informational knowledge	I have a very limited knowledge about the Internet banking. I would like to discuss the possibility of using the Internet banking. I would like to know what resources are available if I want decide to adopt Internet banking. I would like to know what the use of the Internet banking will require in the immediate future. . I would like to know how this innovation is better than what this study have now.	(1)strongly disagree . . . . . (7) strongly agree

(**Source**: Hall, et al. 1977)

C. Attribute name: Experience

Attribute definition: Refers to the computer experience that is associated with the use of PCs, the Internet, and Karjaluoto et al., (2002) add personal banking experience. (Venkatesh et al., 2003 and Karjaluoto et al., 2002)

This study is going to adapt some previous research instruments to measure potential adopters' experience of technology as shown in Table 4.15. Respondents will be asked to rate themselves on their personal banking, computer experience, and Internet experience in general on a 7-point Likert scale, with 1 being a novice and 7 being an expert. In addition, there are three questions asking respondents to rate their experience in terms of the number of years of using computers, the Internet and personal banking technologies. Clearly, the experience dimension is operationalized from the previous research of Gardner and Amoroso (2004) in order to ensure validity. Gardner and Amoroso (2004) claimed the instrument had also been used by Venkatesh and Davis (2000) and Legris et al. (2003). Similarly, the instrument is applied to our study in which the perceived experience of using the technologies of the Internet, computer, and personal banking is measured in conjunction with the number of years of using those particular objects. Table 4.15 displays the items selected to measure experience as follows;

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Table 4.15 Items Developed to Measure Experience

No	Items	Years of Experience						
		Never used	1-2	3-4	5-6	7-8	9-10	11& more
1	How long have you been using computers?							
2	How long have you been using the Internet?							
3	How long have you been using Personal banking?							
	Laforet & Li (2005), Karjaluoto et al. (2002) 7-point Likert Scale							
4	I have a great deal of experience using the Internet.	1 Extremely Disagree . 7 Extremely Agree						
5	I have a great deal of experience using computers.							
6	I have a great deal of experience using Personal banking.							

Karjaluoto et al. (2002)'s study revealed that prior computer experience had a significant impact on online banking usage while personal banking experience is a major factor underlying consumer attitude.

D. Attribute name: Exposure

Attribute definition: The level of exposure of the individual to the behaviour under study, which is the use of IB services (Khalifa & Cheng, 2002).

Although there are no standard operational definitions that measure the level of exposure in adoption studies, the researcher is going to adapt an integrated definition based on the existing literature of IB. For the adoption of IB in advanced developing countries Akinci et al. (2004)'s study segmented "the exposed users" as being "seen rather open to the influence of external factors such as advertising and suggestions of others". Some authors view the exposure within the mirror of experience such as Karjaluoto et al. (2002), who sought prior experience of computers, technology and personal banking. Lim et al. (2002) posit two attributes of IT exposure, which are knowledge and experience. Hence, learning from oneself and others is a good source to raise an individual's level of exposure, especially when an innovation with unknown attributes is offered. According to McFadden and Train (1996), there are two ways to determine whether customers like the product i.e. by trying it themselves or by waiting

to observe the experience of other customers. Khalifa and Cheng (2002) investigated the role of exposure in the adoption and usage of mobile commerce and the exposure was operationalized as a function of three attributes: trial, observation and communication. More recently, Chang (2004) measured exposure within the respondent's answer to Internet banking recommendations, the type of recommendation and if they had ever used IB before. Table 4.16 displays the items selected to measure exposure as follows;

Table 4.16 Items Developed to Measure Exposure

No	Items	Reference
3-1	I have seen advertisements recommending the use of Internet banking.	Khalifa & Cheng (2002) and Chang (2004);
3-5	I have used Internet banking before	
3-6	I have been exposed to a recommendation to use Internet banking.	

4.6 Research Hypotheses Development

A hypothesis is defined by Zikmund (2003, p.499) as "an unproven proposition or supposition that tentatively explains certain facts or phenomena; a proposition that is empirically testable". The main objective of developing the study's hypotheses is to assist the researcher to describe the nature and direction of the relationship existing among the research variables proposed and cited in the theoretical framework (Sekaran 2003, p.97). In addition, to assist in the test for the statistical significance of the linear relationship of those variables that would predict the behavioural intention either directly or indirectly towards adopting Internet banking services based in Yemen. In order to do so, this research utilizes the Decomposed Theory of Planned Behaviour (DTPB) in predicting individual customers' behavioural intention. Some authors like Sekaran (2003, p.103), suggested that several testable statements or hypothesis formats can be drawn from the study's theoretical framework. The null and alternative

hypothesis approach is more appropriate for this study because it fits most propositions that state a definitive, exact relationship between two variables. The true purpose of setting up null hypotheses, according to Zikmund (2003), is to provide an opportunity to nullify them. The null hypothesis (Ho) according to Sekaran (2003) is expressed as no significant relationship between two variables, while the alternative hypothesis, according to Zikmund (2003), is a statement indicating the opposite of the null hypothesis (Ho) or, according to Sekaran (2003), it is a statement expressing a relationship between variables. Therefore, all the statistical hypotheses in this study are stated in an alternative hypothesis form which allocates the symbol (H_1) whereby they can be tested for possible acceptance. This hypothesis would be statistically, according to Malhotra (2004), expressed by ($H_1: \beta_1 \neq 0$).

The subsequent research questions, propositions and alternative hypotheses have been predetermined based on the requirements of the TPB which indicate the predictive relationships among the TPB constructs as in Ajzen and Fishbein (1980, p.80). As well, they verify the hypotheses linking beliefs to the behavioural intention construct. Similarly, some propositions were derived and adapted from Rogers' (1995) empirical research findings discussed in the literature review in Chapter three.

4.6.1 Research hypotheses

Major alternative hypotheses in this study were made in order to explain and examine the predictive relationship among the variables in the proposed research framework. Therefore, the alternative hypotheses and null hypothesis on the two layers of predictors as it is with the Theory of Planned Behaviour. In the following sections the study is going to provide an explanation of these relevant hypotheses.

I. Predicting Intentions to Use IB

As a rule of Ajzen's (1991) TPB, "the stronger the intention to engage in behaviour, the more likely should be its performance". The TPB suggested that three determinants could be used to predict the behavioural intention to use IB. This issue was elaborated and discussed previously in the literature review in Chapter three (see section 3.2.2 page 67). Consistent with Ajzen's (1991, p.189) proposition it is stated that;

"The more favourable the attitude and SN with respect to a behaviour, and the greater the PBC, the stronger should be an individual's intention to perform the behaviour under consideration" (Page189).

This study has utilized Ajzen's (1991) theoretical hypothesis and applied it to the context of IB adoption with the following research hypothesis;

Hypothesis 1:

The more favourable the attitude and subjective norm with respect to IB-use, and the greater the PBC, the stronger should be an individual's intention to use IB.

> *Null Hypothesis 1:*
> *There is no relationship between attitude, subjective norm, PBC with respect to IB-use and an individual's intention to use IB.*

Accordingly, three research sub hypotheses have been derived from the above respective "*Hypothesis 1*" in accordance with the TPB whereby the second "*Hypothesis 2*" can be tested through these research hypotheses as follows:

Hypothesis H1a:
There will be a positive relationship between the behavioural intention of Yemeni bank account holders (BI) towards the use of IB and their attitude to using IB (ATT).

> *Null Hypothesis H1a:*
> *There is no relationship between attitude with respect to IB-use and an individual's intention to use IB*

Hypothesis H1b:

There will be a positive relationship between the behavioural intention of Yemeni bank account holders (BI) towards the use of IB and the subjective norms (SN).

Null Hypothesis H1b:

There is no relationship between subjective norms with respect to IB-use and an individual's intention to use IB.

Hypothesis H1c:

There will be a positive relationship between the behavioural intention of Yemeni bank account holders (BI) towards the use of IB and PBC.

Null Hypothesis H1c:

There is no relationship between subjective norms with respect to IB-use and an individual's intention to use IB.

Following Ajzen (1991), the direct factors of the TPB model (attitudes towards use of IB, SN, and PBC) collectively can explain significantly the behavioural intention of bank account holders towards the use of IB.

Hypothesis 2:

The TPB model of direct factors (customers' attitudes towards use of IB, subjective norms, and PBC) provides a significant model fit in explaining customers behavioural Intention towards the use of IB.

Null Hypothesis H2:

TPB's Psychosocial determinates are not the most influential predictors in explaining an individual's intention to use IB.

Results of the tests of hypotheses H1 to H2 would ultimately answer the first research sub question Q1.1: How do the direct factors of TPB predict and explain customers' intention towards the adoption of IB?

II. The Role of Beliefs in IB-Using Behaviour

Ajzen's (1991) TPB theory, postulates that behaviour is

> *"a function of salient information, or beliefs, relevant to the behaviour… these salient beliefs that are considered to be the prevailing determinants of a person's intentions and actions…*behavioral beliefs *which are assumed to influence attitudes toward the behavior,* normative beliefs *which constitute the underlying determinants of subjective norms, and* control beliefs *which provide the basis for perceptions of behavioral control" Page 189.*

Following Ajzen's (1991) theory, this study hypothesizes that;

Hypothesis 3:

The salient beliefs (behavioural beliefs, normative beliefs, and control beliefs) are antecedents of the respective direct factors; attitude towards IB use (ATT), subjective norms (SN), and Perceived Behavioural Control (PBC).

Hypothesis 3 is tested by the following three research hypotheses as depicted below;

Hypothesis H4:

There will be a positive relationship between bank account holders' attitude towards use of IB (ATT) and its antecedent factor, behavioural beliefs (CI), comprising beliefs about perceived attributes of IB by bank account holders.

> *Null Hypothesis* H4*:*
> *There is no relationship between* attitude *with respect to IB-use and an individual's beliefs about perceived attributes of IB.*

Hypothesis H5:

There will be a positive relationship between subjective norms (SN) and its antecedent factors, "normative beliefs", comprising beliefs about referents' expectation (Personal and Media) and influence of those expectations in their use of IB.

Null Hypothesis H5*:*

There is no relationship between subjective norms with respect to IB-using and individual's beliefs about referents' expectation (Personal and Media) *to use IB.*

Hypothesis H6:

There will be a positive relationship between PBC (PBC) and its antecedent factors, control beliefs, comprising beliefs about facilitating factors (FT, FR, and FGS) and self-efficacy factors (SE) for IB use.

Null Hypothesis H6:

There is no relationship between PBC (PBC) *with respect to IB-use and an individual's* control beliefs about facilitating factors (FT, FR, and FGS) and self-efficacy factors (SE) *to use IB.*

A. Behavioural Beliefs Antecedents and Attitudes toward Behaviours

Ajzen (1991) pointed out that beliefs about an object can be formed by associating it with certain attributes. The attributes that come to be linked to the behaviour in this study attempts to examine the adoption of IB "use of IB". This study postulated some propositions that are relevant to employ Rogers' (1995) five perceived attributes of innovation (IB) that are considered as the direct antecedents of attitude. In this part, the relevant hypotheses related to examine the attitude variable and its antecedents are developed from predetermined propositions (see section 3.3.4.2-(I) in Chapter 3) in Rogers' Characteristics of Innovation (CI). With respect to the attitude variable, this study expected that users' attitudes towards using IB services in general would play a role in determining their behavioural intention to use them. Following Rogers' (1995), this study argues that the greater the perceived relative advantage, ease of use, compatibility, trialability and observability of using IB, the more likely that IB will be adopted. In this study, the researcher paid attention to those propositions which existed

in Rogers' (1995) review, which are utilized and converted to hypotheses that are easy to test and fit the context of IB as follows;

Hypothesis H4:

The aforementioned research hypothesis H4 can be tested by testing the sub hypotheses of H4a to H4d as stated bellow,

Hypothesis H4a:

There will be a positive relationship between a customer's attitude (ATT) towards the use of IB and the perceived relative advantage (RA)/ compatibility (COM) of using IB services.

> *Null Hypothesis H4a:*
> *There is no relationship between a customer's attitude (ATT) with respect to IB-use and an individual's perceived relative advantage (RA)/ compatibility (COM) of using IB services.*

Hypothesis H4b:

There will be a positive relationship between a customer's attitude (ATT) towards the use of IB and the perceived ease of use (EOU) of using IB services.

> *Null Hypothesis H4b:*
> *There is no relationship between* attitude (ATT) *with respect to IB-use and an individual's* perceived ease of use (EOU) of using IB services.

Hypothesis H4c:

There will be a positive relationship between a customer's attitude (ATT) towards the use of IB and the perceived trialability (TR) of IB services.

> *Null Hypothesis H4c:*
> *There is no relationship between attitude (ATT) with respect to IB-use and an individual's* perceived trialability (TR) of IB services.

Hypothesis H4d:

There will be a positive relationship between a customer's attitude (ATT) towards the use of IB and the perceived observability (OBS) of IB services.

Null Hypothesis H4d:
There is no relationship between attitude (ATT) with respect to IB-use and an individual's perceived observability (OBS) of IB services.

B. Normative Beliefs Antecedents and Subjective Norms

The second salient concern of this study was the influence of normative beliefs. This study argues on the basis of two types of normative beliefs that must be examined to understand their influence on the behavioural intention of bank account holders to adopt IB. The first type is the direct influence of subjective norms while the second type of subjective norms is the indirect influence of normative beliefs of personal (word-of-mouth or personal and mass media) channels. The study's argument on this issue is stated as "The greater the perceived personal norms (PR) and media norms (MEDIA) of using IB services, the more likely that it will be adopted".

Hypothesis H5:

The research hypothesis H5 stated earlier can be tested by testing the sub hypotheses of H5a to H5b. The developed sub-hypotheses are indicated precisely as follows;

Hypothesis H5a:

There will be a positive relationship between subjective norms (SN) and the personal norms (PR) of using IB services.

Null Hypothesis H5a:
There is no relationship between subjective norms (SN) *with respect to IB-use and an individual's* personal norms (PR) of using IB services.

Hypothesis H5b:

There will be a positive relationship between subjective norms (SN) and the media norms (MEDIA) of using IB services.

Null Hypothesis H5b:
There is no relationship between subjective norms (SN) *with respect to IB-use and an individual's* media norms (MEDIA) of using IB services.

C. Antecedents of PBC (Control Beliefs)

In the information system discipline, Pavlou & Fygenson (2006) viewed PBC as a two-dimensional construct formed by two underlying dimensions (self-efficacy and controllability), allowing a more detailed examination of external control beliefs. In this connection, hypothesis H6 addresses this issue.

Hypothesis H6:

With respect to the relationship between PBC and its antecedent factors as hypothesized in general in the sub-hypothesis, H6a-H6d can be tested using the following research sub-hypotheses.

Hypothesis **H6a:**

There will be a positive relationship between PBC (PBC) and banks account holders' perceived facilitating technology conditions (FT) for using IB services.

Null Hypothesis H6a:
There is no relationship between PBC (PBC) with respect to IB-use and an individual's perceived facilitating technology conditions (FT) for using IB services.

Hypothesis **H6b:**

There will be a positive relationship between PBC (PBC) and bank account holders' perceived facilitating resources conditions (FR) for using IB services.

Null Hypothesis H6b:
There is no relationship between PBC (PBC) with respect to IB-use and an individual's perceived facilitating resources conditions (FR) *for using IB services.*

Hypothesis **H6c:**

There will be a positive relationship between PBC (PBC) and banks account holders'

perceived facilitating government support (FG) for using IB services.

Null Hypothesis H6c:
There is no relationship between PBC (PBC) with respect to IB-use and an individual's perceived facilitating government support (FG) *for using IB services.*

Hypothesis **H6d:**

There will be a positive relationship between PBC (PBC) and bank account holders'

self-efficacy (SE) of using IB services.

Null Hypothesis H6d:
There is no relationship between PBC (PBC) with respect to IB-use and an individual's self-efficacy (SE) on *using IB services.*

III. UIBR Vs Behavioural Intention (BI)

This study argues that there is a relationship between users' readiness UIBR

(Informational-based) for IB and the behavioural intention as well as the attitude to

adopt this technology. Therefore, this argument is translated into a research proposition

in order to be tested. "The variable that could contribute in predicting customer's

behavioural intention to use IB is UIBR which summated user's (Awareness,

Knowledge, Experience, and Exposure) variables". In other words, this study argues

that the greater the awareness, knowledgeable, experienced, and past exposure to IB of

the customer, the more likely that IB will be adopted.

Hypothesis H7:

There will be a positive relationship between Users' Behavioural Intention (BI) toward the use of IB and all dimensions related to Users' Informational-based Readiness (UIBR).

There are four hypotheses developed to test research hypothesis 7, which are stated as follows;

Hypothesis H7a:

There will be a positive relationship between customers' Behavioural Intention (BI) towards the use of IB and their IB- awareness (AW).

> *Null Hypothesis* H7a*:*
> *There is no relationship between customers' Behavioural Intention (BI) with respect to IB-use and their IB- awareness (AW).*

Hypothesis H7b:

There will be a positive relationship between customers' behavioural intention (BI) towards the use of IB and their IB- knowledge (KW).

> *Null Hypothesis* H7b*:*
> *There is no relationship between customers' Behavioural Intention (BI) with respect to IB-use and their IB- knowledge (KW).*

Hypothesis H7c:

There will be a positive relationship between customers' behavioural intention (BI) towards the use of IB and their IB-experience (EXT).

> *Null Hypothesis H7c:*
> *There is no relationship between customers' Behavioural Intention (BI) with respect to IB-use and their IB-experience (EXT).*

Hypothesis H7d:

There will be a positive relationship between customers' behavioural intention (BI) towards the use of IB and their IB-exposure (EXPO).

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Null Hypothesis H7d:
There is no relationship between customers' Behavioural Intention (BI) with
respect to IB-use and their IB-exposure (EXPO).

Hypothesis H8:

There will be a positive relationship between Users' Behavioural Intention (BI) towards

the use of IB and Users' overall Informational-based Readiness (UIBR).

Null Hypothesis H7d:
There is no relationship between customers' Behavioural Intention (BI) with
respect to IB-use and Users' overall Informational-based Readiness (UIBR).

IV. Hypotheses on Demographic Variables

In the interests of completeness, a number of demographic variables were included

in this study's analysis which, although not central to the main research questions

derived in this study, may provide further insights (e.g. sex, age, education etc).

The external variables that predict a customer's behavioural intention to use IB consist

of demographic variables (e.g. sex, age, education etc).

Hypothesis 9:

There will be a positive relationship between Users' Behavioural Intention (BI) toward

the use of IB and Users' demographic variables

Null Hypothesis H9:
There is no relationship between customers' Behavioural Intention (BI) with
respect to IB-use and Users' demographic variables

4.7 Research Methods

The research methodology most appropriate to this study is a quantitative method

using survey questionnaires. Newsted et al. (1998) reported that surveys are among the

more popular methods used by the IS research community. The usefulness of surveys

based on Newsted et al. (1998)'s point of view is: (1) Surveys can be used to predict behaviour (2), surveys provide responses that can be generalized to other members of the population studied and often to other similar populations (3), surveys allow the researcher to determine the values and relations of variables and constructs, (4) surveys can be reused and provide a way of comparing responses over different groups, times, and places, (5) surveys permit theoretical propositions to be tested in an objective fashion, and (6) surveys are easy to administer and are simple to score and code. Accordingly, a self-administered questionnaire was distributed to obtain participants' responses (bank account holders) to the predetermined and theoretical research variables. Then, the responses obtained by the survey questionnaire were used to analysize the statistical relationships among the constructs of the TPB and its modified DTPB. The main constructs this research study undertook to test are: behavioural intention (BI), attitude towards behaviour (ATT), subjective norms (SN), PBC (PBC), and user's informational based readiness for IB (UIBR). Major constructs that are investigated in this research are measured using a 7-point Likert scale and the research question items are instruments that were published in leading journals in the field of IS some of which had been applied for similar research projects.

4.7.1 Design of the Questionnaire

This study's questionnaire was developed based on the guidelines given by adoption theories which were reviewed in previous sections provided by authors such as Ajzen and Fishbein, (1980), Taylor and Todd (1995a,b) and Rogers (1995). Initially, the survey questionnaire was developed in an English version, and then professional translators translated it into an Arabic version. Following Malhotra (2004), the back translation method was utilized here according to which bilingual speakers of English and Arabic translated items back and forth between Arabic and English. The survey

was concerned with users and non-users of the Internet and the questionnaire included five basic areas. The first section was devoted to the general traits of respondents and their readiness based on UIBR. The second section included questions about the intention and attitude of respondents (bank account holders) toward the usage of IB services. The third section was reserved to undertake items on the characteristics of using IB as attitudinal belief, which describe the user's attitude. The fourth, included questions about two components of subjective norms by which referents were categorized as personal and media. The final part of the survey focused on respondents control belief and assessed the behavioural control followed by the traits of respondents demographic.

The items in the questionnaire were constructed, and selected based on the adoption of IB literature. Furthermore, constructs were operationalized using validated items from prior research and based on the applicability of the items to fit the study context. A seven-point Likert scale was utilized to ensure statistical variability among survey responses for all constructs. To ensure that measurement scales were adapted and developed appropriately to the current context, qualitative interviews were conducted with two academic professionals to carry out the necessary wording changes.

Because IB is quite new to Yemen and there are no estimates available of actual or potential IB users, aspects such as computer usage, Internet usage, personal bank service usage, and respondent profiles were included in the questionnaire. The questionnaire was pre-tested and a focus group of five business professionals evaluated the questionnaire, following which minor wording changes were made.

Questions Sequence

The order of questions is very important, therefore, in section one, respondents were requested to answer three general questions such as the familiarity of respondents

to the banking technologies like usage of the Internet, computers and ATM. Then respondents were asked questions pertaining to their awareness and knowledge of IB. In the following section, the research posed questions mainly about customer attitude and preferences related to IB. Section three was specified to get respondents information on the major variables of this study. Lastly, demographic questions were recommended to be placed in the last section in order to avoid embarrassing the respondents (Zikmund, 2003).

4.7.2 Instrument Development and Pilot Test

The instrument for data collection of this quantitative study is a survey questionnaire. For question items, in most cases, a 7-point Likert scale with anchors ranging from strongly agree to strongly disagree was used. Content validity was established through careful selection and adaptation of items from previously validated instruments. A pre-test for the questionnaire was conducted for further verification. The pre-test was carried out on three academic staff of UM, three academic staff of the IIUM, one Yemeni academic, five Yemeni businessmen, 18 Yemeni PhD and Master Students in Malaysia, and one former Yemeni bank manager. The useful feedback, comments and suggestions regarding the survey's organization, consistency, and clarity received from the pre-test phase were considered and some modifications and corrections were made to the questionnaire's items and instructions, which were found not to be clear. The feedback from the pilot test was used to improve the readability and the quality of the questions in the instrument. The final revised survey questionnaire, the survey instructions, cover letter, and information sheet on IB were developed and included to provide the subjects with a brief idea of what IB is. The survey's instruction page explains the proper way to provide acceptable answers to survey items by the participant, while the cover page explains the purpose of the study and assures the

respondents of the confidentially of their responses. Since our major respondents are Arab native speakers, the researcher decided to translate the questionnaire into Arabic.

4.7.3 Measurements of the Constructs

The literature study reviewed and presented in sections 3.2, 3.3 and 3.4 under the literature review chapter respectively, provided the research with basic support and assisted this work to develop the framework and major research constructs. The measurements of the study's construct were discussed previously in section 4.5 of this chapter (see Research Instrument Development in section 4.5). Therefore, the instrument to measure the constructs of interest were developed either by adapting existing measures found in the literature review to the research context or by using the established theoretical constructs. In other words, several indicators were adapted from previous adoption research, both IS research and IB research, to ensure the validity of the instruments this study used.

4.7.4 Study Population

The target population of this study consists of all bank customers who are account holders in one of the various banks operated in Yemen. The statistical number of the size of this population is not available to the researcher; therefore, participants for the study survey included local and foreigner customers of the retailer commercial, Islamic, government and special banks. The current study assumes that by including local and foreigner customers, the study would provide an exclusive generalization about bank customers' perceptions of the use of IB services in the Yemeni context.

4.7.5 Data Collection Method

Drawing a representative sample of banking users is a difficult task. In this connection there are some considerations, which the researcher took into account from previous research and the experiences of others in the context of IB adoption. For instance, the sampling in previous research on IB has drawn attention to one of the problems a researcher faces, which is the difficulty of getting a customer's information from the bank because banks normally will not release the client's information due to confidentiality (Lai & Li, 2004). Accordingly, the researcher obtained a formal cover letter from the postgraduate studies and scientific research centre at Sana'a University, the student's academic sponsor, and the Faculty of Commerce to which the student is affiliated as one of its academic staff. The issued letters posted to Banks' General Managers explain the purpose of the survey and request their highly appreciated cooperation (See Appendix **X-C**). The cover letters were very helpful because the managers of the major banks cooperated positively and appointed some of their staff in the customer services divisions to assist the researcher in handing the forms to their customers who agreed to participate in this survey as well as to following up on other customers who took the form with them due to lack of time. On the other hand, researchers in IB, according to Akinci et al. (2004), have to consider the fact that there is the likelihood of IB usage being found strongly linked to PC-literacy and Internet usage. One of the major problems the study faced is that there are some customers who are either PC-literate or non-Internet users; therefore, the researcher instructed people to help those kinds of customers to fill in the survey.

The distribution centre for the survey was planned to be all the banks' headquarters and then the total number of 1000 survey questionnaires were distributed to all the points of survey distribution. Fifty forms were assigned to each one of the 14 locations and the remaining 300 questionnaires were self administered by the researcher

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to bank customers in different locations. There were 1,000 forms (14X50= 700 forms through the banks' appointed people + 300 survey forms self-administered). The data collection was conducted within the first quarter of 2006 (January to March 2006). Table 4.17 presents a summary of the data collection process followed.

Table 4.17 Summary of the Data Collection Process

Banks in Yemen	Contact Persons	Position	Total Forms Distributed	Note
CommercialBanks				
1-YBRD.	Mrs.Muluka AlAghbari	Manager Intl. Division.	50	
	Mr.Khaled Al-Bana	IT division	50	
	Mr.M.Al-Domini	Customer services	50	
2-NBY	Mr.Omar Al-Sheibah	Customer services	50	
3-UBL.	Mr.Mohamed Anwar Mr.Naji Al-twity	General Manager Customer service	50	
4-Calyon	Mr.Mutee Al-Tuhaif	Head of Transfer	50	
5-YCB	Mr.Tawfik Hunaish	IT Manager	50	
6-YKB	Mrs.Mrakish AL-Sbahi	Customer services	50	
7-IBYemen	Self-administrated		50	
8-YGB	Mr.Ayman Otifa	E- banking Manager	50	
	Mr.Osamah	Customer services	50	
9-SBYB	Mr.Mohad Sharafudin	IT Head	50	
Islamic Banks				
10-IBFI	Mr.Loqman Al-Aswadi	Customer services	50	
11-TIB	Dr. Hamoud A Saleh Mr. Yahya	Manager, Planning &Dev. Customer services	50	
12-SIB	Prof. Hassan Ferhan Ali Al-Asmary Mr. Bilal Zyed	Manager of Dev. Customer services Customer services	50	
Specialized Banks				
13-CAC	Mr.AbdulMalik AlThour Mrs. Fathyah	Chairman Advisor Customer services	50	
14. CBY	Mrs Fatimah Alwasabi	Customer Division	50	
Others	Self administrated		300	
Total			1000	

4.7.6 Sampling Method Utilized

The sampling instrument utilized here is guided by previous studies that encountered similar situations such as those of El-Haddad and Almahmeed, (1992), and Al-Ashban and Burney (2001).Due to the difficulty in obtaining a comprehensive and up-to-date sample from the banks, convenience sampling was used and randomly drawn as a customer entered the banks. The population for this study consists of all Yemeni bank customers in the retail sector who are account holders, including users and non-users of the Internet. The sample size for IB users will be drawn from the total population of banks customers. An earlier study of adoption of IB by Sathye (1999) highlighted that, "For populations of 10,000 and more, most experienced researchers would probably consider a sample size between 200 and 1,000 respondents", thereupon, initially this study will target a sample size of respondents within that range. This study sample stands for N=369 complete and usable questionnaires received.

Given the exploratory nature of this study, convenience sampling according to Zikmund (2003) is suitable for this research. Accordingly, the study found that the convenience sampling method is widely used in the studies of electronic banking adoption such as Lai and Li (2004), Brown et al. (2003), Al-Sabbagh and Molla (2004), Gerrard and Cunningham (2003), Mattila et al. (2003), Pikkarainen et al. (2004), Al-Ashban and Burney (2001), and Sathye (1999). On the other hand, it is more acceptable in view of time and cost considerations. Since major banks which are endorsed by the Central Bank of Yemen have their headquarters in the capital city Sana'a, the random sample will be drawn from visitors to the headquarters of the banks in this. Another reason for selecting Sana'a as a representative geographical area is because the Yemeni Internet population is concentrated in five large cities with almost 60% in the capital city of Sana'a alone.

Table 4.18 Sampling Methods in Previous IB Research

Reference:	Population	Type of sampling	sample useable	Target sample	survey distribution
Al-Sabbagh & Molla (2004), IB Oman	N/A	convenience	225	limited size	Self administered in Oman
Chang (2004) Korean	Korean residents	systematic and stratified	393	N/A	3200 survey forms via email
Lai & Li (2004)	N/A	convenience	N/A	Graduate students	N/A
(2003),Gerrard & Cunningham	Singapore	convenience	240,	Adults employed in downtown Area	111 adopters & 129 non-adopters
Mattila et al., (2003),IB (Finland)	Bank customers 1,167	convenience	220	a sub-survey sample of 220 individuals,	Post mail to 3,000 individual customer
Mattila,(2003) M-banking Finnish	individual bank customers	stratified	1253	**Note** missing variable	3000 customers
Brown et al., (2003) cell/phones	13 million cell phone subscribers	convenience sampling	158	cell/phone & bank account holders	Shopping centres & malls + online survey
Gurau (2002	Accounts holder	quota sampling	300 clients	150 business and 150 Personal	N/A
Akinci et al., (2004)	List of 1228 e-mail	N/A	140	academic staff	internet survey
Pikkarainen et al., (2004)	427 Questionnaire forms	convenience	268	N/A	N/A
Sohai & Shanmugham in Malaysia	N/A	convenience	300	students and staff at two universities	N/A
Polatoglu & Ekin (2001)	List of 987 customers' e-mail addresses	N/A	114	724 questionnaires sent	Questionnaires sent via email
Al-Ashban & Burney (2001), tele-banking	Saudi bank customers	convenience & random distribution	N/A	sample of 300 bank customers	3 banks targeted Each bank branch was given 50 sets of questionnaires
Sathye (1999)		convenience sampling	500	fixed at 500 individual 250 business 250	N/A
Anandarajan et al.,(2000)	Six banks in Lagos,	convenience sampling	88	125 individuals	Administered to bank's employees
Liao et al., (1999)	Professionals and higher education level. Staff in companies	convenience sampling	118	N/A	N/A
Waite & Harrison 2002	Undergraduates at University of Edinburgh,	convenience sampling	253	N/A	Self administered to students
Luarn & Lin (2005)	394 attending an e-commerce symposium held in Taiwan.	convenience sampling	180	N/A	Self-administered
Tan & Teo (2000)	Restricted to sample that Received the questionnaire.	N/A	N/A	N/A	Online questionnaire

4.7.7 Sample Size

Justification of the sample size was discussed in detail in Chapter 4 in section 4.7.6 In the light of past research conducted in this field, the sample size of n=369 is considered as large enough for this study. (e.g. Al-Sabbagh & Molla 2004; Gerrard & Cunningham, 2003; Mattila et al., 2003; Pikkarainen et al., 2004; Sohai & Shanmugham; Polatoglu & Ekin, 2001; Anandarajan et al.,2000; Liao et al., 1999; Waite & Harrison , 2002; Luarn & Lin, 2005 and Tan & Teo, 2000). Tabachinck and Fidell (2007, p.613) considered the simple size of 300 cases as good for factor analysis. As a general rule, the minimum is to have at least five times as many observations as the number of variables to be analyzed and the more acceptable sample size would have a 10:1 ratio according to Hair et al. (2006, p.112). In these terms, the study sample size achieved the ratio of 25:1 (n=369 and 15 variables) which is more acceptable because the cases had exceeded the ratio of 10:1.

4.7.8 Response Rate

A total of 1,000 questionnaires were self administrated to the initial sample size of 1,000 bank account holders in Yemen. Since the complete list of the population is not accessible due to confidentiality reasons as highlighted in section 4.7, the sample size will be drawn from the total population of 250,000 banks account holders (estimated by a Yemeni banker)[*]. Therefore, the 1,000 sample size is agreed by most experienced researchers when the research has a population of 10,000 or more as highlighted in Sathye's (1999) study. According to Zikmund (2003), this size would suggest that the true parameter lies within $\pm$ 5 percent level of error. Six hundred and twenty-three (623) responses were received achieving a response rate of 62 percent, 369 were completely

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[*] According to Al-Hamdani, chairman of Watani Bank. (Tough times for banks in Yemen) retrived from http://www.ameinfo.com/16688.html on 8/2/2005

filled out and useable for analysis with 254 being returned incomplete. Thus, the gross response rate of the research survey was (623/369) 59.22 percent. The Gross Response Rate this study obtained could be considered good compared to the response rate that Mattila et al., (2003) obtained (220 useable/ 1,167 returned) of 18.85 percent, and Luarn and Lin's (2005) response rate using the self-administrated method and convenience sampling (180 useable / 394 attending an e-commerce symposium) of 45.68 percent. Also, it is considered good compared to the mail survey utilized by Polatoglu and Ekin (2001) whereby 724 questionnaires were sent via email but the useable questionnaires were 114, achieving the response rate of 16 percent. Quite similar to the response rate of this study, Pikkarainen et al. (2004) utilized convenience sampling and the percentage of 62 percent was obtained (268 useable / 427 received). Based on the short review, the response rate for the present study is considered satisfactory. Furthermore, this study follows the guidelines provided by Malhotra (2004), Hair, et al. (2006) and Tabachinck and Fidell 2007). First, as a rule of thumb, sample size should be larger than 30 and less than 500 cases. Second, where the sample is to be broken into sub samples, a minimum of 30 cases for each category is necessary. Third, for the purpose of meeting the assumption of multivariate analysis, as factor analysis and regression, cases in the sample size should exceed 10 times or more the number of the variables in the study. Since there are 16 parameters (variables) in this study, the minimum sample size will be $10 \times 16 = 160$ cases. Table 4.19 presents a summary of responses to self-administrated survey questionnaire.

Table 4.19 Summary of Sample's Responses to Survey Questionnaire

Initial Sample size	1000
Non-Returned	377
Number of forms received (Achievable sample size)	623
Response rate	62 %
Incomplete forms	254
Number of useable forms	369
Gross Response Rate	59.22 %

4.7.9 Sampling Adequacy

Sampling adequacy refers to the adequacy of the study variables for conducting factor analysis (Darren & Mallery, 2003). In order to determine and examine sampling adequacy, this study utilized three approaches; the empirical evidence drawn from the previous adoption studies in this discipline, the guidelines of research methods and the statistical findings of the interdependence test. Empirically, this study exploited two measures provided by factor analysis; the Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) as well as Bartlett's test of sphericity.

In this connection, The KMO[3] values were considered for confirming the significance of using factor analysis. According to Coakes and Steed (2003), Malhotra (2004), and Hair et al. (2006) must be above the recommended level of 0.5. The KMO measure of sampling adequacy provides an index value (between 0 and 1) of the proportion of variance among the variables that might be common variance (i.e. that might be indicative of underlying or latent common factors). Interpretive adjectives for the KMO designated levels of values of sampling adequacy as reported by Darren and Mallery (2003, p 256) are: in the 0.90's as marvellous, in the 0.80's as meritorious, in the 0.70's as middling, in the 0.60's as mediocre, in the 0.50's as miserable, and below 0.50 as unacceptable. Very small values of significance (below 0.05) indicate a high probability that there are significant relationships between the variables, whereas higher values (0.1 or above) indicate the data is inappropriate for factor analysis. Bartlett's test of sphericity and the Kaiser-Meyer-Olkin measure of sampling adequacy were used in this research to assist the researcher to assess the adequacy of the data set correlation matrices for factor analysis.

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[3] (KMO) refer to Kaiser-Meyer-Olkin measure of sampling adequacy which is defined by Darren and Mallery (2003) as a measure of whether the distribution of the values is adequate for conducting factor analysis.

Bartlett's test, according to Darren and Mallery (2003), is a measure of the multivariate normality of the data set distributions. For a large sample, Bartlett's test approximates a chi-square distribution. Consequently, it is usually assumed that the sample correlation came from a multivariate normal population with the variables being analysed as being independent. If they are not, then the data are appropriate for analysis using factor analysis. The Bartlett test, therefore, forms something of a bottom line test for large samples, but is less reliable for small samples. Bartlett's test of sphericity tests the hypothesis that the correlation matrix is an identify matrix (differs significantly from identity matrix); i.e. all diagonal elements are 1 and all off-diagonal elements are 0, implying that all of the variables are uncorrelated. If the significance value for this test is less than study alpha level, the study rejects the null hypothesis that the population matrix is an identity matrix. The significance value for this analysis leads the researcher to reject the null hypothesis and conclude that there are correlations in the data set that are appropriate for factor analysis. Table 5.25 presents the procedures for the sampling adequacy test ().

4.8 Analysis Technique Used

The analysis used in this thesis is divided into two parts. The first part of the analysis attempted to assess the reliability and validity of the measures while the second part addressed the study's descriptive and statistical analysis. The first part was achieved in three different stages of analysis. The first stage of the analysis involved assessment of the internal consistency of the measures that operationalized the variables in the study. The test includes estimation of the reliability coefficients (Cronbach's alpha) of the measures, as well as item to total correlation. The second stage involved assessment of factorial validity through an examination of the convergent and discriminant validity of the research instruments. This test was performed using factor

analysis techniques. The third stage involved the analysis and assessment of multivariate assumption of normality, examination of residual, multicollinearity, linearity, homoscedasticity and outliers.

The second part of the study analysis involved five stages. Firstly, the study performed the descriptive statistical analysis in which the study used descriptive techniques like ranking, frequency, mean, standard deviation and multiple comparisons. Secondly, the range of regression analysis techniques used were, for example, Multiple Linear Regression analysis used for testing hypotheses and stepwise regression was used to identify the TPB Model of Direct and Extended Determinants (study's model). Thirdly, A path-analytic approach using Ordinary Least-Squares method (OLS) was performed to test the proposed model (Cohen & Cohen, 1983), facilitating testing of the causal and effect among variables, as well as estimating the direct and indirect effects of the variables and understanding the magnitude and direction of the relationships among the model variables.

4.9 Validity Concerns and Strategies

Zkimund (2003, p.271) reported two measures to be ensured when evaluating research whereby researchers must determine whether they have internal validity and external validity. Therefore, this study took the issue into consideration by addressing the aspects that lead to strength validity of the findings. The first validity concern is the construct validity which, according to Malhotra (2004), addresses the question of what construct or characteristic the scale is, in fact, measuring. However, the study utilized measurement items validated by others' previous studies which were assumed to measure this study's constructs. The second validity concern has to do with the external validity issues, which concerns whether or not the sample is representative of the population and whether or not the findings can be generalized beyond the cases studied,

generalized to other IS adoption studies and the context of other countries (Zkimund, 2003, p.273). Hair,et al (2006) highlited that ,

*"whenever a multivariate technique is employed, the researcher must strive not only to estimate a significant model but to ensure that it is representive of the population as a whole"(*p. 25).

This study has ensured as much as possible that it is representative by utilizing both the random sampling and splitting the sample techniques. In splitting the sample, the study used one subsample to estimate the model and the second subsample to estimate the predictive accuracy (Hair et al., 2006). However, sample size (n=369) is quite acceptable to sampling in previous research of the IB discipline. It might be that the number of cases is too limited for broad generalizations.

Experimental research designs have two purposes which are to provide answers to research questions and to control variance (differences). Mohd Salleh (2006) reported that "A major problem faced by researchers undertaking filed research is the difficulty in controlling many sources of variance". In this manner, the success in minimizing the potential threat to research validity is a good strategy to build up research validity (Mohd Salleh, 2006). In McKinnon's (1988) study, it was stated that,

*"Threats to validity and reliability in the sociological and anthropological literature are discussed on an ad hoc basis. The ability to talk about the nature of these threats and what can be don about them is generally acknowledge as being less well developed in field study research than in other branches of research" (*McKinnon, 1988, *p. 36.*

Similar to Mohd Salleh (2006), this study was concerned with potential threats to research validity. In line with this, Cook and Campbell (1988) summarized these threats in four questions related to a research study as follows;

I. The threats to "**Statistical Conclusion"** address the question: Is there a relationship between variables?

II. A threat to **"Internal Validity"**, i.e. forces those analytically biased causal inferences. If **(I)** yes, is it plausibly causal from one operational variable to the other?

III. The threats to "**Construct Validity**" address putative causes and effects validity, if **(II)** is true, what are the particular cause and effect constructs involved in the relationship?

IV. Threats to "**External Validity**" address uncertainty about the relationships; if **(III)** is true, how generalizable is this relationship across persons, settings, and times?

The researcher in this thesis has a number of strategies for improving validity through minimizing or eliminating the potential threats as described in the following section;

4.9.1 Statistical Conclusion Validity

A threat to statistical conclusion validity is a factor that can lead the researcher to reach an incorrect conclusion about a relationship in observations. The Researcher can essentially make two kinds of errors about relationships:

I. Conclude that there is no relationship when in fact there is (you missed the relationship or didn't see it). This is called a "Type I error" which, according to Mann (1995), is made when H_o is wrongly rejected.

II. Conclude that there is a relationship when in fact there is not (you're seeing things that aren't there!). This is called a "Type II error" which, according to Mann (1995), is made when H_o is wrongly accepted.

Table 4.20 Statistical Conclusion Validity

Threat	Comments / **Control Threat**
Inappropriate use of statistical techniques	Using inappropriate statistical techniques may threaten the validity of the conclusion, **therefore this risk was reduced by careful adherence to Hair et al., (2006, p.13-14) and Trochim's[4] analysis technique guidelines. Where this study examines dependence relationship of a dependent variable in single relationship measured in metric scale through regression techniques also because no latent variable path analysis is suggested by Trochim**.
Use of a statistical test lacking sufficient power	According to Trochim[1] , there are four components that influence the conclusions which are: sample size, effect size, alpha level (significance level), and power, or the odds that you will observe a treatment effect when it occurs. **Therefore to alleviate this risk, the researcher in the light of previous studies considered** a **sample size of 369 (see sampling in section 4.6.6 page 217), the effect size exhibited by regression tests (section 6.2), alpha level of correlation were comparable in this study (appendix IV-B). It is unlikely that the major conclusions are threatened by low statistical power.**
Reliability of Measure	Reliability of measures threat this can be due to many factors. T**herefore, to alleviate this risk, the researcher took much care to question wording, and instrument design of using guidelines of previous research and adaptation techniques. Also this thesis runs two rounds of internal consistency tests of reliability using Cronbach's alpha and both results show no lack in the reliability of measures (appendix IV-B).**
Violated assumption of statistical test	Normality assumption is critical for using multivariate techniques, therefore to alleviate this risk **the bootstrap** research **used is to test for normality whereby violation to assumption is unlikely detected. Furthermore, transformation techniques were applied in order to improve the normality distribution as shown in Appendix (IV-A). In the light of Mann's (1995, p. 668) review, the errors associated with different observations in this study are independent.**
Fishing and error rate problem	The probability of making a Type I error on a particular comparison in a given experiment increases with the number of comparisons to be made in that experiment. **Therefore, to minimize this threat, each step of regression was checked for D-Watson the test of residual, as well as the Std. error of the estimate**. **The probability of erroneous conclusions drawn from the finding is alleviated through the inspecting adjusted R^2 to check for the accuracy of predictors.**
Random heterogeneity of respondents	When respondent variables do not interact with treatment but are related to outcome, error variance will be high (unless this relationship is captured by blocking, covariance, or the use of within-subject designs). **These threats are alleviated by choosing a homogenous sample where all participants are users of banking services and have a bank account. This is done through screening questions at the beginning of the survey.**
Random irrelevances in the experimental setting	Setting variables may divert respondents' attention to the treatment and/or introduce error variance, thus washing out treatment effects. **This threat is mitigated by having established setting variables (wording setting) selected from previous studies. Pilot test feedback was also used in reforming and rearranging confusing sources of error variance, as well as allowing respondents to fill in and return the survey as soon as possible.**

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[4] http://www.socialresearchmethods.net/kb/power.php accessed on 2-10-2006

4.9.2 Internal Validity

Do the results of the study indicate whether the independent variable was the sole cause of the changes in the dependent variable (Zikmund, 2003) or are they caused by other factors which were not part of the study? Although the lists of validity threats were never intended to be exhaustive, Cook and Campbell (1988) reported that randomized assignment appears to control for most threats to internal validity. Authors such as Cooper and Schindler (2003) and Zikmund (2003) listed some of the common threats as highlighted in Table **4.21** below;

Table 4.21 Internal Validity

Threat	Comments / **Control Threat**
History (Extraneous effects)	Address the question, are participants exposed to events other than the treatments, whose effects on their behaviour could obscure the effects of the independent variable? *To minimize this risk, the study used randomization procedures because randomization "can often", assure that outside events that occur in one group are also likely to occur in the other.* **Furthermore,** *the use of a control group for purposes of comparison minimized the threats to internal validity* (*Cook & Campbell, 1979). Therefore, in this study, results indicated that the history threat was not present.*
Temporal effects (Maturation)	Do the participants change with the passage of time in ways unrelated to the effects of the independent variable? Maturation refers to the natural physiological or psychological changes that take place as we age. **This threat was not serious in this study because the experiment was relatively short in duration (one month). With respect to** *Banks' websites, evaluation is from time to time changed and any changes in the websites may affect the web evaluation's results, The validity of measures may change over time and with new situations. Therefore, it is hard to guarantee the valid results obtained over measures related to Banks' websites evaluation.*
Testing Effect	The process of taking the pre-test and pilot test may affect the responses on the post test. **Therefore, to** *minimize this risk, all responses from the pre-test and pilot test were excluded from the study sample.*
Instrumentation	Instrument's questions look repetitive, Some threat may be present where participants may be becoming bored, tired, disinterested, fatigued, less motivated than they were at the beginning of the series, **To minimize this threat, Instrumental consistency assures alternative form reliability, counterbalancing reduces or eliminates order effects, and a well-designed survey booklet with a cover story instructs respondents to pay attention to misleading statements about what the research is really about. Additionally, this threat was minimized because the measuring instruments used in the pre-tests and post-tests did not substantially differ from each other.**
Selection bias	If different groups are used to compare the effects of treatments, could pre-existing differences among the groups obscure the effects of the independent variable? **Therefore, to minimize this threat, study participants were chosen through** *random selection, random assignment, and random spilt half sample.*

Table 4.21 Internal Validity (Continued)

Statistical regression effects	This bias operates where persons have been selected for treatment on the basis of extreme scores at a specific time period. This bias operates where matching has been employed in a misguided effort to make comparison groups more equivalent. **Therefore, to minimize this threat, extreme scores were casewise diagnosed by the default above value 3 S.D. and randomization technique**
Experimenter Bias (Mortality)	The researcher may be biased toward the results he/she wants; This bias can affect research observations. **To minimize this risk, the study used experimenters who were unaware of the anticipated results (usually called a double blind study because the tester is blind to the results) which works best to control for this bias.**
Direction of causality	This form of bias may threaten conclusions. The s*tudy banks on the justification of theories and previous studies in the discipline. On one hand, meaningless is approached by theory trimming for the deletion of paths* **and is useful to work based on the recursive model.**

Construct Validity

Table 4.22 displays the common threats to construct validity and the strategies

used to mitigate their risks in this study.

Table 4.22 Construct Validity

Threat	Comments / **Control Threat**
Inadequate pre-operational explication of construct	Although items for Operationalizing constructs in this thesis were chosen carefully based on adaptation from previous studies, factor analysis shows that a few items depart to measure other constructs. **Therefore, invalidity of those related items may exist and for the solution to alleviate this risk Sekaran, (2003, p.208) said "when more than one scale exists for any variable, it is preferable to use the measure that has better reliability…and more frequently used. On one hand, literature review verified some of convergent validity problems in distinguishing two construct "self-efficacy" and "Facilitating condition".**
Non-respondent bias	Non-response bias refers to the bias that exists when respondents to a survey are different from those who did not respond in terms of demographic or attitudinal variables. **To alleviate this threat, test bias analysis such as t-test was carried out by determining the date of receipt of the response and running a comparison between early respondents and late respondents (APPENDIX X-B). This thesis assessed non-response bias by testing for differences between early and late responders (first 10% and last 10% of responses) on the basis that late responders would be more similar to non-respondents (Armstrong and Overton, 1977). No significant (p<0.05) differences were found, suggesting that non-response bias was unlikely.**
Evaluation apprehension	In survey's sometime participants attempt to give answers according to what they think the researcher wants to hear from them. **To alleviate this threat, non-threatening, or directive questions designed to elicit facts were used in the survey**.
Mono-method bias	**The use of a single data-gathering method or a single indicator for a concept may result in bias. Therefore, to minimize this threat Noor-Akma (2006) suggested implementing multiple measures of constructs through a pre-validating process. In this thesis , the researcher uses multiple indicators per concept, randomization of items to eliminate order effects of the instrument, survey method, empirical evaluation, and the multi-trait validation strategy like Cross-validation by cross-validating subjective items with objective measures where the researcher developed the instrument on a calibration sample and then cross-validated it on an independent validation sample**

4.9.4 External Validity

External validity (generalizability) addresses the extent to which the results of a study can be generalized, applicable in the real world beyond the sample (Zikmund, 2003). External validity comes in two forms: population and ecological. ***Population validity*** refers to the extent to which the results of a study can be generalized from the specific sample that was studied to the population. On other hand, the ***ecological validity*** refers to the extent to which the results of an experiment can be generalized from the set of environmental conditions created by the researcher to other environmental conditions (settings and conditions) (Cooper and Schindler, 2003).

Table 4.23 External Validity

Threat	Comments / **Control Threat**
Representativeness of the sample	Potential threats address the extent to which the study can generalize from the experimental sample to the accessible population. **To alleviate this problem, cross-validating techniques are applied in this study. According to Hair et al. (2006, p.233), it is the most appropriate empirical validation approach.**
Verification of the Independent Variable	Potential threats address the extent to which the researcher can reproduce the exact implementation of the independent variable. **To alleviate this risk the theoretical deductive method was used. According to Hair et al. (2006, p.193), emphasis on strong theory and selection of both DV and IV variables should be based on conceptual or theoretical grounds when the objective is solely for prediction.**
Multiple Treatment Interference	The extent to which one can generalize the effects of a single independent variable when participants are exposed to several independent variables. **To alleviate this threat, this thesis followed the deductive methods guide by theoretical framework**
Novelty and Disruption Effects	The extent to which the novelty or disruptive aspects of an independent variable limit generalization to situations where these novelty or disruptive aspects are not present or fade away. **In this thesis, novelty or disruptive aspects were controlled in the light of the previous related literature. Therefore, novelty and disruption effects were mitigated.**
Hawthorne Effect	The extent to which the extra attention provided to the participants during the study limits generalization to situations where the extra attention is not present. **Therefore, to minimize this threat equal attention was given to all groups of study each through incentive gifts allocated to participants. On one hand, randomization of selecting respondents minimizes the chance for the Hawthorne effect to occur in one group of respondents and not the other groups.**
Treatment Interaction Effects	Potential threats to external validity include the interaction between treatment and any of the following: selection, history, and testing. **Therefore, to minimize this threat, subject matching, naturalistic observation was carried out.**
Demand Characteristics Or Experimenter Effects	Potential threats address the extent to which the study's results are limited to the individual (s) implementing the independent variable. Or when subjects become wise to anticipated results (often called a placebo effect), they can begin to exhibit performance that they believe is expected of them. **Therefore, to minimize this threat, the researcher made sure that subjects are not aware of anticipated an outcome (referred to as a blind study) which reduces the possibility of this threat.**

Table 4.23 External Validity (Continued)

Threat	Comments / **Control Threat**
Pretest Sensitization	Potential threats address to what extent the study's results are limited to situations where only a pre-test is used. **Therefore, to *minimize this risk, all responses from the pre-test and pilot test were excluded from the study sample.***
Interaction of time of Measurement & Treatment Effects	Potential threats address the extent to which the effects of the independent variable on the dependent variable will maintain through time. **This threat was alleviated by making the data collection stage short (one month)**.
Measurement of the DV	Potential threats address the extent to which the generalizability of the study's result are limited to the particular dependent measure used.
Interaction of History and Treatment Effects	The potential threats that weaken the validity is the extent to which the study's results can be generalized to a Future time period. **According to Jaruwachirathanakul and Fink (2005) highlighted that IT is developing continuously therefore; further research should be repeated at regular intervals to observe the impact of changes.**
Martella, R.C., Nelson, R., & Marchand-Martella, N. C. (1999), *Research Methods*: Learning to Become a Critical Consumer. New York: Allyn & Bacon. http://www.indiana.edu/~educy520/sec6342/week_04/External_validity_threats.pdf	

Note: This table is meant only as a general guideline derived from Cook and Campbell (1979). Quasi-Experimentation

4.10 Factor Analysis Techniques

There are two main applications of factor analytic techniques, which are; to reduce the number of variables (data reduction method) or to detect structure in the relationships between variables (structure detection method).

4.10.1 Factor Axis Analysis versus Component Analysis

By using Principal Components Analysis (PCA), the researcher assumes that all variability in an item should be used in the analysis, while in Factor Axis analysis (FA) the researcher only uses the variability in an item that it has in common with the other items (Tabachinck & Fidell, 2007). For deciding on the most appropriate technique to use in any given research situation Tabachnick & Fidell (1983) emphasised the need to look into the type of research questions and then select the associated techniques. In research questions that are concerned with latent structures underlying a set of variables, the choice between principle components and factor analysis, according to Tabachnick & Fidell (1983), depends on whether the search for the structure is made on empirical or

theoretical grounds. In this connection, the authors suggest basic concepts to differentiate and guide researchers to decide which to choose from the two factor analysis methods Principal Component Analysis (PCA) or Factor Axis FA. As highlighted by Tabachnick & Fidell (2007);

"The choice between the PCA and PFA depends on ...the assessment of the fit between the models, the data set, and the goal of the research. If ... interested in a theoretical solution... and have designed your study on the basis of underling constructs..., PFA is your choice. If...simply want an empirical summary ..., PCA is the better. P.635"

Principal component: Component analysis, also known as principal component analysis, as reported by Hair et al. (2006) is used when the objective of the researcher is to minimize most of the original information (variance) in a minimum number of factors for prediction purposes. According to Malhotra (2004), in principal component analysis, the total variance in the data is considered.

Factor analysis: When there is some prior hypothesis about underlying structure, rotated factor analysis can be used to assess the structure and the extent to which the empirical structure conforms with the hypothetical structure and the underlying IVs are called factors (Tabachnick & Fidell, 1983, p.61). The goal of using PCA in the study is to extract the maximum variance from the data set by identification of a few orthogonal components. According to Tabachnick & Fidell (1983), the advantages of principal factors extraction are that it is widely used, commonly understood and that it conforms to the factor analytic model in which common variance is analyzed independent of unique and error variance. Tabachnick & Fidell (2007) pointed out that principal factors extraction differs from PCA in that estimates of communality, instead of ones, are in the positive diagonal correlation matrix, the Squared Multiple Correlation SMCs of each variable with all other variables calculated.

Initially, differences between **FA** and **PCA** were highlighted by Tabachnick & Fidell (2007) who pointed out that (1) **FA** produces factors, while **PCA** produces components. (2)The processes are similar except in the preparation of the correlation

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matrix for extraction and in the underlying theory. (3) In PCA, all the variance in the observed variables is analyzed while in FA only shared variance is analyzed; attempts are made to estimate and eliminate variance due to error and variance that is unique to each variable.

In addition, another theoretical difference between **FA** and **PCA** lies in the reason that variables are associated with a factor or component. Factors are thought to "cause" variables-the underlying construct (the factor) is what produces scores on the variable (Tabachnick & Fidell, 2007). Within the previous studies of IB, using a varimax-rotated principal component factor analysis in this study is consistent with previous IB adoption research, for instance, the studies conducted by Lai & Li (2004) and Suh & Han (2002). Similarly, it is in line with the analysis used by Tan & Teo (2000) who firstly, accepted only the variances with loadings greater than 0.4 thus consistent with Hair et al.'s (2006) suggestions that variables with loadings greater than 0.5 are very significant. Secondly, they conducted two rounds of factor analysis in order to produce the results. In order to explore the component relationships in the data, Devlin & Yeung (2003) used varimax-rotated principal component factor analysis to differentiate the factors, and provide solutions, which are more straightforward to interpret and more invariant. It has proved successful when coupled with an orthogonal rotation, as employed in this study (Hair et al., 1998).

4.10.2 Orthogonal Vs Oblique Rotation

After extraction, Tabachnick & Fidell, (1983), Hair et al. (2006) and Malhotra (2004) among others, recommend rotation to improve the interpretability and scientific utility of the solution. In the case of conducting rotation, Malhotra (2004, p. 568) argued that different methods of rotation may result in the identification of different factors. According to Malhotra (2004, p. 568), two common rotation methods; an orthogonal

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and an oblique rotation scheme can be applied and the fundamental decision is required by the researcher to select which on to use. In orthogonal rotation, the factors are uncorrelated with one another and the orthogonal solutions offer ease of description and interpretation of results, while in oblique rotation the common factor may be correlated with one another (Tabachnick & Fidell, 1983). Three orthogonal rotational techniques are available using SPSS and, according to Tabachnick & Fidell (1983), varimax rotation is easily the most commonly used of all. Hair et al. (2006) pointed out that varimax rotation seems to give a clearer separation of the rotated factors. The goal of varimax rotation is to maximize the variance of loading across variables within factors. Varimax rotation, according Tabachnick & Fidell (1983), also tends to reapportion the variance among factors so that they become relatively equal in importance. After performing the check-up of data suitability for factor analysis, the suitable techniques involved in factor analysis will be applied commonly in this study to each construct subjected for factor analysis.

4.10.3 Factor Analysis Techniques and Construct Validity Assessment

The basic assumption of factor analysis, as mentioned by Hair et al. (2006), is that "some underlying structure does exist in the set of selected variables". Therefore, an interdependence technique of factor analysis of the exploratory perspective could be utilized with the primary purpose of defining the underlying structure among the variables in the analysis. On the other hand, it is to assess the validity of the measurement involved in the proposed research model. In this study, factor analysis techniques are still required because they are useful, as mentioned by Coakes & Steed (2003), to construct reliable tests and determine whether items are tapping into the same construct. Besides this, it is a starting point for many other multivariate techniques and identifying how many variables are expected to have an impact in the analysis (Hair et

al., 2006). Accordingly, the appropriate method of exploratory factor analysis (EFA) will be utilized to guide us in the data analysis journey in order to establish a good understanding of the research data applied to the whole sample (N = 369). Through the entire analysis, the number of factors this study was trying to maintain was developed based on achieving the a priori criterion methods (e.g. factoring IB attributes). In addition, eigenvalues equal to or above one and the cut-off loading of rotated variables with values exceeding 0.5 were retained. The Kaiser-Meyer-Olkin measure of sampling adequacy index was considered for confirming the significance of using factor analysis and must be above the recommended level of 0.5 (Coakes & Steed 2003; Malhotra 2004; and Hair, et al., 2006). In order to achieve the purpose of good utilization of using factor analysis techniques in this study, the obtained data was classified into two groups. The first group included the data related to the direct predictors of IB suggested in this study framework, while the second group included data related to the indirect predictors (see section **5.4.1** also Appendix **VI-B**).

4.11 Respondents' Profile (Demographic Characteristic)

The respondents' profile received more concern in previous research in order to describe the typical customers of IB such as in Chang (2004), Howcroft et al. (2002), Polatoglu and Ekin (2001) and Mattila (2001) among others. Similarly, this section is going to provide a descriptive analysis and will discuss the respondent's profile based on the demographic characteristics. The study aims, by using demographic variables, to find out in what way the individual's characteristics associated the behavioural intention towards IB adoption. It is useful in determining the potential adopters of IB among the social system members. Table 4.24 present the frequencies output developed from the data pertaining to the twelve demographic variables to explain respondents' profile.

Table 4.24 Respondents Demographic Profile

Variable	Value	Frequency	Percentage
Gender	Male	302	81.8
	Female	67	18.2
Age	Twenties (19-29 Year)	135	36.6
	Thirties (30-39 Year)	147	39.8
	Forties (40-49 Year)	74	20.1
	Older (=> 50 Year)	13	3.5
Martial Status	Single	86	23.3
	Married with children	228	61.8
	Married without children	55	14.9
Nationality	Yemeni	350	94.9
	Non-Yemeni	19	5.1
Resident Area	Sana'a Area	290	78.6
	Other Areas	79	21.4
Personal Income	Less than 30001 Y.R	55	14.9
	30001-60000 Y.R	111	30.1
	60001-120000 Y.R	140	37.9
	120001-180000 Y.R	27	7.3
	Above 180001 Y.R	36	9.8
Profession (Job)	Managerial work	132	35.8
	Clarks	65	17.6
	Specialists	43	11.7
	Technicians.	31	8.4
	Agricultures	5	1.4
	Engineers.	27	7.3
	Handcraft.	5	1.4
	Simple professional.	12	3.3
	Other.	49	13.3
Sector	Public sector	91	24.7
	Private sector	216	58.5
	Individual business	62	16.8
Education	Preparatory level & <	31	8.4
	Secondary & diploma	86	23.3
	Undergraduate	203	55.0
	Postgraduate & Professional	49	13.3
Residence Ownership	Own	154	41.7
	Family house	63	17.1
	Own with mortgage	12	3.3
	Rent	126	34.1
	Given for services	12	3.3
	Others	2	.5
Business Nature	Manufacturing	28	7.6
	Services	83	22.5
	Government	26	7.0
	Commercial	99	26.8
	Banking & Finance	127	34.4
	Others	6	1.6
Household Income	less than 40001	31	8.4
	40001- 80000 Y.R	90	24.4
	80001-120000 Y.R	78	21.1
	120001- 160000 Y.R	66	17.9
	160001-200000	27	7.3
	200001-240000 Y.R	29	7.9
	Above 240001	48	13.0
Total		369	100.0

This study obtained a total of 369 bank account holders from the 14 banks which operate in the capital city of Yemen who responded to the survey employed in the present study. The percentages of (81.8 %) from the total number of account holders' respondents were males. This is in a specified non-western context such as Yemen and it might be inferred that banks' financial services in the country are used more by males rather than females.

The majority of respondents have Yemeni citizenship (94.9 %) and reside in the city of Sana'a (78.6 %) were married with children (61.8 %), more than half of them have bachelor degrees (55.0 %), and were those in their thirties (39.8 %) and twenties (36.3 %). Those with the average monthly income of Y.R 60001 to 120000 were represented by (37.9 %) of the total. The percentage of (41.7 %) respondents are living in their own houses and the majority of them were employed in three business areas: banking and finance (34.4 %), trading (26.8 %) and (22.5 %) is employed in the services.

I. Gender

Respondents' genders were not equally distributed, with male respondents representing a high proportion of 81.8 % and the female respondents being 18.2 % from the total sample. In a specified context such as Yemen, the study inferred that banks' financial services made available to customers by the banks are used more by males than by females. This percentage is consistent with Tan and Teo's (2000) study.

II. Age Group

The age of the respondents is grouped into four different age categories. Out of the total respondents, bank account holders' in their thirties (30-39 Year) were the largest group (39.8 %), followed by those in their twenties (36.3 %). The smallest group identified here being account holders older than 50 years (3.5 %).

III. Marital Status

The majority of the customers who participated in this study were married with children represented by percentage of 61.8 %, while the least represented were bank account holders who were married without children representing (14.9 %) out of the total sample.

IV. Nationality

A majority of the bank account holder respondents are citizens of Yemen representing 94.9 % while the non-Yemenis represented a very low percentage of 5.1 %.

V. Resident Area group

The majority of the bank account holders who participated in the survey reside in the capital city of Sana'a (78.6 %), 21.4 % represented respondents residing in different areas other than the Sana'a area.

VI. Personal Income Group

The personal income of the customers who participated in this survey were grouped into five categories. Results show that 37.9 % of respondents had an income ranging from Y.R 60001 to 120000 while 30.1 % of them earn the amount of Y.R 30001to 60000. Customers with personal income lower than 30001 Yemeni Rial represented 14.9 %.

VII. Profession

35.8 % of respondents who responded to the survey are in managerial positions, followed by 17.6 % who are in clerical jobs. Respondents from the agricultural and handcraft categories are represented by 1.4 percent each.

VIII. Sector

More than half of the respondents were in the private sector with 58.3 % while nearly aquarter of the respondents out of the total sample were in the public sector (24.7

%). The lowest percentage was those who were self-employed with 16.8 % out of the total sample.

IX. Education

The findings on customers' education background resulted in more than half of the sample having a university level of education (203, 55.0 %). Respondents in the preparatory level and other lower educational backgrounds were represented by the percentage of 8.4 % while respondents with a high level of education (postgraduate & professional) representing only **13.3** %.

X. Residence Ownership

The house ownership profile of the survey respondents indicates that 41.7 % of the respondents confirmed ownership of the houses they live in, while more than a third of the respondents (34.1 %) are renting. 17.1 % of the respondents still live in their family house. Two respondent groups with equal percentages are those who own a house but have a mortgage or live in a house that is given by their employer represented 3.3 %.

XI. Nature of Business

Results show that a third of the respondents (34.4 %) are in the banking and finance business, followed by 26.8 % in the trading business. Less than a quarter of the sample respondents (22.5%) are in the services. Respondents dedicated to manufacturing and government business were represented by an equal percentage of 7 percent.

XII. Household Income Group

Seven categories represented the sample household income. The average income range of Y.R 40001- 80000 is represented by 24.4 %, followed by respondents from families that earn between Y. R 80001 to 120000. Families with a high level of income category are represented by (7 % to 13 %) while those who earn less than Y.R 40001 are represented by 8.4%.

CHAPTER SUMMARY

This chapter provided information on the positivist philosophy as the philosophical stance and behavioural science as the paradigm this study follows. Consequently, the study framework has been shown and a set of rules of scientific methodology (Hypothetico-deductive methods) used as a means of testable knowledge. This study developed the research instrument which provided an explanation as to how relevant variables are conceptually and operationally defined. In addition, this chapter provided justification of the sample size as well as the method of sampling (convenience sampling) this study used in the light of previous studies. The gross response rate of the research survey was 59.22 % percent which is considered good. This chapter has provided an explanation of validity concerns and the strategies used as a treatment to alleviate the sort of threats to the four types of validity. The final section discussed the respondents' profile based on the data pertaining to the twelve demographic variables. The next chapter describes and reports required information about how this study deals with the issues of reliability and validity assessment in order to prepare the data collected for the appropriate analysis.

CHAPTER FIVE: ASSESSING THE RELIABILITY AND VALIDITY OF MEASUREMENT

This chapter consists of four sections; the first section presents issues related to data preparation for the preliminary analysis. In the second section, the study examines factor analysis to analyze the reliability and validity of the study construct. In the final section, the researcher discusses the multivariate assumptions and the following paragraphs will look at the analytical process (Coakes & Steed, 2004) to explore the characteristics of the data.

5.1 Data Preparation

Analysis of the data of this study was carried out using the Statistical Package for Social Sciences (SPSS) Version 14. The necessary data preparation process recommended by Malhotra (2004, p. 402) such as questionnaire checking, editing, coding, data cleaning, and adjusting were employed in this study. Some steps still need to be considered before selecting a data analysis strategy such as looking at missing data and required treatment, the validity and reliability of the study's constructs and, lastly, the assumption required by the analysis techniques.

5.1.1 Coding of the Study's Measurements Scale

Table 5.1 indicates each item's description and the coding used in the study.

Table 5.1 Construct Coding

Code	Construct Measured	Question Numbers	Response Format	Items Reverse Scoring
ID	Respondent ID	**Screen Q1**	Cont. integer	
EXPOS	Exposure	3-1, 3-5 &3-6	1 to 7	
EXPER	Experience	3-2 to 3-4	1 to 7	
AW	Awareness	3-7 to 3-11	1 to 7	3-7 to 3-11 (Reverse coded)
KW	Knowledge	3-12 to 3-16	1 to 7	
BI	Behavioural Intention	4-5 to 4-9	1 to 7	
ATT	Attitude	4-1 to 4-4	1 to 7	
ATR	Adoption Time Reaction	Q5	0-5	
IBS	IB services	6-1 to 615	1 to 7	
RA	Relative Advantage	9-1 to 9-5	1 to 7	
EOU	Ease of Use	9-6 to 9-11	1 to 7	
COM	Compatibility	9-12 to 9-14	1 to 7	
TR	Trialability	9-15 to 9-17	1 to 7	
OBS	Observability	9-18 to 9-24	1 to 7	
SN	Subjective Norm	10-1 to 10-6	1 to 7	
PR	Personal Normative	10-7 to 10-15	1 to 7	
MM	Media Normative	10-16 to 10-21	1 to 7	
PBC	Behavioural Control	11-1 to 11-5	1 to 7	
SE	Self-Efficacy	11-6 to 11-10	1 to 7	
DSE	Self-efficacy decomposed Belief	11-11 to 11-16	1 to 7 weight scale	
TFC	Technology Facilitating Conditions	12-1 to 12-16	1 to 7	12-3,5,7,9 reverse coded
RFC	Resource Facilitating Conditions	13-1 to 13-10	1 to 7	13-1,5,5 reverse coded
GOVSP	Government	14-1 to 14-8	1 to 7	

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Screening Question

During the construction stage of survey, the study aimed to maintain two conditions, a screening question and the question sequence order. A screening question was designed in the beginning of the survey to select only those who are bank account holders. This question aims to screen out the respondents who are not qualified for this study in order to minimize the chance of biased responses. The screening question was **Do you use banking services.** In addition, the respondents were given the chance to answer either **Yes** (N=369) or **No** (N=0). If they answered yes, respondents were considered eligible for the study and vice versa.

Table 5.2 Results Screening Question

Question	Response	Frequency	Percentage
Do you use banking services?	Yes	369	100 %
	No	0	0

5.1.2 Missing Data

Missing data, according to Tabachnick & Fidell (2007), is one of the most pervasive problems in data analysis. This missing data, according to Hair et al. (2006), exists where there are valid values on one or more variables which are not available. Therefore, one of the preliminary techniques this study used to minimize the volume of data missing is to monitor with respondents while they are completing the survey. This method assists the study to recover the missing data by encouraging participants to fill in missed items, which leads to a reduction of the amount of missing values in this study. Missing Value Analysis (MVA) was conducted and the result reveals that non-missing values occurred in the variables that the study is going to use in the developed model. There were a few missing values encountered in some cases and the inspection of these missing values indicated that there are no variables with 5% or more missing

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re found to be lower than 1.5 % across all variables.

not produced by using SPSS.

Table 5.3 Univariate Statistics of Missing Values

Variables	N	Mean	S.D	Missing Count	Missing Percent
Frequent use of computer (FRQCOMP)	368	4.16	1.52	1	.3
Frequent visits to bank (FRQBANK)	366	3.17	1.37	3	.8
Inquiry about outstanding balance (IBS1)	368	6.19	1.54	1	.3
Inquiry about credit card and ATM card (IBS2)	368	5.17	2.12	1	.3
Inquiry about currency and exchange rates (IBS3)	368	5.91	1.64	1	.3
Payment for public utilities (IBS6)	368	5.68	1.90	1	.3
Letter of Credit Services (IBS8)	368	4.63	2.21	1	.3
Requests of financing and loans (IBS9)	368	4.52	2.25	1	.3
Web-shopping (IBS13)	368	5.17	2.08	1	.3
New bank account set-up (IBS15)	368	5.06	2.17	1	.3
Bank services take a long time (QUEING)	368	.70	.46	1	.3
Where are you working? (WORKSECT)	368	1.92	.64	1	.3
Current Profession (JOB)	368	3.45	2.84	1	.3
Household Income (INCOMH)	364	7.04	4.23	5	1.4

The univariate statistics in Table 5.3 show that there are 5 missing values for INCOMH (1.4 %), 3 missing values for FRQBANK (0.8 %), and one missing value each for FRQCOMP, IBS1, IBS2, IBS3, IBS6, IBS8, IBS9, IBS13, IBS15, QUEING, WORKSECT, JOB with the percentage of 0.3 % for each one.

5.1.3 Treatment of Missing Data

Concerning missing data, Tabachanick & Fidell (1983) propose that if only a few units of data are missing from a large data set, the problems created are not so serious and any procedure for handling them should yield similar results. In the same way,

Malhotra (2004) said that any treatment of the missing variables (below 10 %) can apply and will not seriously bias or effect results. In this case, Tabachnick & Fidell (2007) point of view that missing values of 5 % or less cause less serious problems and any procedures for treating missing values can be utilized. On the other hand, the pattern of missing data, according to Tabachnick & Fidell (2007), is more important than the amount of missing data. They highlighted that if the missing values are scattered randomly throughout a data matrix, those missing values will pose less serious problems. Inspection of whether the data are Missing Completely at Random (MCAR) using Little's MCAR, reveals that the statistically non-significant result is desired: P =1.0 indicates the probability that the pattern of missing variables that diverges from randomness is greater than .05 so that MCAR may be inferred.

Determining the type of missing values is the first step in applying remedies, according Hair et al. (2006), who classified the missing data process as either Missing at Random (MAR) or MCAR. In this study, the pattern of missing data was random MCAR, therefore, cases with missing values were retained for all cases. The MCAR is the preferred type of missing data according to Hair et al. (2006) because it allows for the widest range of potential remedies. According to Tabachnick & Fidell (2007), EM methods sometimes offer the simplest and most reasonable approach to the imputation of missing data as long as the missing values are randomly (MAR or MCAR) distributed. The EM approach, according to Hair et al. (2006), has been shown to work quite effectively in instances of non-random missing data processes. The advantage of using EM methods is; the use of an EM covariance matrix provides a less biased analysis of a data set with imputed values (Tabachnick & Fidell, 2007). Since there is not a great deal of missing data, (Hair et al., 2006) the missing values encountered in the variables do not relay on inferential statistics such as exploratory factor analysis. Hair et al., (2006) point out that, nonmetric variables are not amenable to imputation because

estimates of the missing data for metric variables can be made with such values as a mean of all valid values (refer to Table 5.3). Missing values found in the scale measure were treated by substituting them with the mean of all valid values and the whole questionnaire was still treated as a valid sample. The advantages of means imputation, according to Hair et al. (2006), are that this method is easy to implement and provides all cases with complete information. The disadvantage of using means methods is that it reduces variance of distribution, distorts distribution of the data and depresses observed correlation (Hair et al., 2006). Therefore, it is apparent that researchers in IS treat missing data, when exhibited by only a few missing cases, by substitution of means of the same variable (e.g. Al-Gahtani, 2003 and Gagnon et al., 2003).

5.2 Multivariate Assumptions

There are numbers of assumptions underpinning the use of regression and factor analysis too. Some of these assumptions relate to research design like the ratio of cases to independent variables. Along these lines, Coakes & Steed (2003, p.163) said that, the minimum requirement is to have at least five times more cases than the independent variables. The second type of assumption is related to normality, outliers, multicollinearity, linearity, homoscedasticity and independence of the residual. These assumptions, according Coakes & Steed (2003), are assessed through regression analysis.

I. Normality

In normal distribution, 68 % of values will lie between ± 1 standard deviation of the mean, 95.5 % of values will lie between ± 2 standard deviation of the mean and 99.7 % of values will lie between ± 3 standard deviation of the mean (Darren and Mallery, 2003). Normality assumption means is that all the variables are multivariate normal distributed assuming that "the joint effect of two variables is normally distributed"

(Hair, et al. 2006, p.410). Sweet and Martin (2003) pointed out that, linear regressions are quite accommodating of variables that do not exactly conform to normal distribution, but the better the dependent variable is to a bell shape distribution, the more accurately …that the relationship is a result of chance. Similarly, in Hair et al. (2006, p.411)'s rule of thumb, normality is hard to assess and there is no direct test available. In this study, the sample size was more than 100 to assume reasonable normality in the scale (Hair et al., 2006). The sample of 369 bank account holders was obtained randomly from Yemeni customers of the banks that operate in Yemen.

Multivariate normality is assumed and has no effect on the results. Multivariate statistical methods, according to Zikmund, (2003, p.574), permit "the effects of more than one variable to be considered at one time". The assumptions regarding the distribution of variables are not required, according to Tabachnick and Fidell (1983, p.380), as long as PCA and FA are used to describe a sample, or as convenient ways to summarize the relationships in a large set of observed variables. Here, the KMO and Bartlett's test of sphericity, according to Darren and Mallery (2003), are both tests of multivariate normality and sampling adequacy. In addition, the statistic value of Skewness can be used, according to Hair et al. (2006), and the accepted level of Skewness and kurtosis values should not exceed ± 2.58 if the research considers .01 significance level) and ± 1.96 which correspond to .05 error level (Hair et al. 2006). Concerning the level of Skewness, Table (see Appendix IV-A) depicted that all levels of Skewness were demonstrated to be within the acceptable level indicated by Hair et al. (2006). The term normal, according to Bryman & Cramer (2001, p.92), is potentially very misleading because perfectly normal distributions are very rarely found in reality. In this connection, Darren & Mallery, (2003) pointed out that Kurtosis and Skewness values between ± 1.0 are considered excellent for most psychometric purposes, but a value between ± 2.0 is in many cases also acceptable. Appendix IV-A presents

distribution characteristics of the variables used in this analysis as well as testing for normality and possible remedies that improve normality. It shows that all variables fall within the excellent range as acceptable variables for further analysis.

II. Examination of Residual

Residual, according to Tabachnichk and Fidell (2007), is the difference between the observed value and the value predicted by the regression equation. Malhotra (2004, p. 517) mentioned that residual checks reveal whether the distribution is normal by determining the percentage of residual falling within the Standard Error Estimate (± 1 SEE or ± 2 SEE). Analyzing residuals can provide evidence of the appropriateness of using the linear model by plotting them against the independent variables. Tabachnick & Fidell (2007, p.81) pointed out that if normality is present, the residual is normally distributed because the differences between the predicted and obtained score (the errors) are symmetrically distributed around the mean value of zero and there is no contingency among the errors.

The data shown in the Table 5.4 assists the study to do the preliminary evaluation of model validation. It helps to find out to what extent the research can trust each of the models findings especially in testing the hypotheses. The assumption of the independence of the errors has been met since Durbin-Watson values fall between 1.5 and 2.5, indicating that the residual values are independent. The data shown in the table assists the study to do the preliminary evaluation of model validation. It helps to find out to what extent the research can trust each of the models findings especially in testing the hypotheses. The assumption of the independence of the errors has been met since Durbin-Watson values fall between 1.5 and 2.5, indicating that the residual values are independent. Table 5.4 presents a brief summary of the regression model output produced during the assessment of the study hypotheses.

Table 5.4 Examination of Residual
(Summary of Multiple Regression Analysis Result)

DV	Predictors IV	R	R^2	ΔR^2	F-Value	*p*	Durbin Watson
BI	ATT,SN,PBC	.847	.717	.715	36.30	.000	2.1
BI	PBC, SN, READINESS, ATT	857	735	.732	252.10	.000	2.03
BI	EXPR, AW, KW, EXPOS	.660	.436	.429	70.21	.000	1.928
BI	PR, MM	.512	.263	.259	65.15	.000	2.042
SN	PR, MM	.731	.535	.532	210.17	.000	1.79
ATT	RAC, EOU, OBS,TR,	.752	.565	.560	118.27	.000	2.010
ATT	AW, KW, EXPOS, XPRT	.607	.369	.362	53.15	.000	1.940
PBC	SE	.798	.637	.636	643.75	.000	1.863
PBC	TFC, RFC, GOVSP	.438	.192	.185	28.91	.000	2.031
PBC	SE, TFC, RFC, GOVSP	.799	.638	.634	160.420	.000	1.862

III. Identifying Multicollinearity

Multicollinearity, according to Hair et al. (2006) occurs when any single independent variable is highly correlated with a set of other independent variables. Hair et al. (2006) reported two most common and direct measures for assessing multicollinearity which are tolerance and the Variance Inflation Factor (VIF). According to Hair et al. (2006), the common cut-off threshold is a tolerance value of .10, which corresponds to a VIF value of 10. As long as the VIF is less than the value of 10, multicollinearity is not a concern (Burns & Bush, 2000). To cope with multicollinearity, Malhotra (2004) suggested the use of factor analysis techniques by which "the set of independent variables can be transformed into a new set of predictors that are mutually independent". Similarly, Zikmund (2003, p.588) pointed out that factor analysis may reduce the problem of multicollinearity in the multiple regression. The current study utilized both the VIF as well as factor analysis solution because all predictors employed in the regression are summated variables resulting from factoring techniques. Furthermore, Tabachnick & Fidell (2007) pointed out that one of the several options for dealing with collinearity, if detected, when the only goal of the analysis is

prediction is to ignore it. In addition, Table 5.5 shows the Tolerance and VIF test on the

predictors used in this study.

Table 5.5 Result of Multicollinearity Test

Model's DV	Independents Variables	Collinearity	
		Tolerance	**VIF**
BI	(Constant)		
	Attitude (ATT)	.582	1.718
	Subjective Norm (SN)	.691	1.447
	PBC (PBC)	.653	1.532
BI	(Constant)		
	Attitude (ATT)	.517	1.934
	Subjective Norm (SN)	.685	1.459
	PBC (PBC)	.547	1.830
	READINESS (UIBR)	.521	1.919
ATT	IB Characteristics		
	(Constant)		
	Relative Advantage/Compatibility (RACOMPT)	.422	2.367
	Ease of Use (eou)	.440	2.273
	Observability (obs)	.701	1.427
	Trialability (TR)	.699	1.430
PBC	PBC		
	Self-efficacy (SE)	.713	1.403
	Government Support (GOVSP)	.804	1.243
	Facilitating Technology (FT)	.747	1.338
	Facilitating Resource (FR)	.865	1.156
SN	Subjective Norm (SN)		
	Personal Referents (PR)	.637	1.569
	Media Referents (MR)	.637	1.569
UIBR	User's Readiness		
	Experience (EXPR	.695	1.440
	Knowledge (KW)	.939	1.065
	Awareness (AW)	.815	1.227
	Exposure (EXPOS)	.740	1.352

Table 5.5 shows that all tolerance and VIF values fall within the acceptable range of

tolerance greater than 0.10 and values less than 10.0 for VIF indexes mentioned by Hair

et al. (1998). Therefore, the predictive ability of the regression models is not affected

here by multicollinearity since it does not exist and the assumption is not being violated.

IV. Linearity

The variables used to examine the predicator of the behavioural intention were subjected to the process of factor analysis. Because factor analysis is based on the correlation, according to Malhotra (2004), factor analysis is an interdependence technique in that an entire set of interdependent relationships is examined. This study assumed that linearity is not violated in using variables that resulted from the PCA of factor analysis (Tabachnick & Fidell, 2007). Furthermore, Hair et al. (1998) suggest using the partial regression plot for each variable when the researcher uses more than one independent variable, to ensure its best representation in the equation. Linearity test output is displayed graphically (see APPENDIX VIII-A).

V. Homoscedasticity

Homoscedasticity, according to Hair et al. (2006), is desirable and it refers to the assumption that dependent variables exhibit equal levels of variance across the range of predictor variables (Hair et al., 2006). It is related to the assumption of normality, according to Tabachinck & Fidell (2007), and when the multivariate normality is met, the relationships between variables are homoscedastic. Tabachinck & Fidell (2007) said that when data is grouped (summated), homoscedasticity is known as homogeneity of variance. The presence of unequal variance called (heteroscedasticity), according to Hair et al., (2006), is one of the most common assumption violations. In order to determine whether heteroscedasticity exists or not Hair et al., (2006) suggested plotting the residual (studentized) against the predicted dependent values. The results of the scatterplot are presented in Appendix IX. A visual inspection of the scatter plots did not show any pattern of increasing or decreasing residual. Also, neither a diamond-shaped pattern nor a triangle-shaped one in either direction were noted. Thus, homoscedasticity exists for the independent variables of the study.

Additionally, Hair et al., (2006, p.207) say that SPSS provides the Levene test for homogeneity of variance the use of which is particularly recommended because it is less affected by departure from normality. The result of this test, which is shown in Appendix IX-C, reveals also the homogeneity of variance, implying that variables exhibit equal levels of variance.

VI.   Outliers

Outliers, according to Coakes & Steed (2003), are "extreme cases which have considerable impact on the regression solution and should be deleted or modified to reduce their influence". Hair et al. (2006) suggested identifying the univariate outliers' (individual variables) existence first then also multivariate outliers. Therefore, in this study both the univariate and multivariate outliers were sought among all cases. Once potential univariate outliers are identified, the multivariate outliers are then investigated. Then a comparison of observation across both univariate and multivariate outliers would be helpful in order to provide the basis for the deletion or retention decision. Sweet & Martin (2003) pointed out that, in some situations, outliers should remain in the analysis if the outliers are the most important observation and they are not exerting an undue influence on the outcomes. Once the identified univariate outliers are also found to be multivariate outliers as well, then the decision about their removal is based on their undue influence on the outcomes. Graphical methods such as boxplots can be employed to detect the presence of univariate outliers.

In this study, an inspection of boxplots of all the variables used in the analysis revealed that no extreme observations were detected. They also revealed the presence of outliers in some variables (ATT, TR and RAC). Hair et al., (2006) pointed out that some observations may occur normally in the out range of the distribution. An inspection of boxplots of all the variables used in the analysis revealed that no extreme observations were detected but there are three variables with some outliers (Appendix VIII). To

identify those truly distinctive observations and designate them as outliers both methods of univariate and multivariate analysis are used. Then, in order to determine how much of a problem these outlying cases are likely to be, a comparison is made between the original mean for a particular variable and the 5% trimmed mean (the new mean calculated after the top and bottom 5 percent of cases are removed from the distribution). If these two means indicate that the outlying values are very similar, the values are not too different from the remaining distribution, then the outlying scores do not have a lot of influence and will be retained. In this study, an inspection of the boxplots for the variable (ATT) shows the presence of outlying cases. When the study compares the original mean (m=22.16) and the 5% trimmed mean (22.71) values for these cases, it indicates that they are not very different showing that those outlying cases are not too different from the other remaining cases in the distribution. Similarly, variable (RA) shows the presence of outlying cases, the original mean (m=26.25) and the 5% trimmed mean (26.83) values for these cases (see Appendix VIII). In addition, the variable (COMPT) shows the presence of outlying cases, the original mean (m=14.66) and the 5% trimmed mean (14.95) values for these cases. Lastly, the variable (TR) shows the presence of outlying cases, the original mean (m=16.93) and the 5% trimmed mean (17.37) values for these cases. Another method to examine the univariate outliers is by looking at all cases with standardized values exceeding $\pm$ 4 as the cut-off or the threshold value of standard scores for a large sample of above 80 respondents (Hair, et al., 2006, p.75). An inspection of the standardized values of all the variables used in this analysis shows that no single case is exceeding the standardized values of $\pm$ 4. Even though the univariate detection method encourages one to retain these cases for further analysis, the final decisions about retaining or omitting these outlying items would be made after inspection of multivariate outliers. According to Hair et al., (2006), multivariate methods are best suited for examining a complete variate, such as the

independent variables in regression. An inspection of the results obtained by the multiple regression model that considered attitude as one of the three predictors (direct variables) of BI, shows the presence of three outlying cases (14,240 and 305) which are different from those in the univariate observation. Hair et al. (2006) suggested investigating if they are potential outliers by an inspection of the Mahalanobis D^2. An inspection of cases with the values of Mahalanobis D^2 that are exceeding the threshold value of ± 4 is not needed as none exist. Assessment of cases having a multivariate outlier was based on the critical Chi-square value obtainable from any standard set of statistical tables, using the number of independent variables as the degrees of freedom distributed as t-value at an alpha level of .001 and .005 (Hair et al., 2006). Another concern of removing outliers when they are not influential to the prediction is violating generalizability. Some authors like Hair et al. (2006) believe that outliers "should be retained unless demonstrable proof indicates they are truly aberrant and not representative of any observation in the population". Cook's Distance and Centered Leverage values are employed in this study as method to examine the influence of outliers on the tested models. According to Hair et al. (1998) the acceptable Cook's Distance value is when it is less than one.

5.3 Construct's First Internal Consistency and Reliability Test

It was recommended that any summated scale should be analyzed for its reliability in order to ensure its appropriateness before proceeding to an assessment of its validity (Hair et al., 1998 and Battacherjee, 2000). According to Malhotra (2004), an instrument cannot be valid if it is not reliable but it will be reliable when it is valid. Therefore, the first reliability test is required as it is part of the preliminary analysis as indicated by Pallant (2005) to explore the nature of the variables. According to Pallant (2005), it is in readiness for conducting specific statistical techniques to address research questions.

Reliability, according to Malhotra (2004), refers to the extent to which a scale produces consistent results if repeated measurements are made. In this section, the researcher attempts to assess the degree to which the measures are free from random error and, therefore, yield consistent results. Here, in this study, the researcher uses the internal consistency reliability method, which is applied to assess the homogeneity of a set of items when several items are summated in order to form a total score. In order to achieve that, the study used two techniques of internal reliability tests. The first technique the study conducted is the **Item-to-total correlation** technique according to which scale items were deleted if they recorded item-to-total correlations of less than 0.25 (Nunnally, 1978). The second is the common technique used by researchers which is based on **Cronbach's coefficient alpha** which is utilized by this study to gauge the internal consistency of the measure. The basis for using the latter technique is that measures with coefficient values of 0.70 or above generally indicate satisfactory internal consistency reliability. In some situations, a Cronbach's coefficient alpha of 60 may be accepted as the minimum acceptable level of reliability for preliminary research as suggested by Nunnally, (1978) as well as in exploratory research as suggested by Malhotra, (2004) and Hair et al.,(1998).

5.3.1 Scales Evaluation on TPB Direct Constructs (Layer1)

This study used four main theorized constructs that anticipated explaining and predicting the adoption of IB based in Yemen. There are four main variables; behavioural intention, which is the key dependent variable, while the other three variables, namely attitude, subject norm and PBC are independent variables. Table 5.6 shows the items involved in each construct as well as the relevant reliability test conducted on the four constructs.

Table 5.6 Reliability Test on Main Constructs

Variables Included	Coefficients Alpha
Behavioural Intention	**.91**
1- Customer will use IB in the future (**INT1**).	
2- Customer will Recommend the use of IB (**INT2**).	
3- IB will be customer favourable choice (**INT3**).	
4- Customer Plans to use Internet Banking (**INT4**).	
5- Customer intends to use Internet Banking (**INT5**).	
Attitude	**.91**
1- Using IB services is a good idea. (**ATT1**)	
2- Using IB services is a wise idea (**ATT2**)	
3- I like Using IB services (**ATT3**)	
4- Using IB is a pleasant experience (**ATT4**)	
Subjective Norms	**.93**
1- Referents think that I should use IB (**SN01**)	
2- Referents influence me to use IB. (**SN02**)	
3- Referents think that I should try out IB (**SN03**)	
4- Referents influence me to try out IB. (**SN04**)	
5- Important people think that using IB is a good idea. (**SN05**)	
6- Important people think I should use IB. (**SN06**)	
PBC	**.90**
1- Customer Being able to use IB (**PBC1**)	
2- Have the resources to use IB. (**PBC2**)	
3- Have the knowledge to use IB (**PBC3**)	
4- Have the ability to use IB. (**PBC4**)	
5- IB would be entirely within control. (**PBC5**)	

As shown in the preceding Table 5.6, the measurement scale used with each of the four constructs was perfectly reliable and yielded consistent results with high approximate Cronbach's alpha values of (0.91) for Behavioural Intention, 0.91 for Attitude, (0.93) for SN and (0.90) for PBC. Admittedly, the possible explanation for the high values of Cronbach's alpha coefficients obtained in the four constructs could be that these constructs are very well established and reliably tested in several previous studies from which this study was adapted.

5.3.2 Readiness Construct Reliability Test

User readiness is a multidimensional construct that includes the four dimensions of exposure, experience, awareness and knowledge of IB. Along these lines, an internal consistency reliability test can be computed for each dimension. The user's readiness

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dimensions were measured using a seven-point Likert type scale (1 = strongly disagree, 2=Quite disagree, 3=slightly disagree, 4=neither disagree nor agree, 5=slightly agree, 6=Quite agree, and 7=strongly agree). Table 5.7 displays the reliability test on user readiness dimensions.

Table 5.7 Reliability Test on User Readiness Dimensions

Construct	Variables	Coefficients Alpha
Exposure		**.75**
	1- Advertisements (EXPOSE01)	
	2- Pervious use (EXPOSE02)	
	3- Recommendations (EXPOSE03)	
Experience		**.80**
	1- Years of using Internet (YUI)	
	2- Years of using Computer (YUC)	
	3- Years of using Banking services (YUPB)	
	4- Computer. (EXPR01)	
	5- Internet. (EXPR02)	
	6- Banking services. (EXPR03)	
Awareness		**.71**
	1- Know what Internet Banking is. (AW1)	
	2- Concern about IB. (AW2)	
	3- Occupied with other things. (AW3)	
	4- Concerned about things in the Internet banking field (AW4)	Dropped
	5- Interested in learning IB. (AW5)	
Knowledge		**.85**
	1- IB's Knowledge (KNOW01)	
	2- Using the Internet Banking. (KNOW02)	
	3- Resources are available. (KNOW03)	
	4- Usage requirements. (KNOW04)	
	5- Know how this innovation is better than what we have now. (KNOW05)	

Firstly, there are three items used to measure respondents' exposure to IB, which demonstrated a significant reliability with coefficients Alpha of .75 when measuring the respondents' exposure. Customers' experiences were examined by utilizing six items adapted from previous studies that were found to be significantly reliable with a Cronbach's Alpha coefficient of (0.80). With respect to customers' awareness of IB, this was evaluated using four items. The four items were screened and re-coded because the items were negatively worded in the questionnaire. The Cronbach's Alpha

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coefficient for the scale of awareness of IB after elimination of the item (AW4) increased marginally to 0.71, which is reliable (see section 5.4.5). Lastly, five items involved in measuring the respondents' knowledge related to IB were found to be significantly reliable with the Cronbach's Alpha coefficient of 0.85.

5.3.3 Evaluation of the Indirect Constructs Scales (Layer 2)

There are three beliefs suggested by the TPB theory. These beliefs are; the customer attitude belief that will be measured based on the individual's perceptions of IB characteristics. Then, the normative belief that will be measured based on the two types of influential norms, inferred from Rogers' two types of communication channels. Lastly, the control belief that will be measured based on individual's perceptions of the control of both facilitating conditions and self-efficacy.

A. Reliability Test on Using IB Characteristics Constructs

In measuring the respondent's belief about using IB, this study proposed 24 items. In order to prepare the obtained data on the characteristics of using IB for multivariate analysis, the researcher needed to determine the internal consistency of this scale using Cronbach's alpha. The appropriate way to achieve this is by looking at the overall scale, the individual items, and the relationship between them. The reliability test was conducted on all the 24 items and the findings show that the overall scale yielded reliable internal consistency with a Cronbach's alpha of 0.88. It was noted that for the two variables (eou05 and eou06), the correlations between each of them and the sum of all other variables are quite low. In the case of **obs07,** it is even a negative (-.248). Correspondingly, the alpha value would increase (see appendix **V-E**) if these items were deleted from the scale (Darren & Mallery, 2003).

Table 5.8 Reliability Test on IB Characteristics Constructs

Constructs	Item Variables	Coefficients Alpha
Relative Advantages		**.93**
	1- IB enables accomplishment of tasks quickly. (RA01)	
	2- IB improves quality of work. (RA02)	
	3- IB enhances effectiveness on the job. (RA03)	
	4- IB would make job easier.(RA04)	
	5- IB gives greater control over work. (RA05)	
Ease of Use (Complexity)		**.93**
	1- Learning to operate I-banking is easy (EOU1)	
	2- IB would be easy to use.(EOU2)	
	3- Easy to become skilful at using IB. (EOU3)	
	4- Easy to get an IB to do everything. (EOU4)	
	5- Internet banking not available. (EOU5)	**Dropped**
	6- IB requires a lot of mental effort. (EOU6)	**Dropped**
Compatibility		**.92**
	1- IB compatible with my work. (COM01)	
	2- IB fit my work style. (COM02)	
	3- IB fits the way I like to work. (COM03)	
Trialability		**.88**
	1- Use IB on a trial basis. (TR01)	
	2- Be able to properly try it out. (TR02)	
	3- Trial basis long enough to see what it can do. (TR03)	
Observability		**.79**
	1- When IB is used by many.(OBS01)	
	2- When I have seen others using IB.(OBS02)	
	3- As soon as I get to know about it. (OBS03)	
	4- If IB is popular, I will use it. (OBS04)	
	5- Wait and see others start to use it. (OBS05)	
	6- Successful experience of using it. (OBS06)	
	7- If this service is unknown to me, I will not use it. (OBS07)	**Dropped**

When this study repeats the test without (obs07) the Cronbach's alpha for the overall scale, it becomes (0.8957). However, this finding could be accepted as satisfactory in achieving the reliable internal consistency, but examining the individual items indicates that items (eou5) and (eou6) have the lowest corrected item-to-total correlations. In these circumstances, Zaichkowsky's (1985) solution was to drop low item-to-total correlations. Accordingly, if these two items were removed from the scale, the Cronbach's alpha is then raised to (0.9102). Therefore, the dropping of these items may be considered appropriate. Using the 21 remaining items after the deletion of less misleading items, the researcher wished to determine the reliability of Rogers (1995)'s

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five independent IB characteristics scales, namely RA, EOU, Compatibility, Trialability and Observability. The reliability test was carried out on each attribute separately and results show that the scales in each attribute are consistent with a Cronbach's alpha greater than 0.70 and involved relevant items presented in Table 5.8. The scale allocated as an instrument to measure these attribute was: 1\strongly disagree to 7\strongly agree. The instrument used to measure the five attributes of the innovation recommended by Rogers (1995) was a seven-point Likert scale for all the attributes.

B. Reliability Test on Normative Belief Constructs

Cronbach's alpha reliability test was conducted on the overall normative beliefs to ascertain that the indirect predictors function as a whole set and do not violate the reliability with Cronbach's alpha of 0.93 (see Appendix V-F). Since this study looked into the normative beliefs based on two categories of norm interactions, there are personal interaction referents (word-of-mouth) and impersonal interaction referents represented by Media. Another reliability test was conducted separately on each of the constructs relevant measures. The result shows that the scales used to measure personal referents are statically reliable and yield a consistent result with a Cronbach's alpha of (0.94) and the Cronbach's alpha of the media norms construct is 0.86 which yields a satisfactory internal reliability of the construct. Table 5.9 presents the output of the internal consistency reliability check, carries both personal and media referents, constructs.

Table 5.9 Reliability Test on the Decomposed Normative Beliefs

Construct	Variables	Coefficients Alpha
Personal Norms		**0.94**
	1- Peers/colleagues think I should use IB and I will do what they think I should do.*(MCPER1)*	
	2- Peers/colleagues think I should try out IB and I will do what they think I should do. *(MCPER2)*	
	3- Opinion leaders think I should use IB and I will do what they think I should do.*(MCLEDR3)*	
	4- Opinion leaders think I should try out IB and I will do what they think I should do. *(MCLEDR4)*	
	5- Bank employees think I should use IB and I will do what they think I should do. *(MCEMPLY5)*	
	6- Bank employees think I should try out IB and I will do what they think I should do. *(MCEMPLY6)*	
Media Norms		**0.86**
	1- Media suggest using IB is good idea and I will do what media suggest. *(MCMEDIA1)*	
	2- Media consistently recommend using IB services and I will do what media recommend.*(MCMEDIA2)*	
	3- My profession encourages IB and I will do what the profession thinks I should do.*(MCPRFS3)*	
	4- Using IB reported as good and I will do what the profession thinks I should do.*(MCMEDIA3)*	

C. Reliability Test on Control Belief Construct

Table 5.10 presents scale evaluations on four decomposed beliefs that are relevant to the control belief construct. Findings show that the coefficient alpha of the self-efficacy construct scored 0.73 above the recommended Cronbach's alpha. This indicates that the summated scale of the construct yields satisfactory internal consistency reliability. Pertaining to the government support construct, the alpha value of 0.82 indicates that the scales are satisfactorily reliable. The reliability test on the eight decomposed variables relevant to measure the technology support construct indicates unsatisfactory internal consistency reliability with an alpha value of 0.66, which is below the standard Cronbach's alpha coefficient of 0.7 recommended by Hair et al. (2006) and Malhotra (2004). In this case, Cooper & Schindler (2003, p. 239) pointed out that one of the methods the researcher can employ to improve reliability is to minimize

external sources of variation. Thereupon, deleting items scoring high values of alpha will improve the reliability of the construct.

Table 5.10 Reliability Test on Control Belief Constructs

Construct	Variables	Coefficients Alpha
Self-Efficacy		**0.73**
1-	Se1- I am confident that I could learn Internet Banking applications	
2-	Se2-I feel comfortable using computers in general	
3-	Se3- I feel comfortable using the Internet.	
4-	Se4- My current skills on using the Internet, enable me to do everything that I want.	
5-	(DSE1)- I feel comfortable using IB on my own. (contblf1*pf1)	
6-	(DSE2)- I can easily operate IB from bank's website on my own. (contblf2*pf2)	
7-	(DSE3)- I can use IB without others' help and for me this aspect is important. (contblf3*pf3)	
Facilitate Government Support		**0.82**
1-	(FGS1)- Government supports e-commerce. (govs1*govs2)	
2-	(FGS2)- Government endorses e-commerce. (govs3*govs4)	
3-	(FGS3)- Government is setting up the facilities to enable e- commerce. (govs5*govs6)	
4-	(FGS4)- Government promotes e-commerce.(govs7*govs8)	
Facilitate Technology Support		**0.66**
1-	(FT1)- I have the computers, Internet access and applications, needed to use IB. (tav1*tav2)	
2-	(FT2) - I have application "software" not compatible with the system to use. IB(tav3*tav4)	
3-	(FT3)-Facilitate accessing banks' website/ application to manage my account online. (tav5*tav6)	
4-	(FT4)- Concerned about the security of IB services. (tav7*tav8)	
5-	(FT5)- Internet access speed problem (tav9*tav10)	
6-	(FT6)- Facilitate bank's IB transactional websites to use IB. (tav11*tav12)	
7-	(FT7)-Facilitate a good quality of Internet connection to use IB. (tav13*tav14)	
8-	(FT8)-Facilitate high quality of Internet wireless to use IB. (tav15* tav16)	
Facilitating Resource		**0.63**
1-	(FR1)-Facilitate computers for everyone to use IB services. (rav1* rav2)	
2-	(FR2)-Facilitate the accessing Internet for low prices attainable to use IB. (rav3* rav4)	
3-	(FR3)-Facilitate IB availability then I would be able to use IB when I need it. (rav5* rav6)	
4-	(FR4)-Have the time to set up IB services. (rav7*rav8)	
5-	(FR5)Have enough money to use IB services. (rav9*rav10)	

Subsequently, dropping items such as FT2, FT5, FT3, and FT4 from the technology support scale will improve the reliability gradually to a Cronbach's alpha of 0.71. The result after such deletions of items ends by the four items of FT1, FT6, FT7

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and FT8, which achieved the standard level of internal reliability. The initial test of reliability on the facilitating resource condition scale provides the alpha value of 0.63, which indicates that the construct scale has unsatisfactory internal consistency reliability. Further deletion to the relevant items in this construct will not improve the reliability of the scale. Thereupon, based on what was mentioned by Hair et al. (1998) this study can still use this construct and the final decision can be made after the purification process of factor analysis. To sum up, Table 5.11 displays a summary of the first reliability test as follows;

Table 5.11 Summary of First Reliability Test

Variables	No. of Items	Cronbach's Alpha
Variable – Behavioural Intention	**5**	**.91**
Dimension		
1. **Behavioural Intention**	**5**	**.91**
Variable – Psychological Determinant	**15**	
Dimension		
1. **Attitude**	**4**	**.91**
2. **Subjective Norms**	**6**	**.93**
3. **PBC**	**5**	**.90**
Variable – Readiness	**19**	
Dimension		
1. **Exposure**	**3**	**.75**
2. **Experience**	**6**	**.80**
3. **Awareness**	**5**	**.71**
4. **Knowledge**	**5**	**.85**
Variable – behavioural beliefs on IB	**21**	
Dimension		
1. **Relative Advantages**	**5**	**.93**
2. **Ease of Use**	**4**	**.93**
3. **Compatibility**	**3**	**.92**
4. **Trialability**	**3**	**.88**
5. **Observability**	**6**	**.79**
Variable – Normative Beliefs on IB	**10**	**.93**
Dimension		
1. **Personal Norms**	**6**	**.94**
2. **Media Norms**	**4**	**.86**
Variable – Control Beliefs on IB	**24**	
Dimension		
1. **Self-Efficacy**	**7**	**.73**
2. **Government Support**	**4**	**.82**
3. **Technology Facilitating**	**8**	**.66**
4. **Resource Facilitating**	**5**	**.63**

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5.4 Factor Analysis

Having conducted the first reliability test and results on the initial internal consistency having been obtained, this study moves on to the following steps of factorial validity analysis. A wide series of factor analysis in the shape of Principle Component Analysis is utilized to test for both the convergent and discriminate validity of the measurements. Factor analysis is an interdependence technique and the primary purpose of using it, according to Hair et al. (2006) and Zikmund (2003), is to define the underlying structure among the variables in the analysis. Principal Component Analysis (PCA) and principal factors, according to Tabachinck & Fidell (2007) and Cooper & Schindler (2003) are the most commonly used. The aims that this study seeks to achieve from the factor analysis technique are presented below;

The first aim is to analyse the scale items of each construct and verify their discriminant validity. According to Davis (1989), discriminant validity is concerned with the ability of a measurement item to differentiate between the objects being measured. Malhotra (2004) put it in another way, saying that discriminant validity aimed to identify new uncorrelated variables to be used in subsequent multivariate analyses such as regression.

The second aim is to reduce the large number of interrelated variables to a small number of underlying factors that ensure the construct validity. According to Malhotra (2004), it addresses the question of what construct or characteristic the scale is, in fact, measuring. The third aim is to explain the interrelations between the constructs and the variables measuring them. According to Davis (1989), it is concerned with whether constructs' items form distinct constructs. The fourth aim is to identify a smaller set of salient variables for use in subsequent multivariate analysis (Malhotra, 2004). For example, IB attributes statements, Normative belief statement and control belief statement, that correlate highly with the identified factors may be used as independent

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variables explain the dependent variable in the second layer of the model. Lastly, factor analysis according to Zikmund (2003) may be utilized to meet the statistical assumptions of various models.

5.4.1 Factors Analysis for Criterion Variable BI

The five items of the construct assumed as BI shown in Table 5.12 were subjected to Principle Component Analysis (PCA) to determine how many dimensions those items which measure BI will converge along.

Table 5.12 PCA Result Component Matrix and Factor Loading: BI

Constructs	Coding	Items	Component 1 Loading
Behavioural Intention (BI)	int1	Customer will use IB in the future.	.900
	int2	Customer will recommend the use of IB.	.926
	int3	Customer will make IB the favoured choice	.913
	int4	Customer plans to use Internet Banking.	.751
	int5	Customer intends to use Internet Banking.	.825

Eigenvalues	**3.75**
The variance explained	**74.9 %**
KMO:	**0.849**
Cronbach's Alpha	**0.911**

Consequently, the result of factor analysis here revealed the following:

I. The presence of one component with eigenvalues of 3.75 exceeding the recommended value of one.

II. The factor analysis provided a solution in one component which explained 74.9 % of the variance.

III. An assessment of the Kaiser-Meyer-Olkin (KMO) value was of 0.849 which shows that the sampling adequacy for factor analysis was appropriate and the Barlett's Test of Sphericity reached statistical significance, supporting the factorability of the correlation matrix.

The interpretation of this component was consistent with previous research on the behavioural intention (BI) scale. In addition, the result of this analysis supports the use of selected items as a scale of behavioural intention as suggested by the scale authors (Venkatesh, & Davis, 2000; Lai & Li., 2004; Mathieson, 1991; Shih & Fang 2004; Gardner & Amoroso, 2004 and Wang et al., 2003).

5.4.2 PFA Results: Direct Psychosocial Determinants of BI (Layer 2)

Table 5.13 presents the coding used for the SN (6 items), PBC (5items), and Attitude toward using (4 items).

Table 5.13 The Coding of Measurements Scale of BI Psychosocial Antecedents

Constructs	Coding	Items
Subjective Norms (SN)	sn01	Referents think that customer should use IB.
	sn02	Referents influence customer to use IB.
	sn03	Referents think that customer should try out IB.
	sn04	Referents influence customer to try out IB.
	sn05	Important people think that using IB is a good idea.
	sn06	Important people think customer should use IB.
PBC (PBC)	pbc1	Customers being able to use IB.
	pbc2	Customers have the resources to use IB.
	pbc3	Customers have the knowledge to use IB.
	pbc4	Customers have the ability to use IB.
	pbc5	IB would be entirely within customers' control.
Attitude (ATT)	att1	Using IB services are a good idea.
	att2	Using IB services is a wise idea.
	att3	Customers like the idea of using the IB.
	att4	Using the IB would be pleasant.

In this study, exploratory factor analysis of (EFA) was employed to identify factors underlying direct predictors (Attitude, SN and PBC). In this case, the factor extraction method of Principal-Axis Factoring Analysis (PFA) was selected because it is useful in

determining the number of factors necessary to represent the data (Coakes & Steed (2003). In this study, both PFA and PCA provide similar solutions on the direct factors of BI.

The set of 15 items comprising three constructs (Attitude, SN and PBC) was subjected to factor analysis and the solution was rotated using the orthogonal rotational method with the varimax rotational approach. It was recommended by Hair et al. (2006) to use the orthogonal rotational method with the varimax rotational approach, which is powerful enough to obtain orthogonal factors. The result of the analysis indicates that:

i. Respondents involved in the study sample are able to distinguish the variation among the three of BI functions (direct determinants) or predictor of behavioural intention whereby this finding's in agreement with the TPB classification of the direct predictors.

ii. The assessment of direct determinants of behavioural intention construct, according to respondents, seemed to be through three predictors; Attitude, SN and PBC.

iii. An assessment of the Kaiser-Meyer-Olkin (KMO) value was of 0.921 which shows that the sampling adequacy for factor analysis was appropriate and the Barlett's Test of Sphericity reached statistical significance, supporting the factorability of the correlation matrix.

In other words, factor analysis revealed the presence of three components with eigenvalues exceeding one. In addition, the required 3 factors was retained on the measurement for the three direct factors conceptually and theoretically assumed to be the direct predictors of behavioural intention as discussed previously in the literature review (see section 3.3.4.1). The Underlying structure of the 15 items involved in the three constructs; attitude towards using Internet banking ATT, SN, and PBC were retained for further analysis and all items interestingly have strong loading in their

5). The result shows three factors with eigenvalues greater

h these factors explaining 50 percent, 15.4 percent and 9.4

percent of the variance. The three components solution explained 74.82 % of the variance. Table 5.14 shows the items used to measure behavioural intention and their loading onto 3 different components as follows;

Table 5.14 PFA Result: Factors Underlying Direct Attributes of BI

	Factors		
	Subjective Norms	**PBC**	**Attitude**
sn01	.793		
sn02	.850		
sn03	.861		
sn04	.876		
sn05	.724		
sn06	.809		
pbc1		.613	
pbc2		.830	
pbc3		.864	
pbc4		.880	
pbc5		.749	
att1			.842
att2			.816
att3			.819
att4			.780
Eigenvalue	**7.506**	**2.307**	**1.410**
Variance explained	**50.041**	**15.382**	**9.397**
Cronbach's Alpha	**.929**	**.899**	**.906**

(a) Total Variance Extracted by three factors 74.82 %;KMO = 0.921; Barlett's Test <.001
(b) Extraction Method: Principal Axis Analysis;
(c) Rotation Method: Varimax with Kaiser Normalization.

The interpretation of the three components was consistent with the theory of TPB on the direct scale of BI (Ajzen, 1991; Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975 and Taylor & Todd, 1995a, b). Also, the results of this analysis support the use of attitude items, SN items, and PBC items as separate scales as suggested by the Theory of Planned Behaviour (TPB) by Ajzen & Fishbein, (1980) and the Decomposed Theory of Planned Behaviour (DTPB) by Taylor & Todd, (1995a, b).

5.4.3 Factor Analysis of TPB Salient Variables (Layer 1)

Three constructs with several items in the study were suggested to represent the individuals' salient beliefs recommended by the TPB. These are behavioural belief, normative belief and control belief. There are 54 items in the survey questionnaire which were used to identify the effect of the three groups of salient beliefs regarding the target behaviour. The verification procedures of factor analysis were employed to understand the structure of the 54 items as a whole set (see **Appendix VI-C)**

As a first step, the 54 items intended to measure people's salient beliefs suggested by the TPB were factor analyzed to identify underlying factors as a basis for developing clusters. According to Barczak et al., (1997), items should be deleted from the factor analysis based on either an improvement in coefficient alpha, weak loadings, or cross-loadings. In addition, the guidelines token from previous literature and adoption studies, which similarly employed quantitative methods, were helpful in identifying the nature of relationships among variables or determining how they cluster (Cronk & Fitzgerald 2002).

Following past studies in the discipline and the guidelines derived from Tan & Teo (2000) and Sundarraj & Wu (2005), two rounds of factor analysis were performed on the results (Principal Components Analysis with Varimax rotation was used). Similarly, variances with loadings greater than 0.4 were accepted to produce the end results shown in Tables 5.16, 5.18 and 5.20.

The first round of factor analysis was performed and the results displayed in **Appendix VI-C,** show that **a** set of 12 factors was extracted by the first round of factor analysis representing diverse components of salient beliefs. Following Ajzen & Fishbein's (1980) suggestion as well as the guidelines of TPB research such as Taylor & Todd (1995) and Ajzen (1991) attitude, SN and PBC should be predicted from a person's salient beliefs; the 12 components obtained by the first round of factor analysis

will be grouped in accordance with three types of beliefs. These three perceptual constructs as in the TPB are behavioral beliefs that influence attitudes, normative beliefs that affect SN, and control beliefs that shape perceived behavioral control.

I. Factor Analysis (PFA): IB Attributes

The coding of items related to the IB Attributes include the relative advantages of using IB (5 items), the ease of use of IB (4 items), observability of IB (5items), compatibility of IB (3items) and the trialability of using IB (3 items) as shown in Table 5.15. By closely adhering to the nomological structure of TPB and DOI, the proposed model integrates a set of behavioural beliefs whereby all items were drawn from the five common attributes of innovation suggested by Rogers' (1995) theory of DOI. In this part, the study looks for a theoretical solution for IB attributes as suggested in the study's framework. The Principal Axis Factoring (PAF) analysis method was found to be the best option according to Tabachinck and Fidell (2007, p.635) to look into the *structure* of the predetermined underling constructs which theoretically account for innovation's attributes. Moore and Benbasat (1991) utilized the Principal Component Analysis (PCA) method to develop a measurement for innovation attributes. In this study, both methods of Principal Component Analysis (PCA) and Principal Axis Factoring (PAF) provide the same solution to factor loading. More recently, Yi et al. (2006) employed the PCA method to look into the factor solution.

Since there are no well-established scales developed specifically to measure the IB attribute applicable to measuring the adoption in less developing and non-western countries, this study developed the scale based on previous IS literature reviews such as Moore & Benbasat (1991) and Taylor & Todd (1995b) among others as well as IB literature review such as Tan and Teo (2000) and Shih & Fang (2004) among others.

Table 5.15 The Coding of Items and Constructs of IB Attributes

Constructs	Coding	Items
Relative Advantages (RA)	ra01	Accomplish tasks quickly
	ra02	Improve work's quality
	ra03.	Enhance job's effectiveness
	ra04	Make my life easier
	ra05	Gives me greater control over my work
Ease of Use (EOU)	eou01	Learning to use IB is easy
	eou02	IB easy to use
	eou03	Become skilful at using the IB is easy
	eou04	Easy to get an IB do what I want
Observability (OBS)	obs01	I will use IB when it is used by many
	obs02	I will use IB when I have seen others using it
	obs04	I will use IB if this service becomes popular.
	obs05	I will wait and see
	obs06	I will use IB when successful experience of using it
Compatibility (COM)	com01	IB is compatible with my work
	com02	IB fits my work style
	com03	IB fits in well with the way I like to work
Trialability TR	tra01	I want to use it on a trial basis
	tra02	I want to properly try it out
	tra03	I want enough time to use IB on a trial basis to see what it can do

Factor analysis was applied to the results in line with the analysis used by Moore and Benbasat, (1991), Barczak, et al. (1997) and Tan & Teo (2000). Similarly, variances with loadings of 0.5 and above were accepted. Two rounds of factor analysis were performed whereby the first round of the reliability test and factor analysis reveal that a few items such eou05, eou06, obs03 and obs07, were found to be confounded. These items were dropped from the scale following the suggestion of Barczak et al. (1997), and Tan & Teo (2000) in order to produce the results shown in Table 5.16 by the second round. This study provides a justification for dropping confounded items from the proposed scale (see page 269) in section 5.4.5, based on the literature review and

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statistical reasons. In the second round of Principal Axis Factoring (PAF) analysis, the 24 items were assessed for the suitability of the data for factor analysis. Also, they were subjected to the purification process of PAF of factor analysis using SPSS with Varimax rotation as suggested by Guertin & Jr (1970,), Hair et al., (2006) and Malhotra, (2004). The results are displayed in Table 5.16.

Table 5.16 PFA Result: IB Attributes

Items	Factor				
	Relative Advantages/ Compatibility	Observability	Ease of use	Attitude	Trialability
ra01	.655				
ra02	.741				
ra03	.781				
ra04	.762				
ra05	.760				
Com01	.662				
Com02	.778				
Com03	.783				
Obs01		.709			
Obs02		.742			
Obs04		.747			
Obs05		.731			
Obs06		.763			
Eou01			.750		
Eou02			.805		
Eou03			.743		
Eou04			.526		
Att1				.702	
Att2				.667	
Att3				.732	
Att4				.649	
Tra01					.774
Tra02					.814
Tra03					.710
Eigenvalue	**10.281**	**4.397**	**1.382**	**1.144**	**1.061**
Variance explained	**42.836**	**18.319**	**5.760**	**4.769**	**4.420**
Cronbach's Alpha	**.943**	**.871**	**.930**	**.906**	**.884**

(a) Total Variance Extracted by the Five factors 76.11 %; KMO = 0.923; Barlett's Test <.001
(b) Extraction Method: Principal Axis Factoring;
(c) Rotation Method: Varimax with Kaiser Normalization.
(d) eou05, eou06, obs03 and obs07 dropped in the second round of factor analysis

Inspection of the correlation matrix revealed the presence of many coefficients of .3 and above and the Kaiser-Meyer-Olkin value was .923, above the recommended value of .6 (Hair et al., 2006) and the Barlett's Test of Sphericity reached statistical

significance, supporting the factorability of the correlation matrix. PFA, as shown in Table 5.16, indicated the presence of five factors with eigenvalues exceeding 1, explaining 42.836 percent, 18.319 percent, 5.760 percent, 4.769 percent and 4.420 percent.

Table 5.16 shows the results of the modified loadings on the respective factors, shown in the shaded portion of Table 5.16 which range from 0.526 to 0.814. Furthermore, Cronbach's Alpha values for the modified scale were not affected considerably. The study, therefore, considered the modified scale sufficient for the analysis described next. Furthermore, the findings obtained from factoring were examined and compared to Rogers (1995)'s five independent IB characteristics scales, namely Relative Advantage, Ease of Use, Compatibility, Trialability and Observability. The result of the analysis indicates that;

I. Contrary to our expectations, the rotated solution revealed the presence of simple structure that involved the relative advantage and compatibility items of the scale comprised in one factor. It was inferred that the respondents do not distinguish the variation among Rogers' (1995) two dimensions of relative advantage and compatibility whereby these findings clashed completely with the DOI classification of the innovation attribute when applied to the context of IB.

II. The results with factor included the measures of relative advantage and compatibility, which loaded together, have been found in other research; e.g., Moore & Benbasat, 1991), as well as, findings in line with the DTPB by Taylor & Todd (1995b) and accordingly, they were thus combined for the purposes of this analysis. In addition, expanding the practical understanding of the combination taking place between Compatibility and Relative Advantage, in IB behaviour, ensures that both constructs address the usefulness of this innovation. Lastly, the issue draws attention to a pressing need for further research to identify why these

two constructs are difficult to discriminate from each other in some previous IS studies similar to the current one.

III. The three factors of ease of use, trialability and observability obtained by factor analysis fit Rogers' attribute and its relevant items showing strong loadings on their own relevant factors.

IV. The interpretation of the factors extracted is consistent with previous research on the innovation attributes like Taylor & Todd, (1995 a,b) , Mattila, (2003) and Tornatzky & Klein (1982) with relative advantages items loading strongly on component 1, observable items loading strongly on component 2, ease of use items loading strongly on component 3 and trialability items loading strongly on component 5.

 V. The results of this analysis support the use of the relative advantages/compatibility scale, ease of use scale, observable and trialability scale as separate scales as suggested by scale authors (Moore & Benbasat, 1991; Karahanna et al., 1999; Tan & Teo, 2000; Wang et al., 2003) and Taylor & Todd, (1995b).

II. Factor Analysis of Normative Beliefs Variables: Rogers' Communication Channel Influence of Personal and Media Interaction Norms

The coding of items related to the IB norms included personal norms of the interaction with the innovation of IB (6 items), norms of the interaction with media norms (4 items), and the individuals' motivation to comply with these norms' influences (4 items).

Table 5.17 The Coding of Items and Constructs of the Normative Belief of IB

Constructs Coding	Items Coding	Items' Statements
Personal Norms	peer1	Peers/colleagues think I should use IB
PR	peer2	Peers/colleagues think I should try out IB
	leader3	Opinion leaders think I should use IB
	leader4	Opinion leaders think I should try out IB
	employ5	Bank's employees think I should use IB
	employ6	Bank's employees think I should try out IB
Mass Media Norms	media01	Media suggests using IB is good idea
MM	media02	Media consistently recommend using IB services
	prof03	For my profession, it is advisable to use Internet Banking services
	media04	I read /saw news reports that using IB is a good way of managing my bank account.
Motive to Comply	mcpc1,2	I will do what peers suggest I do
MC	mcpc3,4	I will do what leaders suggest I do
	mcpc5,6	I will do what bank's people suggest I do
	mcmm124	I will do what the media suggest

To verify the parsimonious set of variables that could represent the large number of variables used to assess the normative belief construct, the extraction method of Principal Component Analysis (PCA) with Varimax rotation was conducted to *summarize* and determine whether items measuring personal norms can discriminate items measuring media norms as well as the motive to comply with both norms.

The result of the analysis indicates that:

I. Respondents involved in the study sample distinguished the variation among the three dimensions of normative beliefs whereby these findings are found to be moderately in line with the TPB classification of normative belief.

II. The assessment of the normative belief construct, according to the respondents, seemed to be through three dimensions; belief in personal norm, belief in the media norm and the motivation to comply with those both beliefs.

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The findings also show that PCA is significantly appropriate with a Kaiser-Meyer-Olkin

Measure (KMO) of the sampling adequacy of 0.902. Table 5.18 shows the items used to

measure normative belief and their loading onto 3 different components as follows;

Table 5.18 PCA Result: Types of Interaction's Norms Vs. Motivation to Comply

	Factor		
	Personal Norms	**Media Norms**	**Motive to Comply**
peer1	.788		
peer2	.792		
leader3	.773		
leader4	.768		
employ5	.707		
employ6	.657		
media01		.703	
media02		.699	
prof03		.740	
media04		.755	
mcpc1,2			.613
mcpc3,4			.667
mcpc5,6			.721
mcmm124			.714
Eigenvalue	**7.221**	**1.537**	**1.146**
Variance explained	**48.137**	**10.243**	**7.641**
Cronbach's Alpha			

(a) Total Variance Extracted by three factors 66.220 %;KMO = 0.902; Barlett's Test <.001
(b) Extraction Method: Principal Component Analysis;
(c) Rotation Method: Varimax with Kaiser Normalization.

The preceding Table 5.18 presents the results obtained from conducting PCA and

shows that there are three factors underlying the normative belief obtained from the 15

items. Interestingly, all items expected to handle the personal belief norms are seated in

the first factor with an eignvalue of 7.2 and can explain the variance of 48.137 %, while

items expected to handle media belief norms are seated together in the second factor,

which can explain 10.243 % of the variance. The third factor of nicely grouped items is

expected to handle the respondent's motivation to comply with both personal and media

norms. The item that is assumed to handle the motivation to comply with the profession

requirement here was not loaded to any of the factors extracted. Therefore, this item

may be eliminated if it is not seated in its group in the next round of factor analysis in the sequence analysis.

The coding of items related to salient belief of SN includes normative expectations of salient referent groups of individuals or media. It includes decomposed belief of personal norms with individual's motivation to comply with the personal norms influences (6 items) and decomposed belief of media norms into the individual's motivation to comply with the media norms influences (4 items).

Table 5.19 the Coding of Items and Constructs of Normative Belief of Internet Banking (weighted belief)

Constructs Coding	Items Coding *a×b = 47	Items' Statements
Personal Norms PR	(MCPER1)	Peers /colleagues think I should use IB and I will do what peer/colleagues suggest I do.
	MCPER2	Peers/colleagues think I should try out IB and I will do what peer/colleagues suggest I do.
	MCLEDR3	Opinion leaders think I should use IB and I will do what leaders suggest I do.
	MCLEDR4	Opinion leaders think I should try out IB and I will do what leaders suggest I do.
	MCEMPLY5	Bank's employees think I should use IB and I will do what bank's people suggest I do.
	MCEMPLY6	Bank's employees think I should try out IB and I will do what bank's people suggest I do.
Media Norms MM	MCMEDIA1	Media suggests using IB is good idea and I will do what the media suggest.
	MCMEDIA2	Media consistently recommend using IB services and I will do what the media suggest.
	MCPRFS3	For my profession, it is advisable to use Internet Banking services and I will do what it suggests.
	MCMEDIA3	I read /saw news reports that using IB is a good way of managing my bank account and I will do what this media suggest.

*a =Individual's Belief Multiplied by his/her motive to Comply (Belief Measure-Based)

Interestingly, the above 10 decomposed items of personal norms and media norms were subjected to the Principle Component Analysis (PCA) inspection of the Kaiser-Meyer-Olkin (KMO) value which was of 0.878 showing that sampling adequacy for factor analysis was appropriate. The Barlett's Test of Sphericity also reached statistical significance, supporting the factorability of the correlation matrix.

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Table 5.20 PCA Result: Factors Underlying Normative Belief of IB

	COMPONENT	
	Personal Norms	**Media Norms**
MCPER1	.842	
MCPER2	.820	
MCLEDR3	.852	
MCLEDR4	.856	
MCEMPLY5	.813	
MCEMPLY6	.773	
MCMEDIA1		.875
MCMEDIA2		.877
MCPRFS3		.674
MCMEDIA3		.873
Eigenvalue	**6.161**	**1.464**
Variance explained	**61.606**	**14.637**
Cronbach's Alpha	**.936**	**.863**

(a) Total Variance Extracted by the two factors 76 %; KMO = 0. 878; Barlett's Test <.001
(b) Extraction Method: Principal Component Analysis;
(c) Rotation Method: Varimax with Kaiser Normalization.

Factor analysis of PCA was conducted on the items after the process of multiplying each belief item by each motive item to get the decomposed output of the normative belief. The result of the analysis indicates that:

i.   Respondents involved in the study sample distinguished the variation between the two dimensions of normative beliefs that are in line with Rogers' (1995) two types of communication channel.

ii.   The assessment of the normative belief construct according to respondents, seemed to be measured through two dimensions; personal normative belief and media normative beliefs.

Furthermore, the correlation matrix revealed the presence of many coefficients exceeding .3 as well as the PCA presented in Table 5.20 showed the presence of two components underlying respondents' normative beliefs with eigenvalues exceeding 1, which both explained 76 % of the total variance. The first factor which grouped personal norms and involved six items, explained 61.61 % of the variance while the second factor grouped the media norms items which explained 14.64 % of the variance. Both components had loadings of .5 and above.

An examination of the screeplot revealed a clear break after the second component. Using Catell's (1966) scree test, it was decided to retain two components for further analysis. This was supported by the result of Parallel analysis, which showed only two components with eigenvalues exceeding the corresponding criterion values for a random generated data matrix of the same size (10 variables × 369 respondents). The Varimax rotation solution revealed that both components demonstrated a number of strong loadings with all variables loading substantially on only one component. The interpretation of the two components was consistent with previous research of Rogers (1995). The result of this analysis supports the use of personal norms items and media norms items as separate scales as suggested by Rogers (1995) and its applicability to the context of IB, as suggested by the scale authors (Taylor & Todd, 1995b; Pedersen, 2005 and Battacherjee, 2000).

III. Factors Analysis of Control Belief

The coding of items related to the IB control belief (salient belief) included the individual's expectations of salient self-efficacy of using IB (7 items), and the belief that deals with the presence or the absence of government support to use IB (4 items), technology facilitating conditions (3 items) and resources facilitating conditions (5 items).

According to Ajzen (2002), the belief-based measures approach have the advantage of providing an insight into the cognitive foundation underlying perceptions of behavioural control. In this approach, two sets of questions can be posed with respect to each. Respondents can be asked to indicate (a) the perceived likelihood (strength of control belief), and (b) the power to facilitate performance of the behaviour (power of control belief). Table 5.21 shows the coding of these constructs as follows;

Table 5.21 The Coding of Items and Constructs of the Control Belief of IB

Constructs Coding	Items Coding	Items' Statements
Self-Efficacy (SE)	Se1	I am confident that I could learn Internet Banking applications
	Se2	I feel comfortable using computers in general
	Se3	I feel comfortable using the Internet.
	Se4	My current skills in using the Internet enable me to do everything that I want.
	DSE1	I feel comfortable using IB on my own and for me this aspect is important. (contblf1*pf1)
	DSE2	Can easily operate IB from bank's website on my own and for me this aspect is important (contblf2*pf2).
	DSE3	Can use IB without others' help and for me this aspect is important. (contblf3*pf3)
Government Support (GOVSP)	FGS1	Government support e-commerce (govs1*govs2)
	FGS2	Government endorses e-commerce (govs3*govs4)
	FGS3	Setting up the facilities to enable e- commerce (govs5*govs6)
	FGS4	Government promotes e-commerce (govs7*govs8)
Technology Facilitating Condition (TFC)	FT6	Facilitate bank's IB transactional websites to use IB (tav11*tav12)
	FT7	Facilitate a good quality of Internet connection to use IB.(tav13*tav14)
	FT8	Facilitate high quality of Internet wireless to use IB. (tav15* tav16)
Resources Facilitating (RFC)	FT1	Have the computers, Internet access and applications needed to use IB. (tav1*tav2)
	FR1	Facilitate computers for everyone to use IB services. (rav1* rav2)
	FR2	Facilitate the accessing Internet for low prices attainable to use IB. (rav3* rav4)
	FR3	Facilitate IB availability then I would be able to use IB when I need it. (rav5* rav6
	FR4	Have the time to set up IB services. (rav7*rav8)
	FR5	Have enough money to use IB services. (rav9*rav10)

A principal components analysis was followed by oblique rotation, due to the fact that an oblique factor solution can provide a good fit to the data (Ajzen, 2002). Oblique rotation was chosen as some correlation was expected among the variables. A factor loading of .3 was used as a lower cut-off value as recommended for exploratory analysis (Pallant, 2005). The factor correlation matrix, after oblique rotation, showed no correlations greater than 0.30 indicting that the oblimin rotation was reasonable. As shown in the component correlation matrix in Appendix (VI-G), the correlations between the components are quite low, so in this thesis very similar solutions expected

either by conducting Varimax or Oblimin rotation (Pallant, 2005). As shown in Table 5.22, the control belief structure is decomposed into two dimensions: self-efficacy and facilitating conditions.

Table 5.22 PCA Structure Matrix Result: Control Belief

Item a×b	Component				
	Self-efficacy	Government	Resources	Technology	5
DSE2	.769				
DSE1	.762				
DSE3	.587				
FT1	.754				
FR5	.752.				
FR4	.737				
FGS3		.815			
FGS1		.807			
FGS4		.806			
FGS2		.774			
FR3			.734		
FR1			.673		
FR2			.638		
FT7				.845	
FT8				.783	
FT6				.770	
FT5			.425		
FT2			.421		
FT3					-.770
Eigenvalues	5.684	1.903	1.660	1.351	1.115
Variance explained	28.418	9.517	8.302	6.753	5.573
Cronbach's Alpha	0.85	.82	.60	.70	-

(a) Total Variance Extracted by the four factors 58.56 %; KMO = 0.858; Barlett's Test <.001
(b) Extraction Method: Principal Component Analysis;
(c) Rotation Method: Oblimin with Kaiser Normalization

The facilitating conditions construct is further broken down into three other dimensions, which include the resource facilitating condition and the technology facilitating condition. The result of the analysis indicates that:

I. Respondents involved in the study sample distinguished the variation among the four dimensions of control beliefs whereby these findings are moderately close to the TPB classification of control belief.

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II. The assessment of control belief constructs, according to the respondents, seemed to show there are items which coincide partially. According to Ajzen's (2002) study, it was demonstrated that there was considerable overlap between control beliefs that predicted controllability (facilitating) and self-efficacy.

III. Ajzen (2002) pointed out that measures of PBC have often lacked high internal consistency.

IV. The findings also show that PCA is significantly appropriate with a Kaiser-Meyer-Olkin Measure (KMO) of the sampling adequacy of 0.858.

5.4.4 Factors Analysis of UIBR Variables

Table 5.23 The Coding of Items and Constructs of User Informational Based

Constructs Coding	Items Coding	Items' Statements
Experience (EXPER)	YUI	Years of using Internet
	YUC	Years of using computer
	YUPB	Years of using personal banking services
	EXPR01	Great deal of experience using computer
	EXPR02	Great deal of experience using Internet
	EXPR03	Great deal of experience using personal banking services
Knowledge (KW)	KNOW02	Using the Internet Banking
	KNOW03	Resources are available.
	KNOW04	Usage requirement
	KNOW05	Know how this innovation is better than what we have now.
Awareness (AW)	AW1	Know what Internet Banking is.
	AW2	Concern about Internet Banking.
	AW3	Occupied with other things.
	AW5	Learning Internet Banking.
Exposure (EXPOS)	EXPOSE01	Advertisements about IB.
	EXPOSE02	Previous use of IB.
	EXPOSE03	Other's recommendation.

Table 5.23 presents the coding of items related to User Informational-Based Readiness (UIBR) to use Internet banking which include individual's assessment of their experience of IB related technology (5 items), IB Knowledge (4 items), IB awareness (4 items), and their IB exposure (3 items).

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Prior to performing PCA, the suitability of the data for factor analysis was assessed. Then the 24 items expected to capture the potential adopter's readiness (UIBR) were subjected to Principal Component Analysis (PCA). The underlying components that *summarize* the necessary information needed by the study on UIBR were obtained by utilizing the factor analysis techniques. The required components with respect to awareness; exposure, experience and knowledge of Internet Banking were extracted. Inspection of the correlation matrix revealed the presence of many coefficients of .3 and above. Factors with eigenvalues of more than or equal to one were extracted. These factors are rotated using the orthogonal approach with the Varimax method. The Kaiser-Meyer-Olkin (KMO) value was .859, exceeding the recommended value of 0.5, According to Malhotra (2004), Barlett's test of Sphericity reached statistical significance, supporting the factorability of the correlation matrix.

The PCA Results presented in Table 5.24 revealed the presence of five components with required eigenvalues exceeding 1, explaining 30.2 percent, 15.8 percent, 7.1 percent, 5.2 percent, 4.9 percent and 4.3 percent of the variance respectively. An inspection of the screeplot revealed a clear break after the fourth component. It was decided to retain the six components for further investigation. This was supported by the result of parallel analysis, which showed that the eigenvalue of component 6 obtained by PCA did not exceed the corresponding criterion value for a randomly generated data matrix of the same size (24 variables × 369 respondents).

Table 5.24 PCA Result of Factors Underlying UIBR Construct

Variables	Component					
	BI	**KW**	**EXPRT**	**AW**	**EXPOS**	**Banking**
	1	**2**	**3**	**4**	**5**	**6**
int1	.860					
int2	.863					
int3	.849					
int4	.653					
int5	.831					
know01		.367				
know02		.803				
know03		.911				
know04		.895				
know05		.796				
YUI			.793			
YUC			.753			
expr01			.723			
expr02			.787			
aw1				.719		
aw2				.757		
aw3				.698		
aw5				.574		
Expose01					.502	
Expose02					.811	
Expose03					.833	
YUPB						.895
expr03			.386			.521
aw4	-.398					
Eigenvalue	**7.249**	**3.805**	**1.697**	**1.258**	**1.169**	**1.036**
Variance explained	**30.203**	**15.852**	**7.072**	**5.241**	**4.870**	**4.316**
Cronbach's Alpha	**.90**	**.90**	**0.87**	**0.71**	**.75**	**.421**

a) Total Variance Extracted by the four factors 67 % ;KMO = .859; Barlett's Test <.001
b) Extraction Method: Principal Component Analysis;
c) Rotation Method: Varimax with Kaiser Normalization

Varimax rotation was used to simplify the factor structure. That is, a given variable should have a high loading on one factor and near zero loadings on other factors. In other words, the variables for a factor are selected only when the absolute size of their factor loading is above 0.5. Interestingly, Table 5.24 shows components with a number of strong loadings and all variables loading substantially on their own component. This assists us in filtering variables assumed to assess customer's readiness for the Internet Banking by providing the desired four factors solution which explained the total variance of 67 percent of the variance of UIBR. The interpretation of the four

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components was consistent with previous research on the knowledge and awareness instrument of Hall et al. (1977), with previous research on experience (Venkatesh et al., 2003; Venkatesh & Davis, 2000 and Legris et al., 2003) and with previous research on exposure (Khalifa & Cheng, 2002 and Chang, 2004). The results of this analysis support the use of experience items, knowledge items, awareness items and exposure items as separate scales as suggested by the scales authors. A summary of the factor analyses procedures is presented in Table 5.25 below.

Table 5.25 Summary of Factor Analyses Procedures

Construct	KMO	Bartlett test of Sphericity	Observation
BI	0.849	Chi-Square =1439.288, df =10, Sig, 0.000	One component was extracted.
Direct Determinants of BI	0.921	Chi-Square= 4158.144, df =105, Sig, 0.000	Three components were extracted.
Attitudinal beliefs (IB attribute)	0.923	Chi-Square =7803.478, df = 276, Sig.000	Four factors representing the attributes of IB were obtained. All items belonging to compatibility departed and loaded themselves on the relative advantage items.
Normative belief	.878	Chi-Square 3380.604, df= 45, Sig.0.000	Two components were extracted although an item that was meant to measure perception on the profession norms was perceived as a measurement for media interaction norm
Control belief	.858	Chi-Square 2414.810, df 190 Sig. 0.000	Four components were retained
Self-efficacy	.885	Chi-Square = 2303.546, df 28, Sig. 0.000	One component was extracted
UIBR	.859	Chi-Square= 5045.742, df 153, Sig.0.000	Six components were extracted

The sampling adequacy was confirmed by the statistical findings of the interdependence tests of factor analyses procedures as displayed in the preceding Table 5.22. The values of the KMO measure of sampling adequacy for the study sets of variables are within the range of (0.923 to 0.859) whereby this study-sampling adequacy would be labelled as

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'meritorious'. Since the KMO meets the minimum criteria, the anti-image correlation in general meets requirement.

5.4.5 Treatment and Justification of Problematic Items

In the previous initial data analysis conducted to check reliability and factor analysis, the statistical assumptions for conducting factor analysis and hierarchical multiple regressions were met. For both statistical analyses, the requirements for the use of sample size of (200+) have been met in this study. The missing data problem in some variables has been dealt with by substituting them with the statistical mean because there are not many and they are below the cut-off standard mentioned by Malhotra (2004). Thus, the whole set of these cases is considered valid for analysis as discussed earlier in section 5.1.2.

The preliminary data analysis on the reliability check reveals that there are some problematic items. In checking the overall reliability of IB characteristics items, an item like (OBS07) was found to be negative to the total correlation. Moore & Benbasat (1991) suggested not including items which had item –scale correlations of less than 0.40 (see note C from Moore & Benbasat, 1991). Furthermore, all items selected to measure observability (OBS01-OBS07) were checked for internal consistency test. This test reveals that corrected item to total correlation values are (-.063) and (.109) for OBS03 and OBS07 respectively. Both values had item –scale correlations of less than 0.40 and even for the OBS03 the value is negative. Inspection of the internal consistency of items measuring the ease of use construct reveals, ss well as another two items, showed that EOU5 (Item-Total Correlation value = .171) and EOU6 (Item-Total Correlation value = -.051) had the lowest corrected item to total correlation. Statistically, in order to improve the reliability of the IB scale in this study, all these

items of OBS07, EOU5 and EOU6 were discarded from any further analysis (Moore & Benbasat, 1991).

The variable EOU6 was found also to be below satisfactory loading by the scale's author during the second round of factor analysis (see Appendix 4 for Moore & Benbasat, 1991). Moore & Benbasat (1991) suggested using the variable EOU5 (which was expected to measure the ease of visibility of using IB as availability) in short scales. Similarly, it was noted that inclusion of the variable EOU5 is very weak in loading as Moore & Benbasat (1991) found.

The variable (know01) which is relevant to the scale measuring respondents IB's Knowledge was loaded on its factor but loading was (.390) which is below the cut-off (0.5). Therefore, it was retained in the scale. This solution is supported by Tabachink and Fidell (2007) as well as Bryman & Cramer (2001).

The item (AW4) seems not relevant to be the construct awareness in the context of IB. Practically, a closer examination of this item indicates that its semantics were somewhat different from those of the remaining scale items. For instance, AW4 (see Table 5.5) measured persons' awareness of IB through their concerns that are given to "things in IB" while the remaining awareness (AW1, AW2, AW3, and AW5) items were simply addressing their overall concern and awareness of IB. Therefore, to establish and have a well-validated scale of awareness this item was dropped from the scale (Pallant, 2005).

Although, the first reliability test on items expected to underlie belief on facilitating resource was found to be below the satisfactory reliable scale (0.6301). This can be accepted since Ajzen (2002) mentioned that measures of PBC have often lacked high internal consistency. Contrary to our expectations, the result of factor analysis revealed that there are three items (FT1, FR4, and FR5) which loaded together with all three items of the self-efficacy forming the first component that explains 28.418 percent

of the variance in PBC. The study investigated these three variables (FT1, FR4, and FR5) and decided to retain them as measurements of the Self-efficacy scale. The possible explanation as to why these variables are retained as the self-efficacy scale could be due to Armitage and Conner (1999 a,b) and Trafimow et al. (2002) who come up with the evidence that PBC is a multidimensional construct. In addition, Ajzen (2002) pointed out that it will be sufficient to compute a single overall index of PBC, but at other times, the objectives of a research programme may require separate measures of self-efficacy and controllability.

The possible explanation to retain these variables could be logically based on the fact that the FR4 and FR5 and FT1 render themselves to be more relevant as a self-efficacy group rather than being resource and technological items. Practically, the study could suggest that individual self-efficacy could be measured if there is an understanding as what extent individuals perceive the availability of computers, Internet access and applications, needed to use IB (FT1), have the time to set up IB services (FR4) and have enough money to use IB services (FR5). In other words, in developing and non-western countries like Yemen, these three variables could by considered as very relevant to individual self-efficacy rather than being part of the resource and facilitating technology. Moreover, the inclusion of these three variables raises construct reliability and validity. Component one with its loaded items was tested again for reliability and the result was shown that internal consistency reliability with Cronbach's alpha of .85 was obtained.

5.4.6 Assessment of the Constructs Reliability and Validity

Having conducted the data reduction method of factor analysis, the results obtained revealed that some constructs were successfully distinct from other constructs by the items measuring them (discriminant validity). Also, the items measuring a

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construct were reduced through the process of PCA. This study has to re-assess the construct's new items suggested by factor analysis for summated process and create a new representative variable. Table 5.26 provides the summary of reliability tests carried out on the entire study's constructs.

Table 5.26 Summary of Second Reliability Test (Cronbach's alpha)

Variables	No. of Items	Cronbach's Alpha
Variable – Behavioural Intention	**5**	**.91**
Dimension		
1. Behavioural Intention	5	.91
Variable – Psychological Determinant	**15**	
Dimension		
1. Attitude	4	.91
2. Subjective Norms	6	.93
3. PBC	5	.90
Variable – Readiness	**15**	
Dimension		
1. Exposure	3	.75
2. Experience	4	.87
3. Awareness	4	.71
4. Knowledge	4	.90
Variable – Behavioural Beliefs on IB	**20**	**.91**
Dimension		
1. Relative Advantages/ Compatibility	8	.94
2. Ease of Use	4	.93
3. Trialability	3	.88
4. Observability	5	.87
Variable – Normative Beliefs on IB	**10**	
Dimension		
1. Personal Norms	6	.94
2. Media Norms	4	.86
Variable – Control Beliefs on IB	**24**	
Dimension		
1. Self-Efficacy	6	.73
2. Government Support	4	.82
3. Technology Facilitating	8	.66
4. Resource Facilitating	5	.63

Study's Constructs Scale Variables Using (7-point Likert Scale, n =369)

The measurement scales used in this study for measuring the four main study constructs were reliable and yielded consistent results with high Cronbach's alpha values of 0.91 for Behavioural Intention, 0.91 for Attitude, 0.93 for SN and 0.90 for

PBC. Admittedly, the possible explanation for the high values of Cronbach's alpha coefficients obtained in the four constructs could be that these constructs are well established and their reliability has been tested previously in several information systems studies in different settings. There are two reliability tests performed and shown in Table 5.26. The first reliability test was performed with the construct as proposed in the study framework, while the second reliability test was performed based on items extracted by the factor analyses procedures.

With respect to the normative belief, results show that the scales used to measure personal interaction norms are statically reliable and yield a consistent result with Cronbach's alpha of (0.94) and the Cronbach's alpha of the media interaction norms scale was 0.8632, which also yield satisfactory internal reliability of the construct. Findings' pertaining to the evaluation of the four dimensions belonging to the control belief dimensions show that the self-efficacy scale has the coefficient alpha of 0.85 and government support of 0.82. Both were above the recommended Cronbach's alpha. These two constructs yield satisfactory internal consistency reliability. For the technology support, this ends with the four items, all of which achieved the standard level of internal reliability with Cronbach's alpha of 0.70. With respect to the facilitating resource construct primary test and test after factor analysis process, this indicates that the construct scale has unsatisfactory internal consistency reliability with a Cronbach's alpha of 0.60.

Concerning the measurement pertaining to UIBR, three items found significant reliability in measuring respondents' exposure to IB with coefficients alpha of 0.75. Also, the six items measuring respondents' experiences were found to be significantly reliable with a Cronbach's alpha coefficient of 0.80. The Cronbach's alpha coefficient for the scale of awareness of IB after the removal of the item (AW4) increased marginally to 0.71. Lastly, the five items involved in measuring the respondents'

knowledge related to IB were found to be significantly reliable with the Cronbach's alpha coefficient of 0.85.

5.5 Validity Test

This study examines the validity of research constructs based on the content validity as well as construct validity. Construct validity considered in three tests suggested by Hair et al. (2006, p.139): (1) Convergent validity, scale correlates with others like scales meaning the homogeneity of constructs and (2) discriminant validity, scale is sufficiently different from other related scales. This study will examine the predictive validity of the model in the context of intention to allow for a comparison of the models. This study is going to highlight these validity tests and discus them in the following sections.

5.5.1 Content Validity of Measures

Content validity or, as it is named by some authors like Malhotra (2004), face validity, was defined by Hair et al. (2006, p.102) as "the assessment of the degree of correspondence between the items selected to constitute a summated scale and its conceptual definition". In general, face validity according to Zikmund (2003), refers to the subjective agreement among professionals that a scale logically appears to reflect accurately what it purports to measure. In this study, face validity was assumed through cautious selection and adaptation of standard items of the questionnaire. Most of the questionnaire items have been used in different studies and have been tested for reliability and validity, in the context of IS and IB that use the content validity of the IB questionnaire. In this study, content validity has been assumed and instrument items were documented by citing those study's questionnaires which utilized them first. For

instance, Venkatesh et al. (2003), Hall et al. (1977), Tan & Teo (2000) and Taylor & Todd (1995a, b) as highlighted in section 4.4.1. Furthermore, the survey was pre-tested by seven academicians with expertise in survey research, businessmen, and by eighteen postgraduate students with banking experience. The feedback from the pre-test resulted in some restructuring and refinement of the survey to improve its quality and content validity. One of the main purposes of conducting the pre-test was also to investigate question wordings. Sutton et al. (2003) found that using different question wordings for the open-ended questions may result in different kinds of salient beliefs. This was in agreement with Sutton et al.'s (2003) recommendation that researchers who use the theory of planned behaviour (TPB) to investigate the determinants of a given behaviour should first conduct an elicitation study to identify the modal salient beliefs in the target population.

5.5.2 Constructs Validity of Measures

Constructs validity according to Hair et al. (2006) is the "extent to which a set of measured variables accurately represent the concept of interest or construct they are designed to measure". In other words, it refers to how well a questionnaire measures what it claims to measure as reported by Malhotra (2004). The above forms of validity, according to Sekaran (2003), can be established through correlation analysis and factor analysis. The construct validity, according to Malhotra (2004), includes convergent, discriminant and nomological validity which are the most widely accepted forms of validity as highlighted by Hair et al. (2006). These three types of the study's measurement validity will be discussed as follows;

A. Convergent Validity of Measures

In the context of IB, convergent validity, according to Chau and Lai, (2003), can be assessed by factor loading. Validity of the measures used for research constructs was evaluated using the orthogonal method of factoring with Varimax rotation. The results of the factor analysis confirmed that all the items converged on their hypothesized dimensions.

I. Along these lines, all the items in the direct layer converged on their hypothesized dimensions forming three distinct construct of attitude, SN, PBC which are applicable to the research context and the conceptual definition that specifies the theoretical basis for the summated scale Hair et al., 2006, p.136).

II. Similarly, the items in the indirect layer, which related to the attributes of IB as perceived by individuals (4 constructs), reached the validity requirements as discussed previously in the factor analysis.

III. All items of normative belief converged into two dimensions (2 constructs) as proposed, thus showing that the validity of this construct did not violate the validity test.

IV. The four dimensions belonging to control belief constructs in this study may fail to achieve validity because there is some overlapping among the items related to the 4 factors extracted excluding items relevant to the government support factor which all converged in their hypothesized proposed factor.

V. In addition, the items in UIBR converged on their four hypothesized dimensions. In view of that, the results appear to demonstrate satisfactory levels of validity whereas convergent validity was confirmed because all indicators loaded only on their expected constructs when they were judged by factor loadings of .50 and above.

B. Discriminant Validity of Measures

Discriminant validity, defined by Malhotra (2004 p.269), as "the extent to which a measure does not correlate with other constructs from which it is supposed to differ". in other words, Anandarajan et al. (2000) defined it as the degree to which items differentiate among constructs or measure distinct concepts. Along these lines, respondents of this study were able to;

I. Discriminate the variation among all the items in the first layer of independent variables according to their hypothesized dimensions forming three distinct constructs of attitude, SN, and PBC (see section 5.4.2 and Table 5.14 page 239).

II. Discriminate the variation among all the items in the second layer of IB attributes as independent variables according to their five distinct hypothesized dimensions (See section 5.4.3 and Table 5.16, page 253).

III. Discriminate the variation among all the items in the second layer of IB normative belief as independent variables according to their two distinct hypothesized dimensions. (See section 5.4.3 and Table 5.19 page 258)

IV. Discriminate the variation among all the items in the second layer of IB control belief as independent variables according to their two distinct hypothesized dimensions (See section 5.4.3 and Table 5.22, page 262).

V. Discriminate the variation among UIBR dimensions as valid variables according to their four distinct hypothesized dimensions (See section 5.4.3 and Table 5.24 page 265).

In other words, convergent and discriminant validity is inferred when construct relevant items load much higher on their hypothesized factor than on other factors. In addition, own-loadings are higher than cross-loadings if they exist.

CHAPTER CONCLUSION

In this chapter, an assessment of the internal consistency of the measures has been performed using Cronbach's alpha and the results showed the reliability of the measures used. An assessment of factorial validity was performed using factor analysis techniques. The convergent and discriminant validity of the research instruments were tested and results showed that the validity assumption seemed not to be violated. Similarly, this chapter involved the analysis and assessment of the multivariate assumption of normality, examination of residual, multicollinearity, linearity, homoscedasticity and outliers. The next chapter is going to discuss the current study's findings and results. It will discuss the descriptive behaviour of the IB adopters, and the statistical techniques of regression will be run to test the research hypothesis as well as the study's model development. Path analysis will be used to test the full effects model and identify significance paths. The analysis of Yemeni banks' websites will be provided in the light of the concepts discussed previously in Chapter 2.

CHAPTER SIX: FINDINGS AND DISCUSSION

6.1 Behaviour of IB Adopters

The descriptive statistical analysis employed in this study is to show the sample population characteristics for a further understanding of the behaviour of the IB adopter. using the simple techniques of measuring sample tendency (e.g. analysis of average, frequency, percentage, standard deviation of data value for variables in relevant to respondents' profile, usage of technologies, IB services ranking, respondent's willingness toward IB and banking difficulties).

6.1.1 Behaviour of IB Adopters in Using Technologies

Eriksson et al. (2005) pointed out that frequency of technology use as well as the duration of the experience with the technology has been found to capture the consumer's use of a technology. Table 6.1 shows the distribution of the sample in terms of four technologies expected to be related to the adoption of IB.

Table 6.1 Behaviour of IB Adopters in Using Technologies

	Statement	Responses	*Freq.*	*%*
Q1	**Do you use banking services?**	**Yes** **No**	**369** **0**	**100** **0**
Q1.2	**How long have you been using computers?**	**Never** **1-4 Years** **5-8 Years** **9 Years >**	**30** **69** **127** **143**	**8.1** **18.7** **34.4** **38.8**
Q1.3	**How long have you been using Personal banking services?**	**Never** **1-4 Years** **5-8 Years** **9 Years >**	**7** **105** **107** **150**	**1.9** **28.5** **29.0** **40.7**
Q1.4	**How long have you been using ATM services?**	**Never** **1-4 Years** **5-8 Years** **9 Years >**	**141** **192** **24** **12**	**38.2** **52.0** **6.5** **3.3**

The preceding Table 6.1 shows that the entire sample (N=369) uses the services of the banks represented by a percentage of 100 % which helps to achieve the purpose of the study. It also shows that accumulated percentages of 79 % have been using the Internet while the rest (21 %) have not used it yet. More than one third (36.3 %) of banks' client respondents had experienced using the Internet for an average duration of from one to four years. The distribution of the sample population shows that only 8.1 % have still not experienced the computer while the rest of the sample (91.9 %) have used this kind of technology. Findings also show that 38.8 % of the sample have been using computers for more than eight years. Previous research examining the use of e-rail conducted by Ba-Alawi's (2004) found that 81 % are not familiar with the Internet and 19 % are familiar with the computer. Therefore, this low percentage of individual's familiarity with both computer and the Internet contributes to the lower the rate of e-rail usage in Yemen. In terms of using personal banking services, Table 6.1 shows that 1.9 % had never used personal banking services while the rest had used them and 40.7 % of them had been using bank services for 9 years and above. With respect to the usage of computers, 8 % of the whole sample indicated that they had not used the computer yet. Meanwhile, 73 % of them have been using computers for a period 5 or more years. The distribution of the sample population shows that more than half of the respondents (52 %) have been using ATM technology for a period of between 1 to 4 years while 38.2 indicated that they had not used it yet. Statistical findings on ATM use show that ATM technology is the least common technology experienced in terms of time by the sample of respondents. In order to further understand the behaviour of IB adopters use frequencies were considered here to understand to what extent the introduced technologies had been experienced by the sample. This was also used to understand the behaviour of both users and the potential adopters of IB towards IB technologies.

Specifically, the use of seven technologies was examined and responses shown in Table 6.2 as follow;

Table 6.2 Technology Usage

Questions*	Responses						
	Never	1<a month	1 = a month	1> a month	1> a week	1> day	Total
Computer	28 (7.6%)	13 (3.5%)	5 (1.4%)	26 (7.0%)	52 (14.1%)	245 (66.4%)	369 (100%)
Banking Services	13 (3.5%)	43 (11.7%)	43 (11.7%)	106 (28.7%)	99 (26.8%)	65 (17.6%)	369 (100%)
Internet	82 (22.2%)	34 (9.2%)	17 (4.6%)	48 (13.0%)	79 (21.4%)	109 (29.5%)	369 (100%)
ATM	143 (38.8%)	22 (6.0%)	32 (8.7%)	107 (29.0%)	58 (15.7%)	7 (1.9%)	369 (100%)
SMS Banking	299 (81.0%)	16 (4.3%)	12 (3.3%)	15 (4.1%)	10 (2.7%)	17 (4.6%)	369 (100%)
IB	318 (86.2%)	14 (3.8%)	11 (3.0%)	15 (4.1%)	6 (1.6%)	5 (1.4%)	369 (100%)
e-rail	325 (88.1%)	15 (4.1%)	12 (3.3%)	8 (2.2%)	6 (1.6%)	3 (.8%)	369 (100%)

The percentage and the figure above are its relevant frequency

Table 6.2 indicates that the majority of the sample respondents had never used e-rail (88.1 %), had never used IB (86.2 %), and had never used SMS banking (81.0 %). Respondents who claim never to have used ATM services were represented by 38.8 %, and the Internet (22.2%). Technologies more frequently used were the computer (66.4% daily). This was followed by the Internet and the Banking services technology (30 % and 18 %). Table 6.2 shows three technologies used the least based on the respondents' responses to the survey in which the majority of the respondents reported never having used them represented by proportions ranging from 81.0% to 88.1 % for the three technologies of e-rail, IB, and SMS banking. The finding is useful to motivate research to identify and address the issue of why respondents in the current study exhibited a lack of use of those technologies. It was noted that the technologies of e-rail, IB, and SMS banking are new to Yemeni customers. It seems that the customers could still lack the awareness, experience, exposure and knowledge to deal with these banking

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innovations. In terms of e-rail, evidence is drawn from this study's finding pertaining to e-rail usage and from similar findings of Ba-Alawi's (2004) study who claimed that the lack of e-rail use is due to the people's lack of awareness of the existence of this service in Yemen. The e-rail providers should make a greater effort to promote it to the public. In terms of IB, this study found that respondents with a low level of awareness, experience, knowledge, and exposure of IB are either rejecters or late adopters. Therefore, the low percentage of IB actual users could be due to the readiness factor addressed by this study. It is also indicated that users of PCs and the Internet are found to be IB adopters and that respondents who are not users of PCs and the Internet are also not actual users of IB. In terms of SMS banking, similar to IB respondents, those with low levels of awareness, experience, knowledge, and exposure to IB are either rejecters or late adopters.

6.1.2 Analysing and Ranking IB Services

Some services that could be offered through IB were evaluated in order to understand to what extent these services are of importance to customers provided through IB. Table 6.3 presents specified data on the mean scores and standard deviation obtained from the sample of about 15 IB services. Then the descriptive comparison was carried out and rankings applied.

Table 6.3 IB Services Ranking by Respondents

IB Services*	Rank	Mean	S.D
• Outstanding balance	1	6.19	1.54
• Print account statement	2	5.92	1.75
• Exchange rate	3	5.91	1.64
• Utilities payment	4	5.68	1.90
• Stop payment on cheque	5	5.49	2.10
• Transactions inquiry	6	5.44	1.95
• Fund transfer between accounts	7	5.36	2.10
• Credit card and ATM card	8	5.17	2.12
• Web-shopping	9	5.17	2.10
• Set-up new bank account	10	5.10	2.17
• Cheque book order	11	5.03	2.11
• E-Phone banking	12	4.71	2.17
• Provide LC and other relevant services	13	4.63	2.21
• Change password and user id	14	4.52	2.25
• Bank interest rate	15	4.31	2.46

* IB Services evaluated using items of 7-point Likert Scale (see Appendix II)

Comparing the mean shows that services such as inquiring about outstanding balances, printing account statements, inquiring about exchange rates, utilities payments, enabling a customer to stop the payment on an undesired cheque, were all the top five online services in the ranking. Services such as online inquiry about bank interest rates were demonstrated as not being an important service with mean score (μ= 4.31) while inquiring about outstanding balance service was the most widely used service and considered to be important by respondents scoring a mean (μ = 6.19). Furthermore, both potential adopters and users of IB were assessed in terms of their preferences for IB services. The following Table 6.4 explains the differences between the two groups of bank customers.

Table 6.4 Ranking Two Groups of IB Services Customers

IB services	Potential Adopters of IB			Active Users of IB		
	Rank	*Mean*	*S.D*	*Mean*	*S.D*	*Rank*
Outstanding balance	1	6.18	1.56	6.26	1.41	1
Print account statement	3	5.88	1.82	6.16	1.22	2
Exchange rate	2	5.90	1.67	5.98	1.48	3
Utilities payment	4	5.64	1.94	5.90	1.56	5
Stop payment on cheque	5	5.46	2.13	5.64	1.84	9
Transactions inquiry	6	5.39	2.01	5.74	1.52	7
Fund transfer between accounts	7	5.31	2.12	5.70	1.66	8
Credit card and ATM card	9	5.05	2.18	5.90	1.52	4
Web-shopping	8	5.13	2.17	5.41	1.35	10
Set-up New bank account	10	5.02	2.25	5.31	1.50	12
Cheque book Order	11	4.92	2.18	5.76	1.44	6
E-Phone banking	12	4.61	2.23	5.36	1.66	11
LC, BC, FCD Services	13	4.57	2.28	4.94	1.70	15
Change password and user id	14	4.43	2.32	5.06	1.71	14
Interest rate	15	4.19	2.49	5.06	2.11	13

Valid N for IB user (listwise) = 49
Valid N for IB Potential Adopter (listwise) = 313

This study noted that the four most popular services (shaded) are still considered the most important online services and seen as the most important services required by both groups. In contrast, both groups of respondents show a discrepancy in the other ten IB services but both groups agree that services on interest rates are not important as represented by the lowest mean for both groups.

6.1.3 Analysing Sample's IB Promptness and Banking Difficulties

The distribution of the sample population shows that the majority of the sample (89.4 %) confirmed they would use IB in the future while the rest (10.6 %) do not intend to use it. The result shows that 47.4 % of the entire sample intends to use IB as soon as IB services are made available to them. Outstanding percentages were distributed amongst the other four categories. Statistically, the average duration for the entire sample to adopt IB fell between category 3 representing a duration of 12 months and category 4 representing six months ($\mu=3.53$ and standard deviation of 1.80).

The distribution of the sample population shows that respondents identified some common problems encountered during their previous use of banking services. Results presented in Table 6.5 show that Queueing and slow services are both common problems encountered with 69.6 % of the entire sample (μ=.69 and standard deviation of .46).

Table 6.5 Sample's IB Promptness and Difficulties

Statement	Responses	Statistics			
		Freq.	*%*	*Mean*	*S.D*
Q5 If Internet Banking services available to you, when do you intend to use them?	Soon	175	47.4	3.53	1.80
	After 6 months	60	16.3		
	After 12 months	42	11.4		
	After 18 months	10	2.7		
	After 24 months	43	11.7		
	Will not use	39	10.6		
Q7 Using traditional banking services at busy time of day you may encounter difficulties. Please, indicate any of the difficulties listed applicable to you?	Queueing	257	69.6	.70	.46
	Slow services	257	69.6	.70	.46
	No ATM	88	23.8	.24	.43
	Clearing cheques	44	11.9	.12	.33
	Rude teller	111	30.1	.30	.46
	Branches dealing	146	39.6	.40	.49
	Working hours	108	29.3	.29	.46
	Other	35	9.5	.10	.29
Q8 How often do you visit the bank?	Every day	117	31.7	3.45	1.46
	Once a week	100	27.1		
	Once a fortnight	43	11.7		
	Once a month	55	14.9		
	Less often	50	13.6		
	Never	4	1.1		

Customers also encountered problems when dealing with other branches represented by the percentage of 39 %. The distribution of the sample population shows that respondents' visit to the bank were disprondpontionately distributed. The result shows that more than a third of the sample (31.7 %) visits the bank every day followed by those who visit the bank weekly (27.1 %). Respondents who never visit the bank represented a very small fraction, while less than two-thirds of the respondents completed each of the remaining categories.

6.1.4 The IB–Decision Period

The IB–Decision Period, according to Rogers (1995, p.197), refers to the length of time required for an individual to pass through the innovation decision process. In line with Rogers' categorization of adopters, the behavioural intention of the participants in this study was also examined based on their adoption time reaction for identifying appropriate groups of adopters with similar characteristics. Rogers (1995) classifies innovation adopters into five categories: (1) innovators, (2) early adopters, (3) early majority, (4) late majority, and (5) laggards. This study identified respondents based on Adoption Time Reaction (ATR) formulated as those who will never use IB = 0 "rejecters", those who will use it within the period of 18-24 months considered "late adopters", within the period of 6-12 months considered as "early adopters" and "Innovators" for those adopters, identified with the intention to use IB soon or those who are currently users. Figure 6.1 displays the Innovation-Decision Period obtained by the study's sample. As shown in the diagram, rejecters and late adopters are those intending to use IB but in much, later than innovators or early adopters.
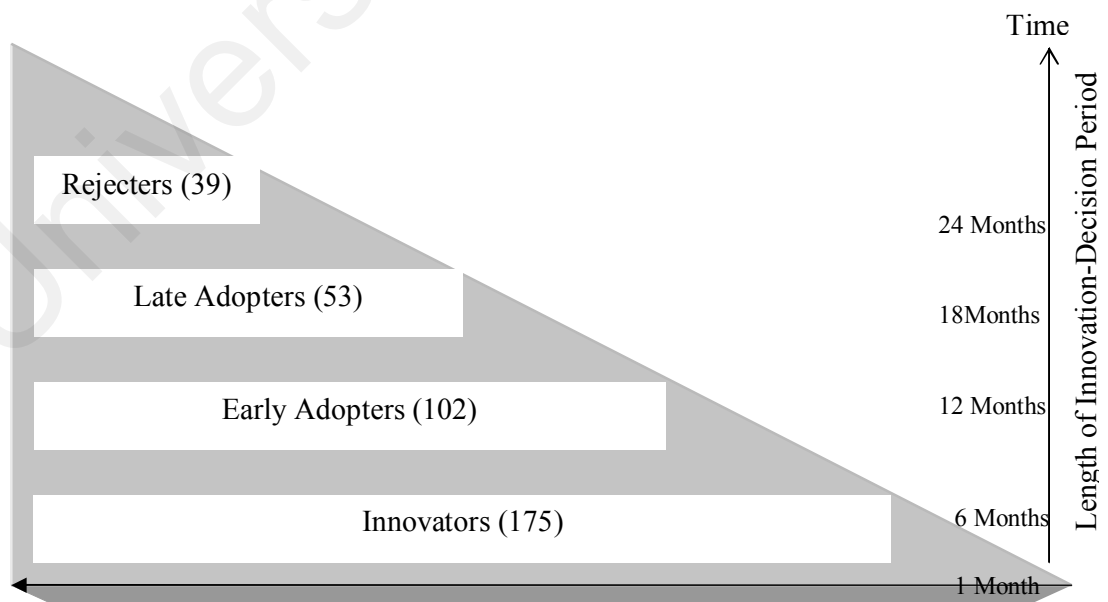
Figure 6.1 Adoption Time Reactions (ATR)

6.1.5 Comparison of Adopters vs. Readiness Dimensions

The Multivariate Analysis Of Variance (MANOVA) was conducted to compare those respondents who had an early intention to use IB with those who have the intention to react and use IB later. Three hundred and sixty-nine bank customers completed a questionnaire that measured their experience, knowledge, awareness and their previous exposure to IB. Since the study had no theoretical foundation for ordering the dependent variable in use for this analysis, step-down analysis is not carried out here. In turn, the assumption of homogeneity of regression is not required here. It was assumed that individuals who agreed to use IB earlier would have more positive awareness of IB, more knowledge that is positive, greater previous exposure to the IB and greater experience of IB.
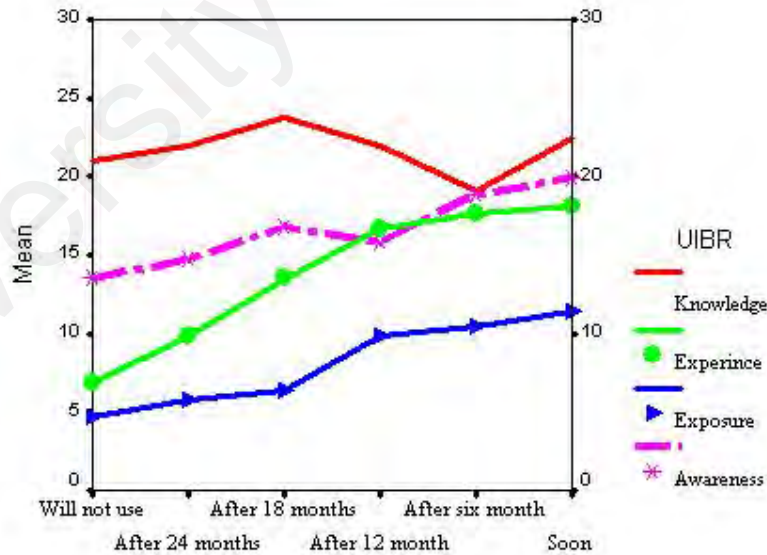
Figure 6.2 Respondents' IB Time to React Vs UIBR

In order to understand an individual's UIBR, a one-way between-groups multivariate analysis of variance was conducted. The four dependent variables were used: awareness, knowledge, experience, and exposure while the independent variable

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was adoption time reaction. Preliminary assumption testing was conducted to check for normality, linearity, univariate and multivariate outliers, homogeneity of variance-covariance, and multicollinearity, with no serious violation noted. There was a statistically significant difference between the six groups on the combined dependent variables: $F_{(20, 1194)} = 10.637$, $p = .000$; Wilks' Lambda=.581; Partial Eta Squared =.127. When the results for the dependent variables were considered separately, the difference that reach the statistical significance, using a Bonferroni adjusted alpha level of .013 were awareness ($F_{(5,363)} = 10.238$, $p = .000$, partial eta squared .124), exposure ($F_{(5,363)} = 23.579$, $p=.000$, partial eta squared .245), and experience ($F_{(5,363)}=32.962$, $p=.000$, partial eta squared .312). An inspection of the mean scores indicates that respondents scoring high averages of experience, exposure, and awareness are those most likely to react towards the adoption than the others with low averages. In addition, inspection of Box's Test of Equality of Covariance Matrices revealed that the homogeneity of variance is obtained at an alpha level of .001.

6.1.6 Comparison of Adopters' Overall Readiness

A one-way between-groups multivariate analysis of variance was conducted to explore the impact of the IB–decision period on readiness. Subjects were divided into four groups according to their time to react (innovators, early adopters, late adopters and rejecters). The independent variable was adoption time reaction. There was a statistically significant difference at the $P < .05$ level in readiness scores for the four ($F_{(3, 365)} = 72$, $p < .001$. The actual differences in mean scores were quite acceptable between the groups. Post-hoc analysis using the Bonferroni test indicates that the mean score for rejecter group (M=46.08, SD=11.92) was significantly different from the late adopter group (M=53.74, SD=11.50), Early adopters (M=65.32, SD=10.28) and Innovators (M=71.89, SD=12.21). The test of homogeneity of variances shows that

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Levene's value is not significant, greater than p=327 > 0.05 level. Therefore, the homogeneity of variance assumption is not violated for the overall readiness. (Refer to APPENDIX VII).

Table 6.6 Means and Standard Deviations of UIBR variables by Adopters

Adopters Category	Variables				
	Knowledge	*Experience*	*Exposure*	*Awareness*	*Readiness*
Rejecters					
M	21.03	6.82	4.69	13.54	46.08
SD	7.54	5.22	2.50	7.69	11.98
Late Adopters					
M	22.25	10.53	5.85	15.11	53.74
SD	5.99	5.74	3.95	6.46	11.50
Early Adopters					
M	20.27	17.25	10.20	17.60	65.32
SD	7.12	4.69	4.95	5.57	10.28
Innovators					
M	22.46	18.06	11.43	19.93	71.898
SD	6.28	5.63	5.40	5.91	12.218

6.1.7 Comparison of Adopters' Psychological Behaviour

A one-way between-groups multivariate analysis of variance was conducted to explore adopters in terms of their psychological behaviour: three dependent variables were used: attitude, SN and PBC, the independent variable being adoption time reaction. Preliminary assumption testing was conducted to check for normality, linearity, univariate and multivariate outliers, homogeneity of variance-covariance, and multicollinearity, with no serious violation noted. There was a statistically significant difference between the adopter group on the combined dependent variables: $F_{(9, 883.60)} =26$, $p = .000$; Wilks' Lambda=.56; Partial Eta Squared =.174. When the results for the dependent variables were considered separately, the differences that reached the statistical significance, using a Bonferroni adjusted alpha level of .017 were attitude ($F_{(3,365)} = 57.65$, $p = .000$, partial eta squared .321), SN ($F_{(3,365)}= 22.98$, $p=.000$, partial eta squared .159) and PBC ($F_{(3,365)}= 64.08$, $p=.000$, partial eta squared .345).

An inspection of the mean scores indicates that in terms of attitude, rejecters reported slightly higher levels of attitude (M=3.74, SD=1.05) than late adopters (M=3.14, SD=1.07), early adopters (M=2.28, SD=.82), and innovators (M=1.86, SD=.93). Table 6.7 displays the results as follows;

Table 6.7 Means and Standard Deviations of Psychological Determinants by Adopter's Categories

Adopters Category	Variables			
	Behavioural Intention	*Attitude*	*Subjective Norm*	*Behavioural Control*
Rejecters				
M	13.23	13.90	16.26	12.59
SD	7.93	7.10	10.72	7.12
Late Adopters				
M	18.49	18.00	18.79	15.58
SD	7.05	6.27	10.76	7.30
Early Adopters				
M	25.58	23.14	24.97	24.72
SD	4.85	3.71	9.31	6.40
Innovators				
M	29.35	24.69	27.98	26.25
SD	5.67	4.34	9.40	7.10

6.2 Hypotheses Testing Techniques

Performing the Preliminary analyses of components in previous sections assisted the researcher to understand the initial structure of the variables as well as to prepare the data for the next stage of multivariate analysis of testing the research hypotheses. In testing hypotheses, there are many statistical methods researchers can use. One of these methods is regression analysis techniques. This technique's appropriateness for testing the study's hypotheses as well as how it works will be highlighted in the following section.

6.2.1 **Regression Analysis**

The second step after having the factor analysis results is regression analysis which is identified by Hair et al. (2006) as a simple and straightforward dependence technique that can provide predictions and explanations to the researcher. It can be used to analyze the relationship between a single dependent (Criterion Variable) and several independent variables (Tabachnick and Fidell, 1983). The use of multiple regression is in line with the objective of this study as Hair et al. (2006) mentioned that the objective of using regression analysis is to use the independent variables whose values are known to predict the single dependent variable. In order to study the relationship between adoption predictors and behavioural intention towards using IB, this study utilized multiple regression analysis where the study statically examined these predictors (independent variables) against the dependent variable. In addition, this study utilizes multiple regression to test the hypotheses that linked the predictors with the criterion variables. The following equation shows the form of multiple regression for the variables used in this study as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_k X_k + e$$

The above equation, according to Malhotra (2004, p.512), is used to explain the result of multiple regression analysis, which is estimated by the following equation:

$$\hat{Y} = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_k X_k$$

Where Y is the responses on the criterion variable; $X_1, X_2, X_3 ... X_k$ are the predictor variables; $\beta_0, \beta_1, \beta_2, \beta_3 ... \beta_k$ are the partial regression coefficients; e denotes the error or residual assumed to be random and normally distributed with equal variances at every predictor variable X (Malhotra, 2004, p.512). As before, the coefficient represents the intercept, but the b_s are the partial regression coefficients. For instance, b_1 denotes the

change in the predicted value, $\hat{Y}$, per unit change in X_1 when the other independent variables have been, X_2 to X_k are held constant (Malhotra, 2004, p.512).

Regression Indictors

This study will use different types of multiple regression analyses, depending on the nature of the question the study wants to address. The three main types of regression analysis employed in this study are as follows;

- Standard or simultaneous;

- Hierarchical

- Stepwise

In the present study, Y represents the criterion variables of Behavioural Intention (BI), Attitude (ATT) or Subjective Norm (SN) or PBC (PBC) in their equations while the associated $X_1, X_2, X_{3\ldots} X_k$ are the independent or predictor variables. Using the SPSS to carry out the regression operation provided some very important statistical tables like the model summary, analysis of variance (ANOVA) residual statistics and graphs. **R** is the bivariate correlation between the observed values of the dependent variable and predicted values based on the regression equation, while the (**r**) in lower case is the partial regression coefficient in the coefficient table that gives the regression equation of the model. $\mathbf{R^2}$ is the coefficient of multiple determinations. Adjusted $\mathbf{R^2}$ denotes the goodness of fit of the model to the population taking into account sample size and the number of independents variables involved. **Beta coefficient** is the standardized regression coefficient that allows for direct comparisons between coefficients as to their relative explanatory power of the predictors. The coefficient table also provides the *t value* and *Sig t value* which indicate how the partial coefficients (slopes) differ significantly from zero. The partial **F values** are denoted as the partial F-test which is a statistical test for the additional contribution to predict accuracy of a variable above that of the variable already in the equation. **Durbin Watson** is the indictor of residual

behaviour examining the difference between the observed value and the value predicted by the regression equation. The **Variance Inflation Factor (VIF)** and **Tolerance** are indictors of the effect that the other independent variables have on the standard error of a regression coefficient. The study uses them as indictors of the collinearity or multicollinearity among the independent variables (Malhotra, 2004; Hair et al., 2006 and Tabachnick & Fidell, 1983). The simple regression method (bivariate) is used with a single independent variable entered whereas in the regression equation this variable is responsible for explaining the variance in the predicted value. The following equation shows the form of regression model recommended as follows:

$$Y = \beta_0 + \beta_1 X_1 + e$$

Which is estimated by the following equation:

$$\hat{Y}_i = a + bx_i$$

Where $\hat{Y}_i$ is the predicted value of Y_i, and (a & b) are estimators of β_0 and β_1 respectively. The hypotheses associated with each variable of the research model, linking different salient beliefs as antecedents to direct predictor and direct predictor to behavioural intention, will be discussed subsequently in the following sections.

6.2.2 Multiple Linear Regression Analysis for Testing Hypotheses

Preliminary analyses of multiple regression and product component analysis were used and computed using SPSS 11.5 to understand the initial associations between variables as well as to examine the research hypotheses. Then, this study's model was developed and tested using the multivariate analysis techniques of simple regression, stepwise regression, and backward regression. Furthermore, a stepwise regression was used as a cut-off to guide the research to the important independent variables that can contribute significantly to the prediction of the behavioural intention of the research sample to use IB

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Regression analysis is a powerful analytical tool designed to explore all types of dependence relationships (Hair et al., 2006). The objective of this study by using multiple regression analysis is in line with this technique function which is to use the independent variables to predict the single dependent variable selected by the researcher (Hair et al., 2006 and Malhotra, 2004). In order to use regression analysis for best prediction of accuracy with regard to the population based on sample data obtained randomly, Malhotra (2004) and Hair, et al. (2006) emphasize testing for the assumption of regression analysis which met with no violation. According to Hair et al. (2006) and Malhotra (2004), the assumptions to be examined are; outliers, multicollinearity and singularity, normality, linearity, homoscedasticity and independence of residuals which, according to Coakes and Steed (2003), can be assessed through regression analysis.

6.2.3 Hypothesis-Testing Procedures

Overall, the Hypothesis-Testing sections are divided into two main parts. First the researcher will look into a technique used to explore the relationships among variables followed by a technique used to explore the predictive ability of a set of independent variables on one continuous dependent measure. Theses two techniques are correlation and regression analysis. The next sub-section provides further explanations on each technique and its necessity for this study as follows;

I. Pearson's correlation

Pearson's bivariate correlation analysis (product-moment correlation) will be performed to test the relationships between variables involved in the proposed regression model. According to Pallant (2005), this technique is used when the researcher wants to know the strength and directions (positive or negative) of the relationships as is also mentioned by Burns & Bush (2000). According to Coakes & Steed (2003), simple bivariate correlation, also referred to as zero-order correlation, is

the most common measure of linear relationships and provides coefficients with a range of possible values from −1 to +1. Linearity is important in a practical sense because Pearson's r only captures the linear relationships among variables (Tabachinck & Fidell 2007). Different authors suggest different interpretations of the correlation values obtained (zero and ±1). For instance, Cohen (1988) suggests using three categories of correlation interpretation; small when r value fall in the range ±.10 to ± .29 or medium when r value falls (±.30 to ± .49) and large when r= ±.50 to ± .1. Authors such as Burns & Bush (2000) considered the correlation coefficient if it falls between (± 1 and ±.81) to be generally very highly and moderate if it falls between (±.80 and ±.61). When the r-values fall between (±.60 and ±.41), it typically indicates low correlation and between (±.21 and ±.40) it is indicative of a very weak association. Meanwhile those correlation coefficients equal to or less than ±.20.5 are uninteresting to marketing researchers. This study adopted TPB and the guidelines suggested by Ajzen and Fishbein (1980) will be applied. In social science, Ajzen and Fishbein (1980) reported that if r is greater than .20 it was considered "satisfactory", r values from .30 to .50 are moderate magnitude while values greater than .50 are considered as strong relationships.

In conducting multivariate analysis, Malhotra (2004, p.500) suggests that it is useful to examine the simple correlation between each pair of variables prior to performing the hypothesis testing by a method of regression because it also shows the direction of the variables' hypothesized format. Tabachinck & Fidell (2007) highlighted that a very small coefficient of determinants (S.D/mean) was also associated with lower correlations. Thus, the descriptive analysis of mean and standard deviation as well as the second internal consistency test using Cronbach's alpha, the product-moment correlation r and its associated p values will also be presented in the form of a correlation matrix in this study.

II. Multiple Regression

Pallant (2005) pointed out that multiple regressions are a more sophisticated extension of correlation and used when the researcher wants to explore the predictive power of independent variables on the dependent variable. Multiple and Hierarchical regressions are useful methods for determining the relationships between a dependent variable and predictors. In addition, this approach helps the study to investigate if some critical variables contribute to a prediction equation for a dependent variable with the effect of other predictors. On the other hand, it serves the purpose of testing research hypotheses, Hierarchical multiple regressions were employed to test hypotheses related to the influence of indirect and external variables on the dependent variables of the research model and then in turn, to answer the research questions. Mainly, there are four groups of relationships the study attempts to examine as follows;

i.   The hypotheses intend to assess the relationships between the three direct predictors and the criterion variable purported in layer 1 of the TPB (proposition 1).

ii. The hypotheses intend to assess three indirect relationships proposed in this study, which are; the attitudinal belief, and normative belief, control belief. This study examines hypotheses of each belief separately to identify their relative predictors.

iii. The hypotheses intend to assess the relationships of the four dimensions relevant to the UIBR construct with criterion variable BI as proposed by this study.

iv. The hypotheses intend to assess the relationships of demographic variables with the BI to use IB

In order to perform the study's hypotheses testing, Malhotra (2004) pointed out that the test for the statistical significance of the linear relationship between the predictors and

the dependent variable can be based on examining the alternative hypothesis (H_1: $\beta_1 \neq 0$). The t two-tailed test with n-2= (369-2) = 367 degree of freedom used the t value which can be calculated by the slope (b) divided by the standard errors (SE_b) as it is in the equation below

$$t = b / SE_b \quad \text{(Malhotra, 2004)}$$

The calculated value assigned to t is compared to the critical value if it is (e.g. attitude 0.872/.049 =17.80) greater than the critical value (1.9600) with degree of freedom 367 and α =.05. In this case, the null hypothesis of no relationship (H_0: $\beta_{1.1}$= 0) could be rejected. Then the researcher is required to look into the sign (+/-) of the standardized coefficient value (Beta) which determines whether the relationships examined are positive or negative. According to Bryman & Cramer (2001), standardized regression coefficients can be compared to determine which of the two or more independent variables are the more important in relation to the dependent variable. In other words, the t value is used to assist in making the decisions on whether any variables should be dropped from the regression model equation. In the current study, the level of significance 0.10 that has the critical value 1.658 with 98 as the degree of freedom was the cut-off level for dropping variables. Furthermore, the standard error of the estimate is another measure according Hair et al. (2006) which could be used to gauge the accuracy of the predication.

6.2.4 Pearson Correlation Analysis of Variables in the Study Model

This section present the analyses of descriptive statistics of the variables utilized in the study model that explain the individual's behavioural intention to use IB. The scores of the 19 variables used in developing the study model were based on the process of summated items applied with each construct obtained by factor analysis. First, a Pearson

product-moment correlation matrix was computed in order to examine and understand the initial relationship between the different components of the TPB and newly introduced variables such as experience; exposure, awareness, knowledge and. UIBR . The Pearson correlation analyses were computed to understand the initial direction of the relationships between pairs of variables prior to examining the research hypotheses. Table (IV-B) presents a summary of the correlation test findings applied to the variables of the study (See Appendix IV-B).

6.3 Testing Research Hypotheses

As specified previously in Chapter two, the first research question for this study was; Question **1.1** "How do the direct factors (customers' attitudes, SN, and PBC) predict and explain customers' behavioural intention towards the adoption of IB?" In order to answer this question, this study argues in Hypothesis 1 that;

6.3.1 Testing Hypothesis (H1)

Hypothesis 1: *"The more favourable the attitude and subjective norm with respect to IB-use, and the greater the PBC, the stronger should be an individual's intention to use IB".*

In line with Ajzen's (1991) theory of planned behaviour, research question 1 could be answered by identifying how the direct factors of TPB namely, attitudes, SN, and PBC do directly predict and explain the bank account holders' behavioural intention.

Table 6.8 Means, Standard Deviations, Alpha Reliability and Zero-order Correlation (TPB Main Psychological Variables Vs Behavioural Intention)

Variables	*M*	*SD*	DV1	IV1	IV2	IV3
			TPB Main Variables			
DV1- Behavioural Intention (BI)	25.04	8.07	(0.91)			
IV1 -Attitude (ATT)	22.16	6.04	** .822	(0.91)		
IV2- Subjective Norms (SN)	24.59	10.56	** .534	** .530	(0.93)	
IV3- PBC (PBC)	22.85	8.55	** .620	** .566	** .439	(0.90)

Note: ** Significance at P < .01, Figure in brackets represent Alpha Reliability coefficients

The result of the Pearson's correlation carried out on the three psychological determinant of BI (Attitude (r=.822, P < .01), SN (r=.534, P < .01) and PBC (r =.620, P < .01) show that all three variables are highly correlated, significant, and in the expected positive direction. The findings also reveal that attitude is most highly correlated with the BI followed in order by the PBC and then by SN. The significant results obtained by the simple correlation analysis implied that behavioural intention to use IB could be a function of those three psychological variables (Ajzen, 1991). A multiple regression analysis was conducted to determine the independent relations as well as the contribution of each of these three variables in predicting Behavioural Intention (BI) as a criterion variable. The results of the analysis are displayed in Table 6.9 as follows;

Table 6.9 Results of Multiple Linear Regression: Direct Predictors vs. BI

Predictor Variable	Unstandardised Coefficients		Standardised Coefficients	t
	B	Std. Error	Beta	
IV1 - Attitude	.872	.049	.653	17.906*
IV2 - PBC	.196	.032	.207	6.025*
IV3 - Subjective Norms	.074	.026	.097	2.912**

R**:**	.847
R^2:	.717
Adjusted R^2:	.715

Analysis of Variance					
	DF	Sum of Squares	Mean Square	F	Significance of F
Regression	3	17174.536	5724.845	308.89	.000
Residual	365	6764.771	18.534	1	

*P <.001, **P <.05

Accordingly, the relevant three hypotheses on the relationships between these variables; H1a, H1b and H1c, which were discussed earlier in Chapter four, are required for answering this research question. The findings based on statistical assessments, which were presented in the preceding Table 6.9 reveal that;

I. The regression equation was found to be significant (F=308.89, P <.001) and the accuracy of the regression model is supported by the examination of the residuals discussed in Table 5.24 (Durbin Watson=2.1).

II. The standardized coefficients Beta (β) for attitude are positive and significant, indicating that "there *is positive linear relationship between attitude and the behavioural intention to adopt IB at* p <0.001". This is support for the study's hypothesis (**H1a**) being statistically true.

III. The standardized coefficients Beta (β) for SN is significant at p<0.001 and the beta value is positive, therefore, this result supports the hypothesis **H1b** which says "*there is a significant and positive linear relationship between Subjective Norm (SN) and behavioural intention to adopt IB* (**H1b)"**.

IV. Similarly, the standardized coefficients Beta (β) for PBC is positive and significant at p<0.001, indicating, "*There is a positive relationship between the behavioural intention (BI) to use IB and PBC"*. Hence, the hypothesis **(H1c)** is supported.

6.3.2 Testing Hypothesis (H2)

Hypothesis 2 represents the question regarding the applicability of TPB and how well the three independent variables (ATT, SN and PBC) explain the dependent variable (BI). In order to test this hypothesis, Bryman & Cramer (2001) suggest we "use the coefficient of determination as a measure of how well the line of best fit represents the

relationship between the two variables, and can also compute the multiple coefficient of determination (R^2) of the collective effect of all of the independent variables.

The findings displayed in the preceding Table 6.9 could be render support to the hypothesis (H2) and show that;

I. The entire model of all the three variables (the direct predictors in the TPB model combined attitude, SN, and PBC) has a positive and significant effect on the behavioural intention to use IB.

II. Collectively, these three variables have a predictive power of $R^2 = 72$ % in explaining the variance related to individual's behavioural intention towards the adoption of IB. The F-value of model was 308.890 which is significant at the P= 0.000<0.0005 level. Implying that only 28 % of the variance in BI is not explained by the three variables in the equation.

III. It was noted that attitude on its own statistically is the most powerful significant predictor that explains 59 percent of the variance in the behavioural Intention to adopt IB followed by PBC (21 %) and then SN (10 %) which was found to be the least powerful of the predictors.

IV. Adjusted $R^2 = 0.715$ denotes the goodness of fit of the model because it is very close to the $R^2 = 0.717$ and F-value of 308.279 significant at (P=0.000<.001), to the population taking into account the sample size and the number of independent variables involved.

6.3.3 Testing Hypothesis (H3)

Hypothesis 3: The salient beliefs; (behavioural beliefs, normative beliefs, and control beliefs) are antecedents of the respective direct factors; attitude towards IB use (AB), subjective norms (SN), and PBC (PBC)).

The above Hypothesis 3 involved three models; behavioural beliefs, normative beliefs, and control beliefs **(H4, H5 and H6)** which the current study is concerned to test and provide the answer for the second research question derived from the third theoretical proposition stated as follows;

*"**Question 2:** "How do the indirect factors (behavioural beliefs, normative beliefs, and control beliefs) relate to the respective direct factors (customers' attitudes, subjective norms, and PBC) and subsequently explain behavioural intention to adopt IB?"*

6.3.4 Testing Hypotheses (H4)

> **H4:** *There will be a positive relationship between bank account holders' attitude towards use of IB (ATT) and its antecedent factor, behavioural beliefs (CI), comprising beliefs about perceived attributes of IB by bank account holders.*

The relationships between the behavioural beliefs of individuals on IB (as measured by the Rogers' attribute) were investigated using Pearson's product-moment correlation coefficient. Preliminary analyses were performed to ensure no violation of the assumptions of linearity, normality and homoscedasticity. There was a strong, positive correlation between the individual's IB-use attitude and the combined variable relative advantage/compatibility ($r = 0.707$, $p < 0.0005$) Also, with individual perceptions on the IB-Ease of Use ($r = 0.726$, $p < 0.0005$). While the association between the individual's IB-use attitude and their perception of the observability of IB was found, it was positive but below the satisfactory level and has a negative and insignificant association with the intention to adopt IB. This study's finding on the variable of observability draws the attention of researchers and service providers to an inverse relationship between IB observability and customer behavioural intention to use IB. This study suggests that the observability construct is a very useful construct addressing IB adopter unwillingness to use IB when the uses of IB by any mean look like observable innovation. However, the relationship between the individual's IB-use

attitude and their perception of the trialability of IB (r = .265, p< .001) was considered

satisfactory, exhibiting a strong relationship (r = .512, p< .001) with the individual's

intention to adopt IB. The results of the Pearson's correlation coefficients on Rogers

(1995)'s five attributes with individual's IB-use attitude and their intention are

displayed in Table 6.10.

Table 6.10 Means, Standard Deviations, Alpha Reliability and Zero-order correlation (IB Attributes Vs Attitude and Intention)

Variables	*M*	*SD*	IV1	IV2	IV3	IV4	DV1	DV2
IV1 - (RA/COMPT)***	40.91	11.82	(0.94)					
IV2 - Observability(OBS)	23.60	8.23	** .140	(0.87)				
IV3 – Ease of Use (EOU)	20.34	6.94	** .726	-.076	(0.93)			
IV4 - Trialability (TR)	16.93	4.47	** .265	** .512	.099	(0.88)		
DV1 - Attitude (ATT)	22.16	6.04	** .716	.050	** .672	** .211	(0.91)	
DV2 - Intention (BI)	25.04	8.07	** .707	-.045	** .700	* .130	** .822	(0.91)

Note: Figures in brackets represent Alpha Reliability coefficient
* Significance at P <.05; ** Significance at P < .01
*** Relative Advantage Combined with Compatibility

The model, which explains the significance of the formative relationship between

the IB attribute, will be drawn from the stepwise multiple regression analysis. Along

this line, multiple regression was applied to examine the sample population's perception

and the influence of the four extracted attributes on the behavioural belief in accordance

with Rogers (1995)'s five attributes of innovation used to explain individual attitudes

towards IB. The four sub-hypotheses H4a, H4b, H4c, and H4d are required to test the

research hypothesis H4. The results of the analysis are displayed in Table 6.11 as

follows,

Table 6.11 Results of Multiple Linear Regression: IB Attribute Vs Attitude

Predictor Variable	Unstandardised Coefficients		Standardised Coefficients	t
	B	Std. Error	Beta	
Relative Advantage/ Compatibility	.238	.027	.466	8.764*
Ease of Use	.282	.045	.325	6.230*
Observability	-.019	.030	-.026	-.627
Trialability	.092	.056	.068	1.653

R:	.752
R²:	.565
Adjusted R²:	.560

Analysis of Variance				
	DF	Sum of Squares	Mean Square	F	Significance of F
Regression	4	7583.066	1895.767	118.286	.000
Residual	364	5833.817	16.027		

*P <.001

As shown in Table 6.11, the relevant statistical findings reveal that;

I. The regression equation was found to be significant (F=118.286, P <.001) and the accuracy of the regression model is supported by the examination of the residuals discussed in Table 5.24 (Durbin Watson=2.0).

II. The standardized coefficients value for Relative Advantage / Compatibility (RAC) is β = .466 which is positively significant at p<0.001. Therefore, the null hypothesis **H4a** can be rejected. Thus, findings reveal that RAC might have a positive relationship with the IB-use attitude and lead to support research hypothesis *H4a.*

III. The standardized coefficients β = -.026 value for observability (OBS) are negative and insignificant *p* .53 > 0.1 and as a result the null hypothesis H4b according to which there is no relationship between the individual's IB-use attitude and perceived observability of IB services could be accepted. Along this line, the result do not supported research hypothesis H4b. This finding has very useful implication for Rogers' (1995) DOI, as Rogers' theory perhaps did not take into account that some innovations such as IB will be different from

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other IS innovations that could attribute to the observability as a factor which can contribute positively to the adoption rate of that particular innovation.

IV.   The standardized coefficients β = .325 value for Ease of Use is significant at p<0.001 and has a positive sign. As a result, the null hypothesis could be rejected, indicating that there is a relationship between the individual's IB-use attitude and perceived ease of use of IB. This supports the research hypothesis *H4c.*

V.   The standardized coefficients β = .068 value for trialability (TR) is positive and insignificant at p .09 > 0.05. Therefore, the research hypothesis *H4d* is not supported**.**

Concerning hypothesis *H4:,* Inspection of beta values for the four indpendent variables are positive except for observability (OBSRV), which is negative. In addition, Table 6.11 shows that the entire model, combining the four variables, has a significant influence on the attitude, therefore, the findings partially support hypothesis H4.

6.3.5 Testing Hypothesis (H5)

The normative beliefs components were subjected to both correlation and multiple regression techniques whereas the study applied regression to SN as a criterion variable and the person's personal and media interaction norms as independent variables. The relationship and linkage of these two variables to SN are presented in Table 6.12 and the two testable research sub-hypotheses H5a and H5b were tested through correlation and regression techniques as well as the main H5;

> *H5: There will be a positive relationship between subjective norms (SN) and its antecedent factors, "normative beliefs", comprising beliefs about referents' expectation (Personal and Media) and influence of those expectations in their use of IB.*

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Table 6.12 Means, Standard Deviations, Alpha Reliability and Zero-order correlation (Subjective Norms Vs Normative beliefs Variables)

| Variables | *M* | *S.D* | Norms Model | | | | | |
			SN	PR	MM	BI	ATT	PBC
DV1-SubjectiveNorms (SN)	24.59	10.57	**(0.93)**					
IV1-Personal Referent (PR)	133.33	80.67	** .714	**(0.94)**				
IV2- Mass Media (MM)	71.41	43.94	** .555	** .603	**(0.86)**			
DV-Behavioural Intention (BI)	25.04	8.07	** .534	** .394	** .499	**(0.91)**		
DV- Attitude (ATT)	22.16	6.04	** .530	** .384	** .482	** .822	**(0.91)**	
DV- Perceived Behavioural Control (PBC)	22.85	8.55	** .439	** .337	** .525	** .620	** .566	**(0.90)**

Note: ** Significance at $P < .001$, Figure in brackets represent Alpha Reliability coefficient

The result of the Pearson's correlation presented in Table 6.12 shows that both personal referent (r =.714, $P < .001$) and mass media (r =.555, $P < .001$) are highly correlated with SN. Also, the relationship is in the expected positive direction. In terms of the personal referent (r =.384) and mass media referent (r = .482) they also exhibit a significant correlation at the $P < .001$ level with attitude (in moderate magnitude). In a similar magnitude, personal referent (r =.394,) and mass media (r = .499) display a significant correlation at the $P < .001$ level with behavioural intention (BI). This study found that there are a strong correlation between the mass media referent (r= .525, $P < .001$) and PBC while PBC (r =.337) has a moderate magnitude of correlation with personal referent. The following Table 6.13 shows the normative belief result obtained by conducting multiple regression analysis as follows.

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Table 6.13 Results of Multiple Linear Regression: Normative beliefs Vs SN

Predictor Variable	Unstandardised Coefficients		Standardised Coefficients	t
	B	Std. Error	Beta	
Personal Referent	.078	.006	.596	13.334*
Mass Media Referent	.047	.011	.196	4.396*

R:	.731		
R^2:	.535		
Adjusted R^2:	.532		

	Analysis of Variance				
	DF	Sum of Squares	Mean Square	F	Significance of F
Regression	2	21938.652	10969.326	210.169	.000
Residual	366	19102.557	52.193		

*$P < .001$

As shown in the preceding Table 6.13, the result of regression reveals that;

I. The regression equation was found to be significant (F=210.169, P <.001) and the accuracy of the regression model is supported by the examination of the residuals discussed in Table 5.24 (Durbin Watson=2.0).

II. The standardized coefficients (Beta) value for the personal referent (PR) is positive and significant at P=.000 <.001. As a result, it indicates that "there is a positive relationship between SN and the personal norms (PR) of using IB services. Therefore, it supports hypothesis **H5a.**

III. The standardized coefficients (Beta) value for Media Referent (MM) is a positive and significant at P=.000 <.001. As a result, it indicates, "there is a positive relationship between SN and the Media Referent (MM) of using IB services, therefore it supports hypothesis **H5b.**

The entire model with both independent variables is significant (F-value 210.169 and p =.000 <.0001) in explaining the variance in a person's SN of using IB with (**R^2 = ·535**). This value is very close to the adjusted R square of .532, thus, indicating the goodness of fit of the model, to the population taking into account the sample size and number of independent variables. The results support **H5a** and **H5b** and the goodness of fit of the model supports the main hypothesis **H5.**

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6.3.6 Testing Hypothesis (H6)

Ajzen (1991) pointed out that "the more resources and opportunities individuals believe they possess, and the fewer obstacles or impediments they anticipate, the greater should be their perceived control over the behaviour".

> **H6:** *There will be a positive relationship between (PBC) and its antecedent factors, control beliefs (PBC), comprising beliefs about facilitating factors (FT, FR, and FGS) and self-efficacy factors (SE) for IB use.*

Table 6.14 displays the relationships between the individual's control beliefs of IB (as measured by facilitating condition and self-efficacy) which were investigated using Pearson's correlation. Preliminary analyses were conducted to ensure no violation of the assumptions of linearity, normality and homoscedasticity.

Table 6.14 Means, Standard Deviations, Alpha Reliability and Zero-order correlation (Control Belief IV Variables Vs PBC and BI)

Variables	*M*	*SD*	DV1	DV2	IV1	IV2	IV3	IV4
					Control Belief IV Variables			
DV1- PBC (PBC)	22.85	8.55	(.90)					
DV2- Behavioural Intention (BI)	25.04	8.07	** .620	(.91)				
IV1- Self-efficacy (SE)	131.82	60.70	** .798	** .564	(.85)			
IV2- Technology (TFC)	62.96	34.77	** .372	** .384	** .450	(.70)		
IV3- Resources (RFC)	66.04	31.40	** .285	** .287	** .334	** .234	(.60)	
IV4- Government (GOVSP)	80.37	42.46	** .272	** .320	** .362	** .364	** .253	(.82)

** Significance at $P < .01$, Figures in brackets represent Alpha Reliability coefficients

The preceding Table 6.14 displays the descriptive analysis and correlation test performed on these variables. There was a strong, positive correlation between the individual's self-efficacy with respect to IB-use and their perceived control behaviour ($r=0.798$, $p <0.005$) Also, self-efficacy was found to be correlated strongly and in a

positive direction with the individual's behavioural intention to use IB (r = .564, *p* < 0.005). Concerning the three variables of facilitating conditions, it was found that there is a positive and satisfactory relationship between PBC and both facilitating resource (r = 0.285 *p* < 0.005) and government support (r = 0.272 *p* < 0.005). There was a positive correlation of moderate magnitude found between facilitating technology and PBC (r = 0.372 *p* < 0.005). Therefore, Hypothesis H6 was tested using hierarchical regression where the four control beliefs were regressed against the criterion variable PBC. The results are shown in Table 6.15. The result of regression reveals that;

I. In model 1, the standardized coefficients (Beta) values for technology (TFC), resources (RFC), and facilitating government support (GOVSP) are positive and all of them significant. The p-values were P=.000 >.001, P=.000 >.001 and P=.019 >.05 for technology (TFC), resources (RFC) and government (GOVSP) respectively. Therefore, there are significant relationship between PBC and the individual's perception on facilitating technology (TFC) and resources (RFC) and facilitating government support (GOVSP) to use IB services. Thus, the results of model 1 support all hypotheses on facilitating conditions **H6a and H6d.**

II. In model 2, examination of the variables in the equation table indicates that the standardized coefficients (Beta) value for self-efficacy is positive and significant at P=.000 <.001. Meanwhile, the standardized coefficients (Beta) values for technology (TFC), resources (RFC), and facilitating government support (GOVSP) are no longer significant when these variables are entered into the regression equation with self-efficacy.

III. As a result, it indicates that "there is a positive relationship between PBC and individual's self-efficacy to use IB services, therefore, it supports hypothesis **H5d.** This study can say that facilitating condition variables on their own are

salient predictors (marginal predictor) of PBC. However, in combination with the self-efficacy variable their effects are insignificant.

IV. Results of model 2 demonstrated that the standardized coefficients (Beta) value of self-efficacy was 79 % which implies that when the four variables entered in the regression equation, self-efficacy (SE) has the major contribution in prediction of the variance in IB.

Table 6.15 Results of Hierarchal Regression: Control Belief Vs PBC

Predictor Variable	Unstandardised Coefficients		Standardised Coefficients	t
	B	Std. Error	Beta	
Step1				
Technology Facilitating Condition	.070	.013	.284	5.555*
Resources Facilitating Condition	.051	.013	.188	3.815*
Government Support	.024	.010	.121	2.347**

R:	.438
R^2:	.192
Adjusted R^2:	.185

Analysis of Variance					
	DF	Sum of Squares	Mean Square	F	Significance of F
Regression	3	5162.091	1720.697	28.906	.000(c)
Residual	365	21727.411	59.527		

Predictor Variable	B	Std. Error	Beta	t
Step2				
Technology Facilitating Condition	.005	.009	.020	.554
Resources Facilitating Condition	.006	.009	.023	.685
Government Support	-.006	.007	-.028	-.788
Self-Efficacy	.111	.005	.791	21.181*

R:	.799
R^2:	.638
Adjusted R^2:	.634

Analysis of Variance					
	DF	Sum of Squares	Mean Square	F	Significance of F
Regression	4	17157.002	4289.251	160.420	.000(d)
Residual	364	9732.499	26.738		

*P <.001, **P<.05

6.3.7 Testing Hypothesis (H7)

Prior to conducting regression analysis to test H7 and H8, this study seeks to give further explanation of the relationships between the BI variable and the psychological variables which existed in TPB, readiness dimensions and the overall UIBR variable.

As mentioned previously in the methodology Chapter, this study hypothesized that there are relationships between the BI variable and both overall UIBR and relevant dimensions. The result of the simple correlation shown in Table 6.16 reveals that UIBR and all its four dimensions extracted by factor analysis are in a positive direction and correlated significantly with behavioural intention.

Table 6.16 Means, Standard Deviations, Alpha Reliability and Zero-order correlation (Psychological Variables Vs UIBR and Dimensions)

Variables	*M*	*SD*	Psychological Variables				Readiness Dimensions				UIBR
			1	2	3	4	5	6	7	8	9
1- BI	25.04	8.07	(0.91)								
2- ATT	22.16	6.04	** .822	(0.91)							
3- SN	24.59	10.56	** .534	** .530	(0.93)						
4-PBC	22.85	8.55	** .620	** .566	** .439	(0.90)					
5- KW	21.67	6.67	** .142	* .104	.081	-.074	(0.90)				
6- EXPRT	15.57	6.63	** .530	** .512	** .283	** .692	** -.179	(0.87)			
7- EXPOS	9.58	5.45	** .467	** .416	** .302	** .526	* -.125	** .540	(0.75)		
8- AW	17.92	6.49	** .393	** .366	** .336	** .313	** -.255	** .406	** .343	(0.71)	
9- UIBR	64.74	14.55	** .657	** .600	** .429	** .618	** .216	** .758	** .717	** .643	(0.72)

Notes: * significance at P <.05; ** Significance at P < .01; Figure in brackets represent Alpha Reliability coefficient; **BI:** Behavioral Intention; **ATT:** Attitude; **SN:** Subjective Norms; **PBC:** Perceived Behavioral Control; **EXPERT:** Experience; **EXPOS:** Exposure ; **AW:** Awareness ; **KW:** Knowledge

The results displayed in the preceding Table 6.16 show that for both behaviours, intentions were positively related to all the component variables, and significantly related to all of them apart from perceived control. Knowledge was found to be negatively correlated with each of the other UIBR components (since higher values

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scored on this measure represent higher scores in UIBR components). Also, it was positively correlated to the other components related to the main TPB predictors. For instance, UIBR was found significantly related to behavioral intentions, perceived control and subjective norms. However, was found to be significantly and positively correlated with each of the component variables.

Multiple regressions were carried out to test hypothesis (H7) and the sub-hypotheses built on this hypothesis (H7a, H7b, H7c, and H7d).

This hypothesis and the produced standardized coefficients Beta (β) were employed to guide the research to make decisions on the sort of relationships between the four factors obtained by PCA as independent variables which are; experience, knowledge, awareness, exposure and behavioural intention as criterion variable. The following Table 6.17 displays the unstandardized regression coefficients (B) and standardized coefficients Beta (β) and the t test, which guide the research to make decisions on the sort of relationships among investigated variables.

Table 6.17 Results of Multiple Linear Regression: UIBR's Dimensions Vs BI

Predictor Variable	Unstandardised Coefficients		Standardised Coefficients	t
	B	Std. Error	Beta	
IV1 . Experience	.442	.059	.363	7.434*
IV2 - Knowledge	.360	.049	.298	7.284*
IV3 - Awareness	.303	.055	.244	5.481*
IV4 - Exposure	.331	.070	.224	4.719*

R:	.660	
R^2:	.436	
Adjusted R^2:	.429	

Analysis of Variance					
	DF	Sum of Squares	Mean Square	F	Significance of F
Regression	4	10425.760	2606.440	70.207	.000
Residual	364	13513.546	37.125		

*P <.001

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As shown in the preceding Table 6.17, the findings reveal that;

I. The standardized coefficient (Beta) values for Awareness, Knowledge, Experience and Exposure are positive and significant at P=.000 <.001 for all. As a result, the research hypotheses H6a to H6d were supported**.**

II. The entire UIBR model, including the four IV, has a significant effect on behavioural intention to use IB with a predictive power of $\mathbf{R^2} = 44$ % in explaining the variability related to the individual's behavioural intention towards the adoption of IB with F-value of 70.207 which is significant at P= 0.000<0.001 level.

III. It was also noted that experience was the best predictor which on its own explains 36 % of the variance in the criterion variable as shown in Table 6.17. This moderately supports the study hypothesis 7 because the factor analysis conducted on the whole set of UIBR had verified the four factors as dimensions of users' informational based readiness. Tan & Toe (2000) found that experience explains 10 % of Singaporeans' attitude to adopt IB while the current study reveals that experience explains 37 % of the variance of Yemenis' attitude to adopt IB (see Figure 6.5).

IV. As shown in the preceding Table 6.17, the standard coefficient (beta) values for awareness, knowledge, experience, and exposure are positive for all. These findings moderately support that all the four alternative (research) hypotheses (*H7a, H7b, H7c, and H7d*) are related to the individual's behavioural intention since they have a positive and linear relationship with the individual's behavioural intention towards the adoption of IB.

6.3.8 Testing Hypothesis (H8)

In order to test hypothesis H8, this study creates the new variable of UIBR. The UIBR variable is created by the four variables; awareness, knowledge, experience, and exposure in a summated construct and the average value is considered as the score for UIBR. According to Hair et al. (2006, p.135) the summated scale is formed by combining several individual variables into a single composite measure and the average score of the variables is more commonly used as the replacement variable.

Hypothesis 8: *There will be a positive relationship between Users' Behavioural Intention (BI) towards the use of IB and Users' overall* Informational-based Readiness *(*UIBR*).*

The multiple hierarchal regression result shows that the fourth model is the best in measuring the joint effect of external factors related to UIBR on users' behavioural intention to use IB (summated UIBR). The test of the hypothesis and the results of regression are presented in the following Table 6.18;

Table 6.18 Results of Multiple Linear Regression: UIBR Vs Intention (BI)

Predictor Variable	Unstandardised Coefficients		Standardised Coefficients	t
	B	Std. Error	Beta	
Attitude	.790	.050	.592	15.763*
Users Informational Based Readiness	.101	.021	.182	4.880*
PBC	.128	.034	.136	3.712*
Subjective Norms	.064	.025	.083	2.550**

R:	.857
R^2:	.735
Adjusted R^2:	.732

Analysis of Variance				
	DF	Sum of Squares	Mean Square	F	Significance of F
Regression	4	17589.932	4397.483	252.101	.000
Residual	364	6349.374	17.443		

*$P < .001$, **$P < .05$

As shown in the preceding Table 6.18, the findings reveal that;

I. The regression equation was found to be significant (F=252.101, P <.001) and the accuracy of the regression model is supported by the examination of the residuals discussed in Table 5.24 (Durbin Watson=2.0).

II. The standardized coefficient (Beta) values for all variables are positive and exceed the significance level of P < 05. As a result, the research hypothesis H8 was supported**.**

III. UIBR has a significant effect on the behavioural intention to use IB with jointly predictive power of **β =** 18.2 % in explaining the variability related to the individual's behavioural intention towards the use of IB.

6.3.9 Testing Hypothesis (H9)

In order to facilitate investigation of the research question highlighting the influence of demographic characteristics on the adoption of IB, this study aims to look into the issue from two angles. In the first part, the study investigates the association between the demographic characteristics and the IB adopter, while in the second part it aims to examine the contribution of demographic variables as independent variables in the adoption of IB.

I. Relationship Between Demographic Characteristics and IB Adopters

Correlation, according to Coakes & Steed (2003), can be performed between dichotomous or categorical variables (Phi Coeffecient) which run under crosstabs analysis. In this connection, the relationships between IB adopters and adopters' demographic characteristics involved in the current study (see section 3.6.2 in literature

review) were subjected to a non-parametric test for which the Pearson's chi-square test was utilized. The results are displayed in Table 6.19 as follows;

Table 6.19 Pearson's Chi-square Test: IB Adopters and Demographic

Relationship	Pearson's Chi-square χ^2	Asymp. Sig. (2-sided)	Result
IB Adopters and Gender	7.439	0.059	Significance
IB Adopters and Age	23.424	0.005	Significance
IB Adopters and Nationality	3.452	0.327	No
IB Adopters and Level of Education	99.829	0.000	Significance
IB Adopters and Marital Status	20.815	0.002	Significance
IB Adopters and Type of Job	70.001	0.000	Significance
IB Adopters and Personal Income	20.738	0.054	Significance
IB Adopters and Household Income	41.129	0.637	No
IB Adopters and Type of Housing	18.695	0.228	No
IB Adopters and Area of Residence	25.891	0.000	Significance
IB Adopters and Nature of Business	26.639	0.032	Significance
IB Adopters and Sector	17.963	0.006	Significance

Significant at 0.05 Level

The preceding Table 6.19 demonstrated that there is no significant relationship between adopters' household income, type of housing and nationality and the use of IB. However, the findings show that gender, age, education, marital status, jobs, personal income, area of residence and nature of business have significant associations with IB adoption.

II. The Influence of Demographic Variables on Behavioural Intention to adopt IB

The main purpose of analyzing demographic variables here is to analyze the predictive capability of demographic variables related to the use of IB services. The fourth research sub-question which undertakes the demographic hypothesis (H9) is **"**How do the external factors relevant to demographic factors (sex, age, nationality, education, marital status, type of job, personal income, household income, type of housing, area of residence) explain bank customers' behavioural intention to use IB?

In order to examine the research demographic propositions, this study suggested the formation of an associated research hypothesis to be statistically tested and ultimately answer the research question. The relevant hypothesis to evaluate demographic propositions is stated below:

Hypothesis (H9a) *"demographic variables positively influence the Bank's account holder's Behavioural Intention (BI) towards IB adoption".*

Correspondingly, the above hypothesis (H9a) can be tested using hierarchical multiple regression to test the influence of each of the demographic variables (as independent variable) on Behavioural Intention (BI). In order to achieve that, all the intervening variables (ATT, SN and PBC) between the external variables and the dependent variable are entered first, and then the demographic variables are entered in the second step. Table 6.20 shows the results of the hierarchical multiple regression analyses for the assessment of $(H_{1:}9a)$.

Table 6.20 Hierarchical Multiple Regressions test for influence of external variables (Demographics) on BI.

Model	R	R^2	Adjusted R^2	Std. Error of Estimate	Change Statistics				
					R^2 change	F change	df1	df2	Sig. F change
A	.847	.717	.715	4.30507	.717	308.890	3	365	.000
B	.856	.732	.721	4.26182	.015	1.620	12	353	.084

Dependent Variable: BI
A = Mediating Variables controlled: (Constant), PBC, SN, and ATT
B = Predictors: HOUSE OWNERSHIP, SEX, NATURE OF BUSINESS, NATIONALITY, JOB, HOUSEHOLD INCOME, MARTAIL STATUS, RESIDENT AREA, SECTOR, AGE, EDUCATION, PERSONAL INCOME

Table 6.20 shows that demographic variables explain an additional 1.5 % of the variance in the total intention after controlling for the three intervening variables. It is small and insignificant (at $p < .05$) therefore, the result on the effect of demographic variables on intention leads to the rejection of $H_{1:}9a$. The following Table 6.21 illustrates the regression coefficients of the various demographic variables on intention after controlling all intervening variables (Model B).

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Table 6.21 Influence of Demographic Variable on BI after Controlling for all Intervening Variables.

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
SEX	.445	.611	.021	.729	.467
AGE	-.348	.166	-.070	-2.090	.037
NATIONALITY	1.449	1.051	.040	1.379	.169
EDUCATION	.064	.180	.012	.354	.723
MARTAIL STATUS	-.496	.405	-.038	-1.225	.221
SECTOR	-.469	.398	-.037	-1.180	.239
JOB	.050	.085	.018	.592	.554
NATURE OF BUSINESS	.316	.171	.054	1.849	.065
PERSONAL INCOME	.055	.076	.030	.720	.472
HOUSE OWNERSHIP1	-.186	.157	-.035	-1.182	.238
RESIDENT AREA	.149	.259	.018	.575	.565
HOUSEHOLD INCOME	.059	.072	.030	.812	.417

Significant at 0.05 level

The preceding Table 6.21 indicates that the age variable is the only external variable that shows statistically significant prediction of intention with a beta value of = -.070; p = .037). Furthermore, the negative sign implies that the younger the people were found to be, the more likely they were to adopt IB.

Table 6.22 Summary of Hypotheses Testing

Analysis Techniques	Criterion (DV)	H1:	Predictors (IV)	Statistic Test			Results
				t	Sig.	Beta	
Multiple Regression + FA	Behavioural Intention (BI) H1, H2	H1a	Attitude	17.80	.000***	.653	Supported
		H1b	Subjective Norm	2.85	.004**	.097	Supported
		H1c	PBC	6.13	.000***	.207	Supported
Factor Analysis	H3	H4	Behavioural beliefs				Supported
		H5	Normative beliefs				Supported
		H6	Control beliefs				Supported
Factor Analysis + MR	Attitude H4	H4a	Relative Advantage/ Compatibility	8.764	.000***	.466	Supported
		H4b	Observability	-.627	.531	-.026	**Rejected**
		H4c	Ease of Use	6.230	.000***	.325	Supported
		H4d	Trialability	1.653	.099*	.068	**Rejected**
MR + Factor Analysis	Subjective Norm (SN) H5	H5a	Personal (PR)	13.33	.000***	.596	Supported
		H5b	Media (MM)	4.40	.000***	.196	Supported
Hierarchical Regression + Factor Analysis	PBC H6	H6a	Facilitating Technology (FT)	5.555	.000***	.109	(a)
		H6b	Facilitating Resource (FR)	3.815	.000***	.662	(a)
		H6c	Government Support GOVSP	2.347	.019**	.016	(a)
		H6d	Self-efficacy (SE)	21.181	.000***	.791	Supported(b)
	Behavioural Intention (BI)	H7a	Awareness (AW)	5.481	.000***	.244	Supported
		H7b	Knowledge (KW)	7.284	.000***	.298	Supported
		H7c	Experience (EXT)	7.434	.000***	.363	Supported
		H7d	Exposure (EXPOS)	4.719	.000***	.224	Supported
Stepwise Regression	Behavioural Intention (BI)	H8a	Attitude (ATT)	15.763	.000***	.592	Supported
		H8b	User's Informational Based Readiness (UIBR)	4.880	.000***	.182	Supported
		H8c	PBC (PBC)	3.712	.000***	.136	Supported
		H8d	Subjective Norms (SN)	2.550	.011**	.083	Supported

***P <0.001, **P <0.05 , *P <0.1
(a) Marginal positive and significant relationships

The preceding Table 6.22 provides a summary of the entire result of the hypotheses testing. It shows that twenty-two out of the 24 main and sub-hypotheses were supported. There are two hypotheses which were rejected and three which exhibited marginal positive and significant relationships.

6.4 TPB Model of Direct and Extended Determinants

An exploration of the influences of the proposed extended TPB of direct predictors (attitude, SN, PBC and UIBR) on predicting the intention to use IB is one of this study's aims. Hierarchal regression and the stepwise method are employed in this part of the analysis where the three TPB direct variables of BI are entered in the first block whilst in the second block, the new proposed variable of UIBR was entered with those TPB direct determinants. Table 6.23 shows the findings of the best regression model accounting for the direct predictors of Behavioural Intention (BI) to use IB.

Table 6.23 Extended TPB's Model of Direct Determinants

Independent Variable	B	Beta	t	F	*p*
				764.538	0.000
Constant	0.715		0.784		0.433
IV1 - Attitude (ATT)	1.098	0.822	27.650		0.000
				449.900	0.000
Constant	-0.380		-0.433		0.665
IV1 - Attitude (ATT)	0.926	0.693	20.340		0.000
IV2 - PBC (PBC)	0.215	0.227	6.674		0.000
				308.890	0.000
Constant	-.587		-0.673		0.501
IV1 - Attitude (ATT)	.872	0.653	17.906		0.000
IV2 - PBC (PBC)	.196	0.207	6.025		0.000
IV3 - Subjective Norms (SN)	.074	0.097	2.912		0.004
				252.101	0.000
Constant	-3.504		-3.384		0.001
IV1 - Attitude (ATT)	0.790	0.592	15.763		0.000
IV2 - Readiness (UIBR)	0.101	0.182	4.880		0.000
IV3 - PBC (PBC)	0.128	0.136	3.712		0.000
IV4 - Subjective Norms (SN)	0.064	0.083	2.550		0.011
Summary Table					
MODEL	R	R^2	Adj. R^2	F	*p*
1	0.822	0.676	0.675	764.538	0.000
2	0.843	0.711	0.709	449.900	0.000
3	0.847	0.717	0.715	308.890	0.000
4	0.857	0.735	0.732	252.101	0.000

Dependent Variable: BI
P<0.01

Table 6.23 shows four models obtained. The findings of model 3 which including the original direct determinates of BI in the TPB (ATT, PBC and SN) reveal that; the variations in all of the direct determinates collectively explain significantly R^2 = .72 of the variance in BI as depicted in the equation of model three with a significant F value (308.890*) at p* <.01 level. Along these lines, there is 99 percent of confidence in explaining the dependent variable. This is an indicator of the applicability of TPB in predicting BI in the context of Yemen. Multicollinearity is not a concern in this regression model since the VIF is below 10 for all variables. This study's extended model of direct predictors shown in model four depicts an improvement in the predictive power of the suggested direct predictors of BI to use IB R^2 = .74 explained in the dependent variable by the variation of the 4 independent variables . In the TPB Model, attitude has the larger predictive power path to BI with beta value of 0.653 while the SN has lower predictive power of 0.097 in the stepwise multiple regression analysis.

6.5 Study's Model Development

Stepwise regression is used in this study because it is useful to identify the predictors that account for the most of the variation in the criterion variable (Malhotra, 2004). Furthermore, it was used as a cut-off to guide the research to the important independent variables that can contribute significantly to the prediction of the dependent variable such as behavioural intention to use IB based on the research sample. In other words, to obtain the best predictive model in equated regression, according to Hair et al. (2006), the ability of the stepwise method to add and delete makes it the preferred method among most researchers. In this study, the regression analysis technique is helpful to assist the researcher in obtaining the best models that have the greatest values of R^2. Malhotra (2004) highlighted that the stepwise procedure sometimes has problems such as that an important variable may never be included, or less important variables

may enter the equation. Thereupon, another approach to stepwise regression like the one backward elimination will also be employed and this procedure, according to Hair et al. (2006), "starts with regression equation including all the independent variables and then deletes independent variables that do not contribute significantly".

In this study, stepwise regression analysis, for the extended TPB's direct predictors (ATT, SN PBC and UIBR), indirect predictors (comprising the beliefs on direct predictors) and UIBR (Awareness, Knowledge, experience, and exposure) is performed separately to each group as highlighted in the research framework. The best model of direct predictors, belief on IB attributes, normative belief, control belief, UIBR are shown in Table 6.23 all the results having been checked to ensure no violation to the regression assumption in the developed model.

Table 6.24 Regression Results: Predicting Overall Behavioural Intention by Psychological Determinants and UIBR

Independent Variable	B	t	R^2	F	*p*
DV1 – Behavioural Intention (BI)					
			0.735	252.101	0.000
Constant	-3.504	-3.384			0.001
IV1 - Attitude (ATT)	.790	15.763			0.000
IV2 - Readiness (UIBR)	.101	4.880			0.000
IV3 - PBC (PBC)	.128	3.712			0.000
IV4 - Subjective Norms (SN)	.064	2.550			0.011
Summary Table					
MODEL	**R**	**R^2**	**Adj. R^2**	**F**	*p*
1	0.822	0.676	0.675	764.538	0.000
2	0.847	0.718	0.716	465.059	0.000
3	0.854	0.730	0.728	329.006	0.000
4	0.857	0.735	0.732	252.101	0.000
Independent Variable	**B**	**t**	**R^2**	**F**	*p*
DV2 - Attitude (ATT)					
			0.562	234.693	0.000
Constant	6.380	8.361			0.000
IV1- Relative Advantage/Compatibility (RAC)	0.247	9.600			0.000
IV2 - Ease Of Use (EOU)	0.279	6.375			0.007
Summary Table					
Model	R	R^2	Adj. R^2	F	*P*
1	.716	.513	.512	386.958	0.000
2	.750	.562	.559	234.693	0.000
Independent Variable	**B**	**T**	**R^2**	**F**	*P*
DV3 – Subjective Norms (SN)					
			0.535	210.169	0.000
Constant	10.821	13.774			0.000
IV1 - Personal Referent (PR)	0.078	13.334			0.000
IV2 - Media Referent (MM)	0.047	4.396			0.000
Summary Table					
Model	R	R^2	Adj. R^2	F	*P*
1	0.714	0.510	0.509	381.947	0.000
2	0.731	0.535	0.532	210.169	0.000
Independent Variable	**B**	**T**	**R^2**	**F**	*P*
DV3 – PBC (PBC)					
			0.192	28.906	0.000
Constant	13.120	11.319			.000
IV1 – Technology Facilitating Condition (TFC)	.070	5.555			.000
IV2 – Resource Facilitating Condition (RFC)	.051	3.815			.000
IV3 – Government Support (GOVSP)	.024	2.347			.019
Summary Table					
Model	R	R^2	Adj. R^2	F	*P*
1	0.372	0.138	.136	58.921	0.000
2	0.424	0.180	.175	40.111	0.000
3	0.438	0.192	.185	28.906	
Independent Variable	**B**	**T**	**R^2**	**F**	*P*
DV3 – PBC (PBC)					
			0.637	643.747	0.000
Constant	8.033	12.498			0.000
IV1 – Self-efficacy (SE)	.112	25.372			0.000
Summary Table					
Model	R	R^2	Adj. R^2	F	*P*
1	0.798	0.637	0.636		0.000
Independent Variable	**B**	**T**	**R^2**	**F**	*P*
DV4 – Behavioural Intention (BI)					
			0.436	70.207	0.000
Constant	1.746	1.034			0.302
IV1 – Experience (EXPRT)	.442	7.434			0.000
IV2 – Knowledge (KW)	.360	7.284			0.000
IV3 – Awareness (AW)	.303	5.481			0.000
IV4 – Exposure (EXPOS)	.331	4.719			0.000
Summary Table					
Model	R	R^2	Adj. R^2	F	*P*
1	0.530	0.281	0.279	143.592	0.000
2	0.583	0.339	0.336	94.016	0.000
3	0.633	0.401	0.396	81.438	0.000
4	0.660	0.436	0.429	70.207	0.000

P<0.05

I. Behavioural Intention (BI)

Table **6.24** shows there are four significant formative variables at P<0.05 related to individuals' IB-use behavioural intention whereby they collectively can explain 74 percent of the variance in the individual's behavioural intention of IB-use. The result of multiple regression carried out on the direct determinant of IB provides the following regression equations;

(1)   BI = .715+ 1.098 (ATT) + e.

(2)   BI = -3.928+ .893 (ATT) + .142 (UIBR) + e.

(3)   BI = -3.467 + .832 (ATT) + .106 (UIBR) + .141 (PBC) + e.

(4)   BI = -3.504 + .790 (ATT) + .101 (UIBR) + .128 (PBC) + .064 (SN) + e.

The equation provided by model three is the most adequate to consider because all entered variables met the criteria of generalizability to the population. The findings are in agreement with Pavlou & Fygenson (2006) who pointed out that SN has weak role in online behaviours. In addition, SN in this study failed to meet generalizability when a cross validation sample test was carried out.

II. Attitude

Table **6.24** shows there are two significant formative attributes (out of four attributes extracted by factor analysis) which are related to the individuals' IB-use attitude successes to meet the criteria of both stepwise regression and generalizability. The result of the behavioural belief model based on individual perception on IB attributes provides the following regression equations,

(1) Attitude (ATT) = 7.189 + .366 (RAC) + e.

(2) Attitude (ATT) = 6.380+ .247 (RAC) + .279 (EOU) + e

III. Subjective Norms

Table **6.24** shows the result of stepwise regression applied to SN as a criterion variable and a person's personal and media interaction norms as independent variables. The findings show that both referents are significant in explaining 53 % of a person's IB-use subjective norm. Furthermore, the result provides the following regression equations presented as follows,

(1) SN = 12.126 + 0.093 (PR) + e

(2) SN = 10.821+ 0.078 (PR) + 0.047 (MM) + e

When SN and BI were treated as dependent variables and regressed separately against the Personal Referent (PR) and Mass Media (MM) referent, the following relationships were obtained.

 **P<0.001, *P<0.05
***R^2

Relationship met the Generalizability ———————————→
Relationship does not met Generalizability -----------------→
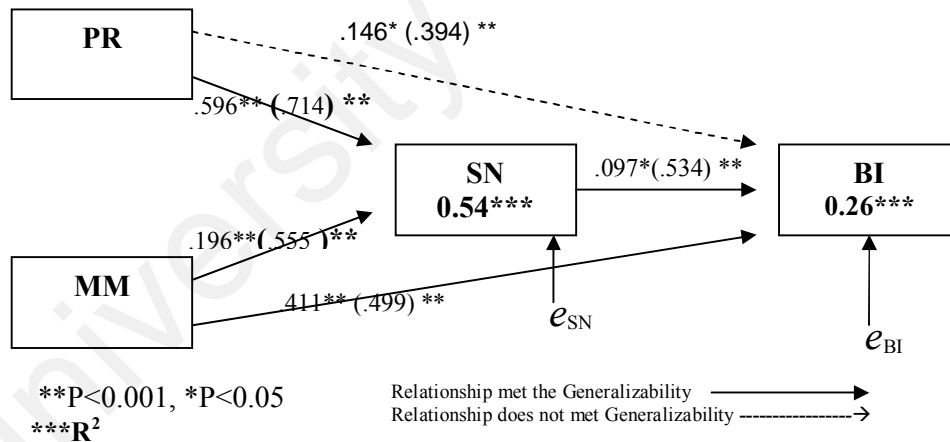
Figure 6.3 Regression Analysis of Normative Belief Model
Numbers in Parenthesis indicate zero-order correlation, other numbers are path coeffiecint.

IV. **Control Belief**

Control belief components of self-efficacy (SE) and Facilitating Condition (FC) were treated as independent variables and regressed separately with the dependent variable PBC and, the following relationships were obtained. Table **6.24** shows the simple regression for the self-efficacy variable (SE) as an independent variable for the criterion variable PBC indicating that 58 % of the variance in PBC can be explained by the variance of the individual's self-efficacy.

$$(1) \quad PBC = 11.144 + .166 \ (SE) + e$$

An examination of the three independent variables (Facilitating Condition) entered into the regression equation as formative predictors for the PBC; provides three regression equation models as follows;

(1) $PBC = 17.092 + .091 \ (TFC) + e$

(2) $PBC = 14.085 + .079 \ (TFC) + .057 \ (RFC) + e$

(3) $PBC = 13.120 + .070 \ (TFC) + .051 (RFC) + .024 \ (GOVSP) + e$
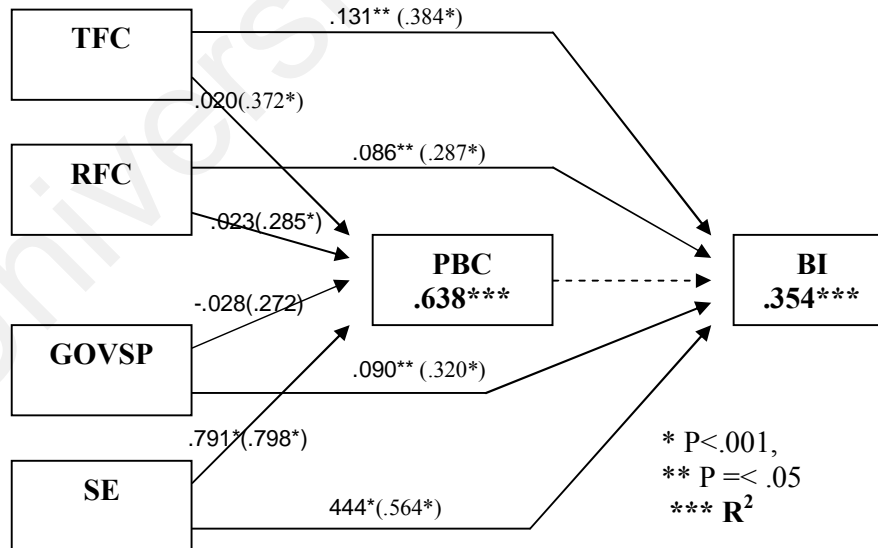
Figure 6.4 Regression Analysis of control belief components
Numbers in Parenthesis indicate zero-order correlation, other numbers are path coeffiecint.

V. User Informational Based Readiness (UIBR)

Table **6.24** shows that attitude (ATT) and Behavioural Intention (BI) were treated as dependent variables and regressed separately against the independent variables; experience; knowledge; awareness and exposure. The following relationships were obtained.
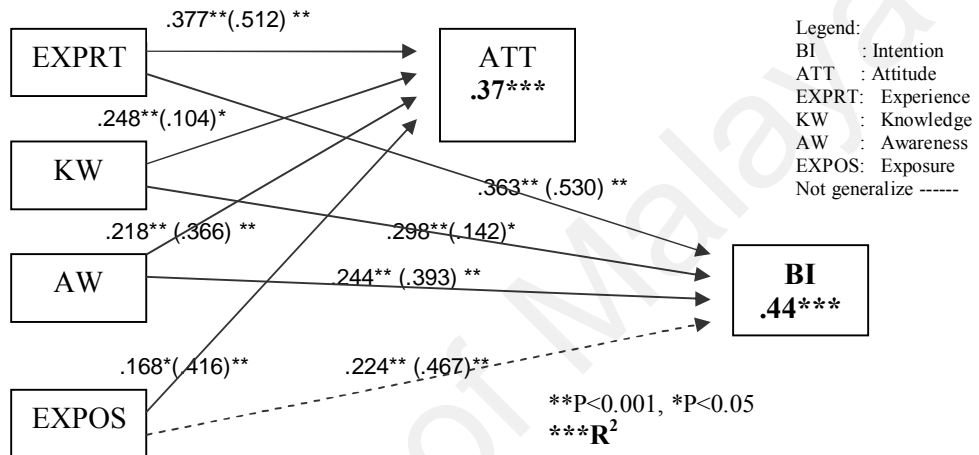
Figure 6.5 Regression Analysis of User's Readiness Components
Numbers in Parenthesis indicate zero-order correlation, other numbers are path coeffiecint.

The four regression equations of the models were obtained as follows;

(1)   BI = 15.008 + .645 (EXPRT) + e

(2)   BI = 7.750 + .698 (EXPRT) + .297 (KW) + e

(3)   BI = 2.163+ .572 (EXPRT) + .360 (KW) +.345 (AW) + e

(4)   BI = 1.746+ .442 (EXPRT) + .360 (KW) +.303 (AW) + .331 (EXPOS) + e

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6.6 Path Analysis

Path analysis, according to Bryman and Cramer (2001), is an extension of the multiple regression procedures. It was developed as a method for studying the direct and indirect effects of variables hypothesized as causes of variables treated as effects (Pedhazur, 1997). Path analysis and path coefficient are among the oldest terms in causal analysis where standardized β's are usually employed as estimates of causal effects (Cohen & Cohen, 1983).

The aim of path analysis is to provide quantitative estimates of the causal connections between sets of variables. According to Bryman & Cramer (2001), a direct effect occurs when a variable has an effect on another variable without a third variable intervening between them ; an indirect effect occurs when there is a third intervening variable through which two variables are connected. Along these lines, Pedhazur (1997, p.765) points out that multiple regression analysis can be viewed as a special case of path analysis. Following Pedhazur's (1997) guidelines, this study's construct can be interpreted as loadings in factor analysis while the paths can be interpreted as standardized beta weights in regression analysis. In order to illustrate further the study have to utilized path diagrams and path coefficients. The path diagram, according to Pedhazur (1997, p.770), is very useful for displaying graphically the hypothesised pattern of causal relations among a set of variables. In line with Bryman & Cramer (2000), the arrows indicate expected causal connections between variables. Thus, in the diagram presented in Figure (6.6), the study used upper case letters and numerical figures to represent variables in the model. Letters like "I" refer to the variable Intention, "R" User Informational Based Readiness, "A" Attitude, "N" Subjective Norm, and "C" Perceived Behavioural Control. Meanwhile, numbers like "1" refer to the variable Relative Advantage/Compatibility, "2" Ease of use , "3" Observability, "4"

Trialability , "5" Personal Norm, "6" Mass Media Norm, "7" Technology Facilitating Condition , "8" Resource Facilitating Condition, "9" Government Support , and "10" Self-Efficacy.

In studying causal connections, the researcher has to distinguish between exogenous and endogenous variables (Kerlinger & Pedhazur, 1973). Therefore, all the variables represented by numerical figures are examples of exogenous variables while those represented by letters with the exceptional of "R" are endogenous variables. In Pedhazur's (1997) words:

> *"An exogenous variable is one whose variation is assumed to be determined by causes outside the hypothesized model. Therefore, no attempt is made to explain the variability of an exogenous variable or its relations with other exogenous variables. An endogenous variable… is one whose variation is explained by exogenous or other endogenous variables in the model." (Page 770)*

Based on this distinction of variables in path analysis, it is implied that variables could be dependent and independent in the same model. Kerlinger & Pedhazur, (1973, p.309) highlighted some assumptions underlying the application of path analysis as follows;

1. The relations among the variables in the model are linear, additive, and causal.
2. Residuals are not correlated with variables preceding them in the model.
3. There is a one-way causal flow in the system.
4. Variables are measured on an interval scale.

The diagram in Figure 6.6 below represents the a priori model as follows;
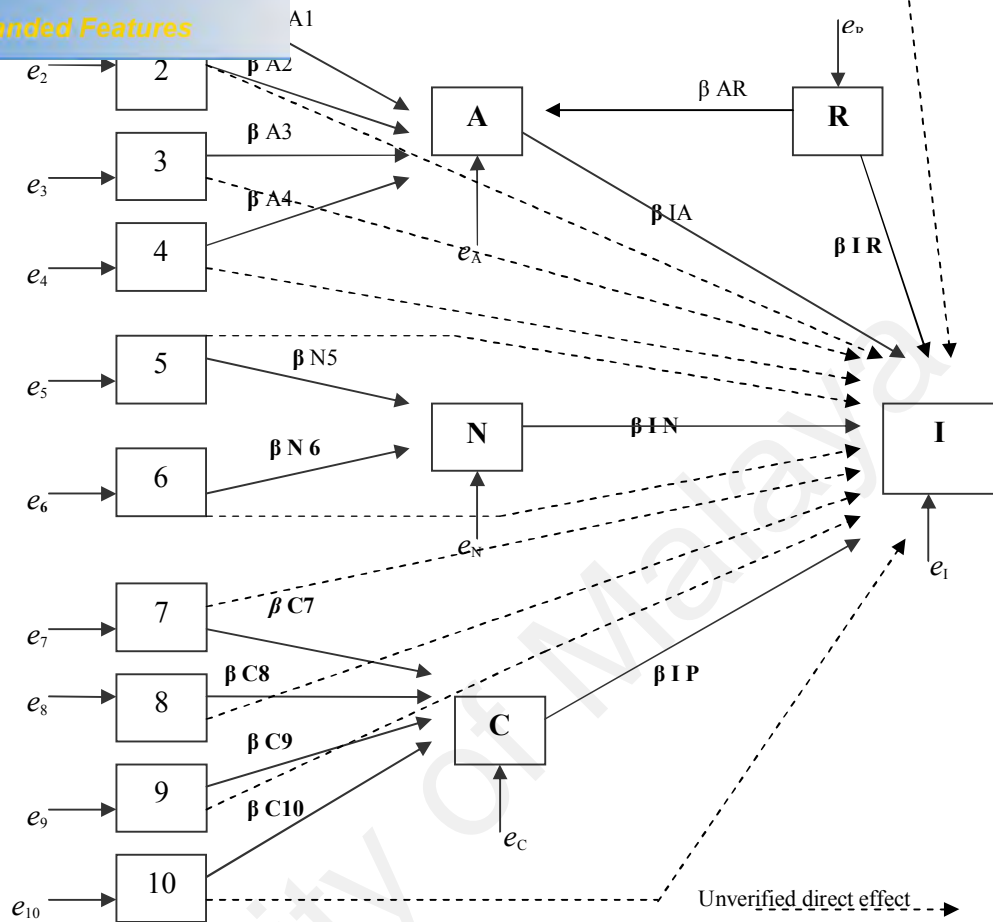
Figure 6.6 A priori Model

This study checks for the aforementioned assumption required for using the application of path analysis and there is no violation. In addition, both the simple and multiple linear regressions employed in previous sections were helpful in explaining the predictive power of independent variables in direct relation. The arrows in the above diagram were drawn from the independent variable (*exogenous)* to the dependent variable (end*ogenous)*. For instance, variable A is conceived to be dependent on variables 1, 2, 3, 4 and variable R. Similarly, variable N is conceived to be dependent on variables 5 and 6, and variable C is conceive to be dependent on variables 7, 8, 9 and variable 10. Consequently, variable I is conceived to be dependent on A, N, C, and variable R. As shown in the priori model, variables with a numerical symbol from 1 to

10, including the variable R, are exogenous variables while the variables in uppercase letters (I, A, N, and C) are said to be endogenous variables. Furthermore, an endogenous variable treated as a dependent variable in one set of variables may also be conceived as an independent variable in relation to other variables (Kerlinger & Pedhazur 1973). Along these lines, the path coefficient indicates the direct effect of variable taken as a cause of a variable taken as an effect. The Variable 1 is exogenous and is, therefore, represented by a residual (e_1).

6.6.1 Testing the Full Effects Model to Identify Significance Paths

According to Kerlinger and Pedhazur (1973, p.310) a set of equations referred to as a recursive[1] model are required to assess the full effects model and identifying significance paths. Recursive models or as according to Cohen and Cohen (1983, p. 355) can be estimated by ordinary regression equations. In the testing hypotheses part, this study performed a series of multiple regression to derive the various path coefficient for full effects model and to identify significance paths. A path analytic approach using Ordinary Least Squares (OLS) technique was utilized to test the proposed model as recommended by Cohen and Cohen (1983) shown in Figure (6.7) The relationships among the variables in the recursive model depicted in series equations as fellows;

$$X1 = e_1$$
$$X2 = e_2$$
$$X3 = e_3$$
$$X4 = e_4$$
$$X5 = e_5$$
$$X6 = e_6$$
$$X7 = e_7$$
$$X8 = e_8$$
$$X9 = e_9$$

---

[1] Recursive models are those in which there is no reciprocal causation, feedback loops, or unmeasured common causes. Involving one or more endogenus are present ... Nonrecursive models are more complex models involving any or all of the above phenomena" Cohen &Cohen, 1983, page 376.

X10	=	e_{10}
XR	=	e_R
XA	=	PA1X1 + PA2X2 + PA3X3 + PA4X4+ PARXR + e_A
XN	=	PN5X5 + PN6X6 + e_N
XC	=	PC7X7 + PC8X8 + PC9X9 + PC10X10+ e_C
XI	=	PI1X1 + PIRXR + PIAXA + PA2X2 + PI3X3 + PN5X5 + PINXN + PI6X6 + PI7X7 + PI8X8 + PI9X9 + PICXC + PCI10X10 + e_I

The notion PA1X1, PN5X5, PC7X7, PIAXA, etc denote a specific path coefficient.

Thus, PA1X1 would indicate the path coefficient relating the exogenous variable X1 to the endogenous variable A1. The full effects model is displayed in Figure 6.7 below and the results of the series of regressions are shown in Table 6.25.
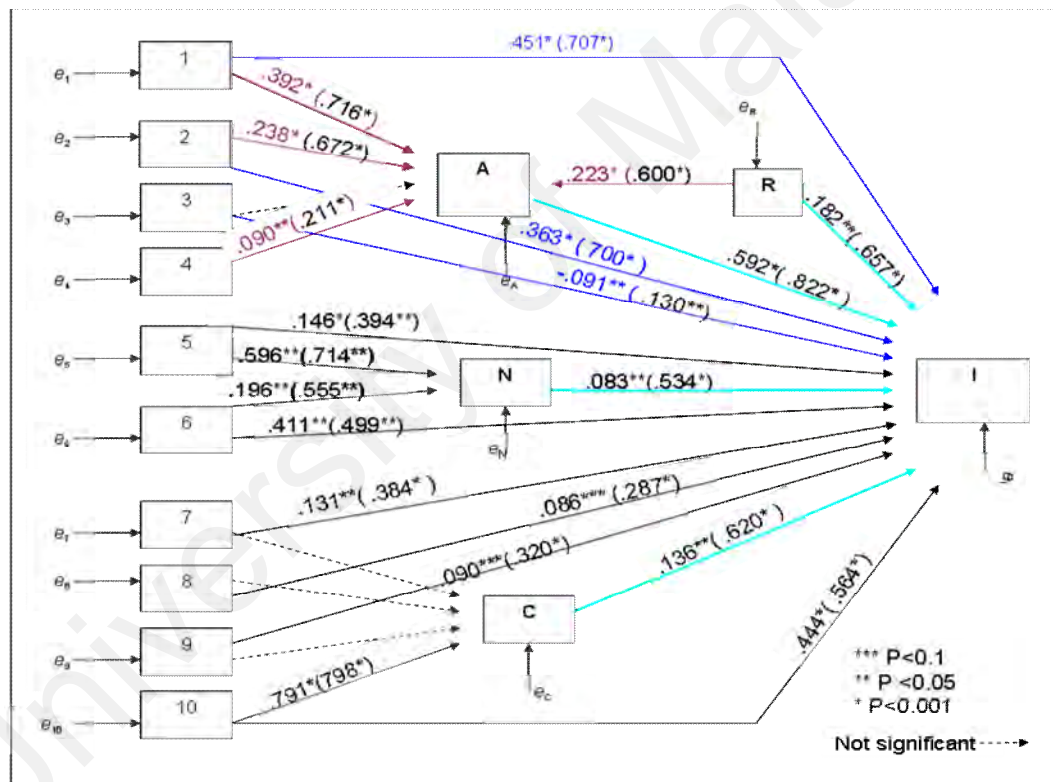
Figure 6.7 Full Effect Model of Causal Path Findings via LRA
Numbers in Parenthesis indicate zero-order correlation, other numbers are path coefficients.

In Pedhazur's (1997) words;

"In path analysis, more than one regression analysis may be called for. At each stage, an endogenous variable is regressed on the variables that are hypothesized to affect it. The β's thus calculated are the path coefficients for the path leading from the particular set of independent variables to the dependent variable under consideration." Page 776

The model in Figure 6.8 requires five regression analyses for the calculation of all the path coefficients. The path coefficient from R to I (P_{IR}) is calculated by regression I on R, from A to I (P_{IA}) is calculated by regression I on A, from N to I (P_{IN}) is calculated by regression I on N and from C to I (P_{IC}) is calculated by regression I on C. For the purpose of this research, a path is deemed significant if it passes the 90 % confidence level.

Table 6.25 Results of Path Analysis on the Full Effects Model

Regression	R^2	ΔR^2	Beta value	t-value	Sig
Pi1X1			.111	2.353	.019
PiRXR			.153	4.043	.000
PiAXA			.534	12.839	.000
Pi2X2			.073	1.550	.122
Pi3X3			-.062	-2.064	.040
Pi5X5			.024	.581	.562
PiNXN	.756	.747	.015	.355	.723
Pi6X6			.022	.555	.579
Pi7X7			.069	2.170	.031
Pi8X8			-.007	-.238	.812
Pi9X9			.031	1.035	.301
PicXc			.121	2.408	.017
Pi10X10			-.095	-1.965	.050
PA1X1			.392	7.309	.000
PA2X2			.238	4.444	.000
PA3X3	.593	.587	-.011	-.285	.776
PA4X4			.090	2.238	.026
PARXR			.223	4.961	.000
PN5X5	.535	.532	.596	13.334	.000
PN6X6			.196	4.396	.000
PC7X7			.020	.554	.580
PC8X8	.638	.634	.023	.685	.494
PC9X9			-.028	-.788	.431
PC10X10			.791	21.181	.000

6.6.2 Model Revision to Derive a Trimmed Model

In the model revision analysis, all insignificant paths (identified through the multiple regression carried out in the first part of the analysis) were eliminated from the full effects model. This step is necessary to derive a more parsimonious model via benefit

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from the approach of *theory trimming*. Many researchers like Pedhazur (1997) prefer to use a criterion of meaningfulness for the deletion of the paths, even when their coefficients are statistically significant. The study performed another round of regression analysis to drive new regression statistics. The regressions were carried out based on the following equations which represent the significant relationship identified in the full effect model.

$$XA \quad = \quad PA1X1 + PA2X2 + PA4X4 + PARXR + e_A$$
$$XN \quad = \quad PN5X5 + PN6X6 + e_N$$
$$XC \quad = \quad PC10X10 + e_c$$
$$XI \quad = \quad Pi1X1 + PiRXR + PiAXA + Pi3X3 + Pi7X7 + PicXc + Pi10X10 + e_i$$

Consequently, Table 6.26 presents the results of path analysis of the trimmed model of this study which is enhanced by the diagram in Figure 6.8.

Table 6.26 Result of Path Analysis on the Trimmed Model

Regression	R^2	ΔR^2	Beta value	t-value	Sig	VIF	Durbin-Watson
Pi1X1			.161	3.814	.000	2.570	
PiRXR			.161	4.301	.000	2.022	
PiAXA			.555	13.794	.000	2.343	
Pi3X3	.751	.746	-.060	-2.168	.031	1.118	1.974
Pi7X7			.090	3.009	.003	1.298	
PicXc			.143	3.036	.003	3.229	
Pi10X10			-.089	-1.886	.060	3.222	
PA1X1			.389	7.389	.000	2.481	2.042
PA2X2	.593	.588	.240	4.583	.000	2.459	
PA4X4			.085	2.387	.017	1.127	
PARXR			.224	5.002	.000	1.790	
PN5X5	.535	.532	.596	13.334	.000	1.570	1.794
PN6X6			.196	4.396	.000	1.570	
Pc10X10	.637	.636	.798	25.372	.000	-	1.863

The trimmed model result shows the lack of support for the Subjective Norms (SN) affect on BI. This is not consistent with Ajzen's (1991) theory that potential adopters

intend to act based on others' perceptions and also with the results reported by Taylor & Todd (1995a), who found subjective norms to be important in affecting adoption. In contrast, this study's result is consistent with previous IB studies findings conducted by Liao et al. (1999), Tan & Teo (2000) and Shih & Fang (2004). The findings support the importance of observability in directly affecting a person's intention to use IB in a negative way.
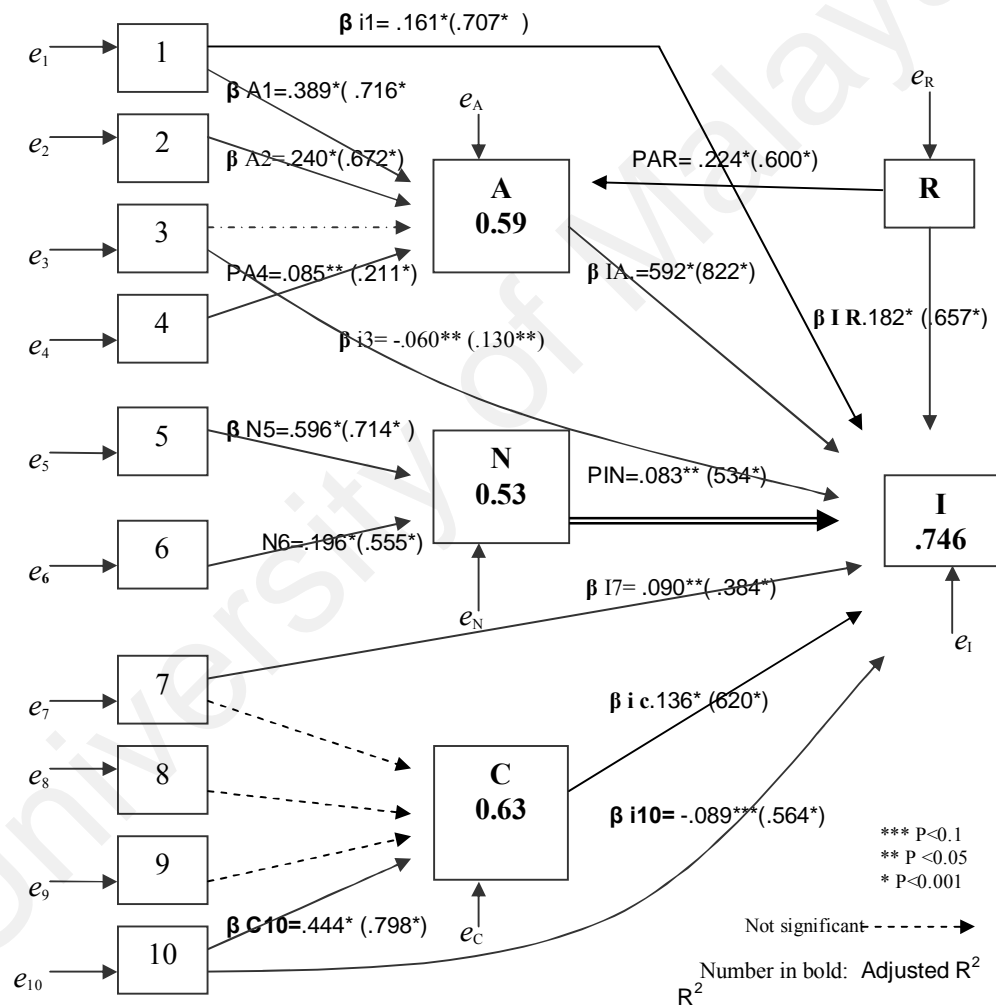
Figure 6.8 The Trimmed Model

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6.6.3 Determining the Indirect Effects

Following Pedhazur's (1997, p.795) suggestion, the indirect effect of the exogenous variables on the research main endogenous variable "I", Behavioural Intention, could be calculated based on paths multiplication. Table 6.27 shows the indirect effects of behavioural belief, normative belief, and control belief on the behavioural intention to adopt IB as well as their relevant path coefficients.

Table 6.27 Path Analysis Indirect Effects

Cause /effects	*Indirect Paths*	*Path Coefficient*
Behavioural belief / Intention	X1→XA →XI	(.389×.592) = 0.230288
	X2→XA →XI	(.240 ×.592) = 0.14200
	X4→XA →XI	(.085 ×.592) = 0.05032
	XR→XA →XI	(.224 ×.592) = 0.132608
Normative belief / Intention	X5→XN →XI	(.596 ×.083) =.049468
	X6→XN →XI	(.196 ×.083) =.016268
Control belief / Intention	X10→XC →XI	(.798 x .124) =.098952

6.6.4 Determining the Total Effects

Table 6.28 the Total Effects of Behavioural Belief, Normative Belief and Control Belief on the Behavioural Intention

Cause /effects	Indirect Effect	Direct effect	Total Effect
Behavioural belief / Intention	0.230288 + 0.14200 + 0.05032 + 0.132608 *= 0.555216*	.161 -.060 *= 0.10*	 *= 0.655216*
Normative belief / Intention	.049468 +.016268 *= 0.065736*	*= 0.00*	*= 0.065736*
Control belief / Intention	*= 0.098952*	*= -0.089*	*= 0.075688*

Results presented in Table 6.28 were obtained by calculations reported in Figure 6.8. The total indirect effect of a customer's behavioural beliefs on their Intention is equal to the sum of four components (0.56), which are the composed products of standardized regression coefficients. It is clear that normative belief is virtually zero- a potentially important finding that is obscured when only the total indirect effect is reported. The total indirect effect of a customer's behavioural beliefs on their Intention was almost 0.10.

6.6.5 Determining the Crossover Effects

Allowing for crossover effects in the Theory of Planned Behaviour resulted in improvements in model prediction (Taylor & Todd, 1995b). Figure 6.9 presents the trimmed model, which permits crossover effects relations among variables. In complex models, as mentioned by Pedhazur (1997), one variable may affect another variable indirectly through multiple paths. According to him, it stands to reason that indirect effect through certain paths may be more meaningful and/or stronger than others.
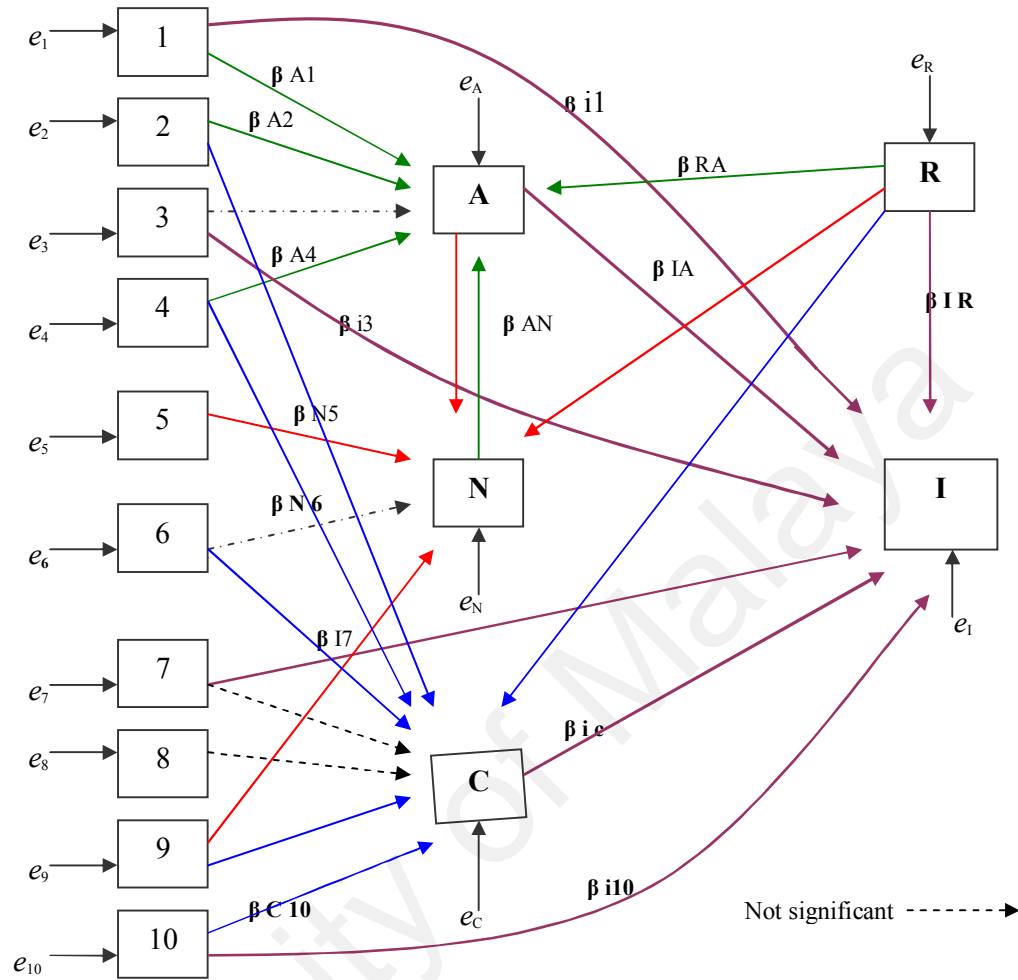
Figure 6.9 Crossover Effects Model

6.7 Validating Regression Results and Model

Lee & Baskerville (2003) pointed out that generalizability of an IS theory to different settings is important not only for purposes of basic research, but also for purposes of managing and solving problems that corporations and other organizations experience in society. In order for a Multiple Linear Regression equation to have utility for prediction it must be generalized beyond the sample that was used to derive it. Generalizability in Information Systems, according to Lee & Baskerville (2003), refers to the validity of a theory in a setting different from the one where it was empirically

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tested and confirmed. A theory that lacks such generalizability also lacks usefulness. Statistical sampling-based generalizability is a valid concept within its bounds, but its uncritical application as the norm for all generalizability can lead to an improper assessment of the generalizability of many research studies (Lee & Baskerville, 2003).

A variety of methods are available for assessing such generalizability. In order to generalize our findings to populations beyond our sample, this study needs to aggregate evidence that the study's regression results are not limited to the sample used in estimation. Since the study does not usually have the resources available to replicate and validate our results, the study employ statistical procedures to assure that the solution that fits our data sample can be generalized. In this connection, Hair et al. (2006, p. 259) suggested two approaches by which the researcher can assess the validity of the results, the first method including an assessment of adjusted R^2 and the second approach dividing the sample into two subsamples (split-sample).

(1) Adjusted R^2

This study's first indicator of generalizability is the adjusted $\mathbf{R^2}$ value, which is adjusted for the number of variables included in the regression equation. The adjusted $\mathbf{R^2}$ is used to estimate the expected shrinkage that would not generalize to the population because our solution is over-fitted to the data set by including too many independent variables. Hair et al. (2006, p.234) reported that adjusted $\mathbf{R^2}$ is useful in comparing models between different data sets because it will compensate for the different sample. If the adjusted $\mathbf{R^2}$ value is much lower than the $\mathbf{R^2}$ value, it is an indication that the regression equations may be over-fitted to the sample, and of limited generalizability. $\mathbf{R^2}$=.751 and the Adjusted R Square =.746 are very close values, anticipating minimal shrinkage based on this indicator (Tabachnick & Fidell, 2007).

(2)

(3) Cross-Validation

Cross-Validation, according to Malhotra (2004, p.522), is one of the approaches for evaluating the model, whereby the researcher examines whether the regression model continues to hold on comparable data not used in the estimation (Hair et al., 2006). The typical procedures to validate the study results (model) which are obtained by using the entire data set, were guided by Malhotra (2004, p.523) as follows;

I. The researchers divides the sample randomly into two groups which are the estimation sample and validation sample.

II. The regression is computed for the estimation sample and used to predict the values of the dependent variable in the validation sample. SPSS provides us with Multiple R statistics for both the estimation and the validation sample.

The study then compares the regression equations derived for both samples. If the two regression equations contain a very different set of variables, this indicates that the variables might have achieved significance because of the sample size and not because of the strength of the relationship. Our findings about these individual variables would be that the predictive utility of these variables does not meet generalizability. R^2, also called the coefficient of multiple determination, is the percentage of the variance in the dependent explained uniquely or jointly by the independents. If the Multiple R value for the validation sample is close to the value for the screening sample, the model is validated. In the double cross- validation strategy, the study reverses the designation of the screening and validation sample and re-run the analysis. Table 6.29 displays the split sample validation analysis results as follows;

Table 6.29 Split Sample Validation Analysis: Validating Regression Results (Determinants and Models)

Variable Entered	Full Model Sample (n=369)			Sample 1 Split = 1(n=192)			Sample 2 Split = 0 (n=177)		
DV – Intention	Beta	t	*p*.	Beta	t	*p*	Beta	t	*p*
F		252.10	**.000**		122.99	**.000**		127.14	.000
(Constant)		-3.384	.001		-2.562	.011		-2.186	.030
IV1 - Attitude	.592	15.763	.000	.573	10.716	.000	.619	11.525	.000
IV2 – Readiness	.182	4.880	.000	.173	3.158	.002	.191	3.700	.000
IV3 – PBC	.136	3.712	.000	.132	2.445	.015	.134	2.676	.008
IV4 – SN	.083	2.550	.011	.111	2.393	.018	.051	1.089	.277
Summary Table									
Multiple R		.857			.851			.864	
R²		.735			.725			.747	
Adjusted R²		.732			.719			.741	
SE		4.18			4.31			4.07	
DV – Attitude	Beta	t	*p*.	Beta	t	*p*	Beta	t	*p*
F		105.69	.000		58.97	.000		48.087	.000
(Constant)									
IV1 – Readiness	.223	4.961	.000	.248	4.098	.000	.201	3.003	.003
IV2 – RACOMPT*	.392	7.309	.000	.293	3.877	.000	.475	6.169	.000
IV3 – OBS	-.011	-.285	.776	-.038	-.695	.488	.002	.041	.967
IV4 – Ease of Use *	.238	4.444	.000	.320	4.290	.000	.168	2.175	.031
IV5 – Trialability	.090	2.238	.026	.100	1.778	.077	.090	1.536	.126
Summary Table									
Multiple R		.770						.764	
R²		.593						.584	
Adjusted R²		.587						.572	
SE		3.87950						4.05118	
DV – SN	Beta	t	*p*.	Beta	t	*p*	Beta	t	*p*
F		210.17	.000		137.48	.000		78.40	.000
(Constant)		13.774	.000		9.528	.000		9.854	.000
IV1 - PR***	.596	13.334	.000	.628	10.622	.000	.553	8.084	.000
IV2 – MM**	.196	4.396	.000	.202	3.420	.001	.196	2.864	.005
Summary Table									
Multiple R		.731			.770			.688	
R²		.535			.593			.474	
Adjusted R²		.5327			.588			.468	
SE		.22446			6.94279			7.50467	

* p < 0.05

Continued Table 6.29
Split Sample Validation Analysis: Validating Regression Results
(Determinants and Models)

Variable Entered	Full Model Sample (n=369)			Sample 1 Split = 1(n=192)			Sample 2 Split = 0 (n=177)		
DV3 – PBC	Beta	t	*p.*	Beta	t	*p*	Beta	t	*p*
F		28.91	.000		15.319	.000		14.053	.000
(Constant)		**11.319**	**.000**		**8.623**	**.000**		**7.271**	**.000**
IV1 – TFC*	**.284**	**5.555**	**.000**	**.259**	**3.535**	**.001**	**.309**	**4.289**	**.000**
IV2 – RFC*	**.188**	**3.815**	**.000**	**.232**	**3.346**	**.001**	**.147**	**2.079**	**.039**
IV3 – GOVSP	**.121**	**2.347**	**.019**	**.092**	**1.276**	**.204**	**.153**	**2.069**	**.040**
				Summary Table					
Multiple R		438			.443			.443	
R^2		.192			.196			.196	
Adjusted R^2		.185			.184			.182	
SE		7.72			7.56			7.93	
DV – PBC	Beta	t	*p.*	Beta	t	*p*	Beta	t	*p*
F		643.75	.000		327.77	.000		311.41	.000
(Constant)		**12.498**	**.000**		**9.102**	**.000**		**.8515**	**.000**
IV1 – SE*	**.798**	**25.372**	**.000**	**.796**	**18.104**	**.000**	**.800**	**17.647**	**.000**
				Summary Table					
Multiple R		.798			.796			.800	
R^2		.637			.633			.640	
Adjusted R^2		.636			.631			.638	
SE		5.16			5.08			5.27	
DV – BI	Beta	t	*p.*	Beta	t	*p*	Beta	t	*p*
F		70.207	.000		40.013	.000		33.826	.000
(Constant)		**1.034**	**.302**		**.618**	**.538**			**.302**
IV1 – KW *	**.298**	**7.284**	**.000**	**.263**	**4.733**	**.000**	**.329**	**1.035**	**.000**
IV2 – EXPRT *	**.363**	**7.434**	**.000**	**.426**	**6.477**	**.000**	**.294**	**5.511**	**.000**
IV3 – EXPOS	**.224**	**4.719**	**.000**	**.096**	**1.489**	**.138**	**.358**	**4.082**	**.000**
IV4 – AW	**.244**	**5.481**	**.000**	**.318**	**5.154**	**.000**	**.166**	**5.186**	**.010**
				Summary Table					
Multiple R		.660			.679			.664	
R^2		.436			.461			.440	
Adjusted R^2		.429			450			.427	
SE		6.09			6.02			6.06	
DV1 – Intention	Beta	t	*p.*	Beta	t	*p*	Beta	t	*p*
F		308.98	**.000**		153.35	**.000**		153.69	.000
(Constant)		**-.673**	**.501**		**-.977**	**.330**		**.084**	**.933**
IV1 - Attitude	**.653**	**17.906**	**.000**	**.636**	**12.531**	**.000**	**.675**	**12.663**	**.000**
IV2 – PBC	**.207**	**6.025**	**.000**	**.203**	**4.023**	**.000**	**.208**	**4.348**	**.000**
IV3 – SN	**.097**	**2.912**	**.004**	**.118**	**2.507**	**.013**	**.075**	**1.538**	**.126**
				Summary Table					
Multiple R		.847			.843			.853	
R^2		.717			.710			.727	
Adjusted R^2		.715			.705			.722	
SE		4.31			4.41			4.22	
DV – Attitude	Beta	t	*p.*	Beta	t	*p*	Beta	t	*p*
F		234.69	.000		127.46	.000		110.12	.000
(Constant)		**5.363**	**.000**		**4.839**	**.000**		**2.825**	**.005**
IV1 - RACOMPT*	**.466**	**8.764**	**.000**	**.377**	**4.992**	**.000**	**.540**	**7.135**	**.000**
IV2 – OBS	**-.026**	**-.627**	**.531**	**-.051**	**-.908**	**.365**	**-.013**	**-.206**	**.837**
IV3 – Ease of Use *	**.325**	**6.230**	**.000**	**.412**	**5.564**	**.000**	**.251**	**3.401**	**.001**
IV4 –Trialability	**.068**	**1.653**	**.099**	**.075**	**1.302**	**.195**	**.069**	**1.167**	**.245**
				Summary Table					
Multiple R		0.752			0.760			0.750	
R^2		0.565			0.578			0.562	
Adjusted R^2		0.560			0.569			0.552	
SE		4.00			3.87574			4.14453	

* p < 0.05

6.8 Nomological Validity of Measures

Nomological validity according to Hair et al. (2006) refers to the degree to which the summated scale makes accurate predictions of other concepts in a theoretical based model. This type of validity here assesses the relationship between theoretical constructs and seeks to confirm significant correlations between the constructs as predicted by theory (Malhotra 2004, p.269). Moore & Benbasat (1996) found support for the predictive validity of innovation characteristics (see also Agarwal & Prasad 1997, 1998; Karahanna et al., 1999; Plouffe et al., 2001).

6.9 Analysis of Yemeni Banks Websites

This section aims to discus and evaluate banking presence via the Internet in Yemen. Therefore, this study has carried out an exploratory review of all the websites of the banks based in Yemen that have a website. There are two reasons which motivate the researcher to evaluate banks' websites. The first major reason is that the development in IB is affiliated with the utilization of the Internet; therefore, researchers need to make sure of the availability of the bank's website (Bradley & Stewart, 2003). Secondly, is to extract and identify features, contents, and interactivity of the banks' web site that this study can use in the evaluation.

The list of all banks operating in Yemen was obtained form the Central Bank of Yemen website at http://www.centralbank.gov.ye/combanks.htm#ISBYFI. Then, each bank was investigated to determine if they had a web presence or not. Consequently, the websites of these banking institutions were then analyzed based on models similar to those used by Southard & Siau (2004), Jasimuddin (2001) and Diniz (1998) and the model utilized by Guru et al. (2003) and the Chung & Paynter (2002) method which is basically adapted from Hersey's Model to evaluate banks' websites. There are many

techniques which can be used in websites evaluation but in this empirical study, the qualitative evaluation method will be used.

In evaluating Yemenis banks' presence on the web the study did not make any direct contact with the banks themselves and our observation is from the point of view of a user who is looking for a bank to do business with. Since the number of banks in Yemen is small compared to the USA, the evaluation framework included all the banks operating in Yemen which are recognized by the CBY and the Union of Arab Banks (UAB).

6.9.1 IT Utilization by Yemeni banks

The following Table 6.30 shows the Yemeni banks' utilization of Internet technology according to the five dimensions inspired by Southard & Siau (2004), namely informational, administrative, transactional, portal and other services. Southard & Siau's (2004) method was found useful and applied in this evaluation to gain a further understanding of how Yemeni banks are currently utilizing Internet technology. According to the method used by this study, the bank websites were evaluated using a binary score of zero and one. For each feature, zero points indicate an absence of the feature whereas one indicates the presence of the feature. Table 6.30 shows that Yemeni banks scored the highest scores of 39 points in the informational level that involved the five components. This indicates that their websites were of high quality in terms of the informational function. This finding is consistent with previous studies (i.e. Denis, 1998; Southard & Siau, 2004; and Ainin et al., 2005). Consequently, the administrative level achieves 23 percent while the percentage at the transactional level is 27 percent. The portal level scores a rating of 36 percent while level (4) scores 10 percent, which is the lowest one. Overall, the study noted that Yemeni banks' websites have a high rating in providing general information and bank history.

Table 6.30 Banks' Utilization of Internet Technology in Yemen

Items	Banks Operating in Yemen																	Total Scoring By each item
Level (0) Informational	C B Y	Y B R D	N B Y	Y K B *	I B Y	Y C B	U B L	A B	C A I B	R B *	W B *	Y G B	S B y B	I B D	T I B	S I B *	C A C	
1. General Bank Info. And History	1	1	1	0	1	1	1	1	1	0	0	1	1	1	1	0	1	**13**
2. Financial Education Info.	1	1	1	0	0	1	0	1	1	0	0	1	1	1	0	0	1	**10**
3. Employment Info.	0	0	0	0	0	1	0	1	1	0	0	0	1	1	1	0	1	**8**
4. Interest Rate	1	0	1	0	1	1	0	1	0	0	0	1	0	0	0	0	1	**7**
5. Financial Calculators	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	**1**
Level (1) Administrative																		**39**
6. Account Info. Access	1	0	0	0	1	1	1	1	0	0	0	1	1	0	0	0	1	**8**
7. Applications for Services	1	0	1	0	1	1	1	1	0	0	0	1	1	0	1	0	1	**10**
8. Personal Finance Software Applications	1	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	1	**5**
Level (2) Transactional																		**23**
9. Account Transfer Capabilities	1	0	0	0	0	1	1	1	0	0	0	1	1	0	0	0	0	**6**
10. Bill-pay Services	0	0	0	0	1	1	1	1	0	0	0	1	1	0	0	0	0	**7**
11. Corporate Services	1	0	0	0	0	1	1	1	1	0	0	1	1	0	1	0	0	**8**
12. Online Insurance Services	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	**2**
13. Online Brokerage Services	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	**3**
14. Online Trust Services	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	**1**
Level (3) Portal																		**27**
15. Links to Financial Info.	1	1	1	0	1	1	1	1	1	0	0	0	1	0	1	0	1	**11**
16. Links to Community Info.	1	1	1	0	0	1	1	1	0	0	0	0	1	0	1	0	1	**9**
17. Links to Local Businesses	1	1	1	0	0	1	0	1	0	0	0	0	0	0	1	0	1	**7**
18. Links to Non-local Businesses	1	1	1	0	1	1	0	1	1	0	0	0	0	0	1	0	1	**9**
Level (4) Others																		**36**
19. Wireless Capabilities	1	0	0	0	1	1	1	1	0	0	0	1	0	1	0	0	1	**5**
20. Search Function	1	0	0	0	0	1	0	1	1	0	0	0	1	1	0	0	0	**5**
																		10
Overall Scores	14	6	8	0	8	15	13	17	7	0	0	11	12	4	8	0	13	
Presence Percentages	70	30	40	0	40	75	65	85	35	0	0	55	60	20	40	0	65	
Ranking	3	9	7	0	7	2	4	1	8	0	0	6	5	10	7	0	4	
Average of Presence[1]	**52.31 %**																	

*Websites under construction considered not available.

*Each item given one point for presence of the feature and zero for the absence of the feature (total items points is 20) based on banks' website survey as of Saturday, 12 November 2005.

1- Average of Presence is exempted banks do not have website.

Source: Selected items utilized from Southard & Siau (2004).

At the time of this study, Table 6.30 also indicated that the Arab Bank (AB) was the best in terms of utilizing web technology. It is number one in the ranking with its website scoring 17 out of 20 points (85%). The second bank in this ranking is the

Yemen Commercial Bank (YCB), which scored 15 out of 20 points (75%). The third

bank placed in utilizing web technology is the Central Bank of Yemen (CBY), which

scored 14 points with a percentage of 70 percent followed by United Bank Limited

(UBL), (CAC) and the Yemen Gulf Bank (YGB). The other banks remain under 50

percent and these low indicators reflect that the majority are still not fully utilizing web

technology. Oerall, the average score of web presence by Yemeni banks is 52.31 %

considering that banks which do not have a website were exempted.

6.9.2 Interactivity of Yemeni Banks' Website

The interactivity of banks' websites was assessed using Denis' (1998) method and the

components used in this evaluation were discussed previously in the literature review

(see section 2.6.2 and Table 2.7).

Table 6.31 Level of Interactivity of Bank Websites

Banks Websites	Informational			Transactional			Customer Relationship			Overall Score			
	Basic	Intermediate	Advanced	Basic	Intermediate	Advanced	Basic	Intermediate	Advanced	Basic	Intermediate	Advanced	Overall bank Scoring
Central Bank of Yemen (CBY)	3	2	1	1	0	0	3	1	0	6	1	4	**11**
Yemen Bank for Reco. & Dev. (YBRD)	2	2	1	0	0	0	2	0	0	5	0	2	**7**
National Bank of Yemen (NBY)	3	2	1	0	0	0	3	0	0	6	0	3	**9**
Yemen Kuwait Bank (YKB)	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Inter- Bank of Yemen (IBY)	3	2	2	3	3	0	1	1	1	7	6	3	**16**
Yemen Comm. Bank (YCB)	3	2	2	3	3	1	3	1	1	7	7	5	**19**
United Bank Limited (UBL)	3	2	2	3	3	0	2	1	0	7	6	3	**16**
Arab Bank Limited (AB)	3	3	3	3	3	0	3	1	1	9	6	5	**20**
Credit Agricole Indosuez Bank (CAIB)	3	3	2	0	2	0	3	1	1	8	2	5	**15**
Al-Rafidayn Bank (RB)	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Islamic Bank for Development (IBD)	3	2	1	0	0	0	3	0	0	6	0	3	**9**
Tadamon Islamic Bank(TIB)	1	2	0	0	0	0	1	1	0	3	0	2	**5**
Saba' Islamic Bank (SIB)	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Watani Bank(WB)	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Yemen Gulf Bank (YGB)	3	2	2	3	3	0	3	1	1	7	6	5	**18**
Shamil Bahrain Bank (SBB)	2	2	0	0	0	0	0	0	0	4	0	0	**4**
Coop. Agriculture Credit Bank (CAC)	3	2	3	3	0	0	3	0	0	8	3	3	**14**

Source: Derived form Denis (1998) Model

Based on those components the bank websites were evaluated using the matrix of 3X3 = nine cells explained by using a binary score of zero and one for each feature in each of the (informational, transactional and improve customer relationship) categories to the level of interactivity matrix cells. A zero indicates an absence of the feature whereas a one indicates the presence of the feature (Denis 1998). Table No 6.31 explains the extent of the interactivity of banks' websites based in Yemen. According to Guru et al. (2003), the perfect well-developed bank website should have a maximum overall score of 27 and a zero would indicate a bank with absolutely no Internet presence.

6.9.3 Contents of Yemeni Bank Websites

The contents and features of banks' websites vary from bank to bank. In order to provide the necessary information on the nature of elements that form a bank's website in Yemen, this study attempted to investigate the Yemeni banks' websites contents based on both Jasimuddin's (2001), Chung & Paynter's (2002) methods.

The following Table 6.32 presents Jasimuddin's (2001) methods of evaluating Banks' websites. The results presented in the table show the contents of major Yemeni banks' websites. It reveals that the Websites of banks in Yemen lack some facilitating functions such as site search, site map, links to job opportunities or the human resources division, and links that provide information on financial market issues. On the other hand, the websites belonging to the foreign banks which operate in Yemen are much better in facilitating most of the features to their online customers.

Table 6.32 Yemeni Banks' Websites Contents

Web Sites Contents	Banks in Evaluation																	Overall Scores
	C B Y	Y B R D	N B Y	Y K B	I B Y	Y C B	U B L	A B	C A I B	R B	W B	Y G B	S B B	I B D	T I B	S I B	C A C	
Internet banking	0	0	0	0	1	1	1	1	1	0	0	1	0	0	0	0	0	**6**
Financial Market	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	**4**
Retail banking	0	1	1	0	1	1	1	1	1	0	0	1	1	1	1	0	1	**12**
Corporate Banking	1	1	1	0	1	1	1	1	1	0	0	1	1	1	1	0	1	**13**
Investment Services	1	1	1	0	1	1	1	1	1	0	0	1	1	1	1	0	1	**13**
Treasury services	1	1	1	0	1	1	1	1	1	0	0	0	1	0	0	0	0	**9**
About the bank	1	1	1	0	1	1	1	1	1	0	0	1	1	1	1	0	1	**13**
Financial Outlook	1	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	**4**
Hot links	1	0	0	0	0	1	1	1	1	0	0	1	0	1	0	0	1	**8**
ATM/Branches/Find Us	1	1	1	0	1	1	1	1	1	0	0	1	1	1	1	0	1	**13**
Job/HR resources	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	**3**
Publications	1	0	1	0	0	1	0	1	1	0	0	1	0	1	1	0	1	**9**
Press Releases/ News	1	0	1	0	1	1	1	1	1	0	0	1	1	1	0	0	1	**11**
Contact and email	1	1	1	0	1	1	1	1	1	0	0	1	1	1	1	0	1	**13**
Your feedback	1	0	1	0	0	1	0	1	1	0	0	1	0	1	0	0	1	**8**
Site map	1	0	0	0	0	1	0	1	1	0	0	1	0	0	0	0	1	**6**
Site search	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	**3**
On line form	0	0	0	0	1	1	1	1	1	0	0	1	0	0	0	0	1	**7**
Rates	0	1	1	0	1	1	1	1	0	0	0	1	1	0	0	0	1	**9**
Overall Scores	**12**	**8**	**11**	**0**	**11**	**17**	**13**	**19**	**18**	**0**	**0**	**16**	**9**	**10**	**7**	**0**	**13**	**164**
Ranking	**6**	**10**	**7**	**0**	**7**	**3**	**5**	**1**	**2**	**0**	**0**	**4**	**9**	**8**	**11**	**0**	**5**	
Average of the Contents Overall Presence	**164/ 323 * 100 = 50.8 %**																	

Source: Jasimuddin, (2001)

Table 6.33 presents the evaluation method proposed by Chung & Paynter (2002) which consists of seven components with 34 elements that required the researcher to record zero for the absence and one for the presence of each element. In this evaluation method, each bank was given a score based on the total score achieved and the percentage term by dividing the total number of presented elements by 34, which is the maximum number of elements a bank should have as suggested by Chung & Paynter's (2002) model. The evaluation's results reveal that Yemeni banks which provide IB had high scores. At the time of the study, there were four out of seventeen banks which did not have websites (i.e Yemen Kuwait Bank (YKB), Saba Isalmic Bank (SIB), Al-Rafidayn Bank (RB), and Watani Bank (WB)). The evaluation of the banks' websites

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using Chung & Paynter's (2002) Model was performed in the period 2004-2007 and the

results of the evaluation are presented in Table 6.33 as follows.

Table 6.33 Evaluation of Banks Websites: Hersey's Model

Components/ Elements	CBY	YBRD	NBY	YKB*	IBY	YCB	UBL	AB	CAIB	RB*	WB*	YGB	SByB	IBD	TIB	SIB*	CAC
Information (3)																	
Company Information	1	1	1	0	1	1	1	1	1	0	0	1	1	1	1	0	1
Customer Information	1	1	1	0	1	1	1	1	1	0	0	1	1	1	1	0	1
Product Information	1	1	1	0	1	1	1	1	1	0	0	1	1	1	1	0	1
Legal Statement(3)																	
Legal disclaimer	0	0	0	0	0	1	1	1	1	0	0	0	1	1	0	0	0
Privacy policy	0	0	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0
Security policy	0	0	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0
Order(14)																	
Check account balance	0	0	0	0	0	1	1	1	0	0	0	1	1	0	0	0	0
Transfer funds	0	0	0	0	0	1	1	1	0	0	0	1	1	0	0	0	0
Check bank statement	0	0	0	0	0	1	1	1	0	0	0	1	1	0	0	0	0
Purchase bank product	0	0	0	0	0	1	1	1	0	0	0	1	1	0	0	0	0
Download account Info.	0	0	0	0	0	1	1	1	0	0	0	1	1	0	0	0	0
Make payment	0	0	0	0	0	1	1	1	0	0	0	1	1	0	0	0	0
Order cheque book	1	1	0	0	1	1	1	1	0	0	0	1	1	0	0	0	0
Request loan changes	1	0	0	0	0	1	1	1	0	0	0	1	1	0	0	0	0
Cheque reconciliation	0	0	0	0	0	1	1	1	0	0	0	1	1	0	0	0	0
Make IRD payment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Change password	0	0	0	0	0	1	1	1	0	0	0	1	1	0	0	0	0
After sales services	1	1	0	0	0	1	1	1	0	0	0	1	1	0	0	0	0
Check account balance	0	0	0	0	0	1	1	1	0	0	0	1	1	0	0	0	0
Transfer funds to accounts	0	0	0	0	0	1	1	1	0	0	0	1	1	0	0	0	0
Ease of use (5)																	
FAQ	1		0	0	0	1	0	1	1	0	0	1	0	1	0	0	1
Tutorial/Demonstration	0	0	0	0	1	1	0	1	1	0	0	1	1	0	0	0	1
Search function	0	0	0	0	0	1	0	1	1	0	0	0	1	1	0	0	0
Help function	0	0	1	0	0	1	1	1	1	0	0	1	1	1	0	0	1
Navigation menu/ button	1	1	1	0	1	1	1	1	1	0	0	1	1	1	1	0	1
Aesthetic effects(2)																	
Graphics	1	1	1	0	1	1	1	1	1	0	0	1	1	1	1	0	1
Animations	1	1	0	0	1	1	1	1	1	0	0	1	1	1	1	0	1
Performance(4)																	
Update frequency (daily)	0	0	1	0	0	1	1	1	1	0	0		1	0	0	0	1
Response time(5 seconds)	1	0	1	0	1	1	1	1	1	0	0	1	1	1	1	0	1
Download time (10 Sec.)	1	1	1	0	1	1	1	1	1	0	0	1	1	1	1	0	1
Technical problems	0	0	1	0	0	1	0	0	1	0	0	1	0	0	0	0	1
Others(3)																	
Innovation features	1	0	1	0	1	1	1	1	1	0	0	1	1	1	0	0	1
Competitions / rewards	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0
Community contribution	1	0	0	0	0	1	0	0	0	0	0	1	0	1	1	0	1
Overall Scores	13	9	11	0	11	32	26	32	17	0	0	25	29	14	9	0	15
Percentage %	38	27	32	0	32	94	76	94	50	0	0	73	85	41	27	0	44
Ranking	8	10	9	0	9	1	3	1	5	0	0	4	2	7	10	0	6
Average	42.4 %																

Source: Chung & Paynter (2002)

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It is not surprising that none of the banks provided tax payment services to the Inland Revenue Department (IRD) via Internet banking, because the IRD system does not exist in Yemen as it does in New Zealand.

6.9.4 Discussion on Web Evaluation

With respect to the website evaluation demonstrated in Tables 6.30, 6.31, 6.32 and 6.33, this study summarizes the findings as follows;

- The major banks operating in Yemen have a presence on the web, whereas 13 banks have an electronic site on the Internet.

- Overall, the presence of domestic banks at the informational level takes the shape of communicative services in which banks provide the customer historical background, organizational structure, a list of services and products, contact channels and publish the annual financial reports electronically in this website. Foreign banks go beyond those features to provide the customers links to other community information, advertisements, and search engines.

- Foreign banks are doing better than local ones in the information delivery field at higher levels of interactivity with the exception of the Yemen Gulf Bank and Yemeni Commercial Bank who have an interactive website similar to those of their foreign counterparts. Overall, three local banks and one foreign bank are leading the IB services in Yemen.

- None of the banks operating in Yemen offers transaction services at the advanced level.

- At the customer relationship level, the study observed that banks offering IB at the transaction level scored differently from other categories of services.

- At the advanced level for enhancing customer relationships, the study could not obtain any observation for high scoring by any of the banks' websites analyzed.

Hence, the findings agree with Diniz (1998) who justified that this type of information cannot be clearly seen by just looking at the website but needs information from inside the bank to see how they keep track of their clients' demands. Given the strength, expertise and experience of the foreign banks which operate in Yemen this evaluation's findings posed these questions; what will prevent the domestic bank from further use of IB services. Secondly, will the domestic banks continue to be left behind by foreign banks or will they quickly become the leaders in the provision of banking services in Yemen in the years after 2006? Thirdly, will the provision of IB by domestic banks require bankers to know about the customers' attitude and society norms that could drive this innovation? The answers to the first two questions are beyond the scope of this study and future studies should pay attention to this issue. The answer to the last question could be given by understanding the role of attitude and norms in the adoption of IB in this study. The data demonstrated and presented in Tables 6.30, 6.31, 6.32 and 6.33 shows that there are lots for the banks in Yemen to do in the future in order to utilize the technology of the Web perfectly and provide banking services successfully to customers online.

CHAPTER SUMMARY

This study has explained the behaviour of IB adopters in using technologies and has verified that the 4 attributes of readiness are practical tools in classifying IB adopters. It shows significantly that 24 main and sub-hypotheses were supported excepted for two hypotheses which were rejected. The study's trimmed model provides an explanation of how the direct and indirect determinants exhibited significant influences on intention to use IB. Regression results were investigated for Validation. The analysis of Yemeni banks' Websites provided information about ICT utilization in banks. The next chapter presents the conclusion and the main contributions to both theory and practice.

CHAPTER SEVEN: CONCLUSIONS

This Chapter starts by providing an overview of the research objectives, questions and methodology. Also, the findings related to the research hypotheses as well as the major findings answering the research questions will be presented. The second section presents a discussion of the findings, while the third section discusses the proposed model. The fourth section presents the limitations of the study. The sixth section presents suggestions and directions for further research, while the final section discusses the contributions of the study.

As highlighted earlier in Chapter four, ***the aim of this study*** was to predict the prominent determinants relating to the adoption of IB services. It was also intended to assess the relationship of users' informational-based readiness (UIBR) as a new construct to explain the tendency to adopt IB innovation, as well as whether or not it contributes to the prediction of BI to be adopted as a new variable extending the former TPB direct psychological determinants. This study is considered as a quantitative research in which the researcher employed the deductive method and the survey instrument was the tool for collecting the primary data.

In an attempt to achieve the study's aims the researcher followed authoritative ***Research Methodology.*** Since this research is quantitative, the deductive method employed and theoretical research framework created. In this study, the research objectives were translated into questions, then a survey instrument was used to collect the usable research primary data obtained from 369 bank customers. In turn, the collected data were analysed using multivariate techniques like factor and regression analysis to provide answers to the research questions. The following sections will address these research questions and provide the possible answers to them based on the findings obtained as follows;

7.1 Discussion on Research Questions

This section contains the interpretation of the results, the analysis of the findings of the research that answer the research questions. The researcher will recall the research questions and discuss the relevant answers based on the study of the empirical findings presented in Chapter Six.

7.1.1 Research Question 1: What are the prominent predictors of IB adoption that could affect (influence) a user's behavioural intention?

Answering this research question required the researcher to look into study's findings that provide answers to the two sub questions (Q1.1 and Q1.2). In this respect, Ajzen (1991) suggested that the three psychological variables of attitude, SN and PBC are important determinants of behavioural intention, which are referred to as direct predictors of BI. Thus, this issue was addressed by the sub question **Q1.1** How do the direct factors (customers' attitudes, SN, and PBC) predict and explain customers' behavioural intention towards the adoption of IB?

I. Direct Determinants of BI

Respectively, the adoption's model that combined the three independent variables to explain the intention to use IB performs well by exceeding the 40 % in explaining the intention that was achieved by several other theoretical models in the field of information systems as discussed in the literature review in Section 3.3.1. Evidence is drawn from Armitage & Conner's (2001) meta-analytic review of 185 independent studies, in which they demonstrated that the TPB has accounted for 27 % to 39 % of the variance in behavioural intention. Also, the study findings are compared to previous research from the same discipline, findings such as Liao et al. (1999), Tan & Teo

(2000), and Shih & Fang (2004). Shih & Fang (2004) found that the three independent variables explained $R^2 = 0.54$ percent of the variance in intention to use IB. However, those studies utilized the theory of planned behaviour (TPB) and innovation diffusion to study the intention towards adopting IB and their respective findings are different. For instance, Liao et al. (1999) argued that the TPB only partly explained relationships, in that behavioural intention is a function of attitude and SN. Shih and Fang (2004) postulated that attitude and PBC are significantly related to behavioural intention while SN is not.

However, the findings of this study supported significant relationships between BI and the four direct determinants (attitude, SN, PBC and UIBR), although SN failed to meet the criteria of generalizability. Thus, the direct prominent determinants of BI to adopt IB, according to the findings of this study, are attitude (ATT), UIBR and then PBC. This study's extended model of direct predictors also shares some similarities with the TPB model such as that attitude and SN maintain their positions in terms of the higher and lower predictive power (Armitage & Conner, 2001). While this extended model differs from the TPB in that the independent variable of UIBR becomes the second important variable contributing to the prediction of BI, SN was frequently found to be less useful than attitude in predicting intention (Donald & Cooper, 2001). These results have led to the suggestion that most of the behavioural intention to use IB is under greater attitudinal, readiness and control aspect than normative influences. The elimination of the SN was also supported by the Trimmed Model results. In this study model, the direct determinants of a person's behavioural intentions towards IB-use were expanded to include seven variables. These are a person's attitude (β=.592), RAC (β=.224), UIBR (β=.18), PBC (β=.136), TFC (β=.09), SE (β = -.089) and OBS (β= -.060).

Q1.2. How do the indirect factors (behavioural beliefs, normative beliefs, and control beliefs) relate to the respective direct factors (Customers' attitudes, SN, and PBC) and together explain customers' behavioural intention to adopt IB in managing their accounts at the banks?

Doll and Ajzen's (1992) TPB depicts that, each of those three direct determinants is influenced by their respective indirect factors or salient beliefs: Behavioural, normative, and control beliefs. The answer to this question is obtained through two series of analytical processes. The first step was to employ the factor analysis to verify each of the belief components while in the second step we employed regression techniques to identify to what extent the obtained components influenced their respective direct factors. The answer to this issue is addressed in the following three sections.

II. Behavioural Beliefs Components Vs Attitude

Contrary to the researcher's expectations, results of the PFA shown in Table 5.13 reveal that only four out of the five predetermined variables of Rogers's theory were statistically extracted by the study, and then were entered into regression analysis to examine their influence as valid predictors of attitude. Results of the Multiple Linear Regression presented in Table 6.11 demonstrated that only three behavioural beliefs components were found related to the attitude. The findings on Rogers' attributes is in line with Taylor & Todd (1995b) according to which only relative advantage combined with compatibility and EOU are directly related to attitude while observability and trialability are not.

Theoretically, this result is worthy of note because it shows some similarity with those of Moore & Benbasat (1991), Taylor & Todd (1995b) and Tan & Teo (2000). All of the items measuring compatibility loaded together with those measuring relative

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advantage. Tan & Teo (2000) suggest that respondents who perceived IB as compatible might tend to view them more favourably and then be more likely to perceive IB services as an advantageous innovation. Concerning the overall relative advantage as a determinant of attitude, the study findings are in agreement with previous studies of IB adoption, which have found that relative advantage is one of the best predictors, and has a significant influence on the adoption. Evidence could be drawn from the studies conducted by Tan & Teo (2000), Shih & Fang (2004), Wang et al. (2003), Bradley & Stewart (2002), Eriksson et al. (2005), Polatoglu & Ekin (2001), Mattila (2003) and Sabbagh & Molla (2004). In addition, the study findings show that the relationship between the combined variable of relative advantage/compatibility and attitude is the strongest variables. In addition it is in agreement with previous IS studies conducted by Davis et al. (1989), Davis (1993), and Taylor & Todd (1995 a, b).

Findings on the ease of use attribute show that it has a significant positive relationship with IB adoption with r of 0.700 at $p < 0.01$ level. This is in agreement with past IB diffusion studies, which found that the ease of use of an innovation is an important motivator and a predictor of its rate of adoption (e.g. Al-Sabbagh & Molla, 2004; Polatoglu & Ekin, 2001; Wang et al., 2003; Lai & Li, 2004; Chau & Lai, 2003 and Suganthi et al., 2001. In addition, Tan & Teo (2000) studied the construct from the complexity side and they found that complexity has a negative relationship with adoption intentions. Apparently, the complexity of an innovation, (contrary in meaning to ease of use), is hypothesized by Rogers (1995) to be in negative association with its rate of adoption. The attribute of ease of use could be an important motivator or inhibitor (complexity) to its rate of adoption. In previous studies on diffusion, some researchers found that compatibility is relatively lower in magnitude in predicting the rate of adoption than the relative advantage and ease of use attributes (Rogers, 1983; Liao et al., 1999). On the contrary, Gerrard & Cunningham (2003), Black et al. (2001)

and Lassar et al. (2005) claim a higher magnitude of significant positive relationship. In the current study's findings, the compatibility attribute is in agreement with Moore & Benbasat (1991) and Taylor & Todd (1995 b) who perceived that the compatibility and relative advantage items loaded together on one factor. In addition, the combined factor is positively associated with the behavioural intention towards the adoption of IB.

With respect to trialability, the study findings show that trialability has a significant positive relationship with the behavioural intention towards IB adoption with r = 0 **.130** at p <.05. Since there is not enough past research in this area considering this relationship from less developing countries, this construct of trialability could be more important to non-Western and developing countries than it is to developed ones where individuals might be more exposed to similar technologies of the banking services and familiar usage of IT. In this respect, trialability needs to be investigated in a similar context and could be applied to pioneer adopters in developing countries.

In the current study the observability attributes have a negative and insignificant correlation with intention. In addition, regression has revealed no predictive power to explain the attitude with a beta value of (-.035) and Rogers (1995) pointed out that some innovations have a lower degree of observability and Black et al. (2001) have defined observability as the extent to which it is visible to others. In addition, in this study's review which was presented in Section 3.2.7, it was pointed out that quite a few studies excluded the use of the observability variable in their models (e.g. Tan & Teo, 2000; Suganthi et al., 2001; Gerrard & Cunningham, 2003; and Brown et al., 2004). Observability is included in the study framework on the basis that observability and privacy or perhaps security are just two sides of the same coin for some innovations like IB. Inspection of the association between observability and the key dependent variable of Behavioural Intention (BI) was r = -.045 which implied a negative relationship between these two variables. The plausible explanation for this unanticipated relation is

that the less observable the IB-use is, the more IB will be adopted by individuals and vice versa. This is because privacy is an important aspect of performing IB for the customers. This is in agreement with Black et al. (2001) who indicate that the possibility of observing individuals performing banking is rather difficult and is not visible.

III. Normative Beliefs Components Vs SN

The assessment of relationships of variables involved in the SN Model and findings presented revealed that there is a positive and significant relationship between personal referents and both SN (r= .714) and BI (r=.394,) at the $p < 0.01$ level. In addition, a positive and significant relationship was found between an individual's SN (r=.56, at the $p < 0.01$ level) and BI (r=.50, at the $p < 0.01$ level) interaction with their referents by means of Mass Media (MM) interaction. In social science, according to Ajzen (1980), a significant correlation between each pair of variables achieves a moderate magnitude of association. In addition, the findings on SN determinants explain that both the variables of personal norms (PR), and media norms (MM) together can explain 53 % of the variations of an individual's SN with respect to IB-use. Moreover, F-values indicate that the model obtained is highly significant in explaining normative belief. Furthermore, in the formative model of (Normative Belief →SN) it was noted that PR (**β= 0.60,** significant at P<0.001**)** is the best and most significant predictor of the SN because on its own it can explain 51 % of the variance in the criterion variable.

In contrast, the findings obtained by the formative model of (Normative→BI) revealed that MM (**β= 0.41,** significant at P<0.001**)** is the best and most significant predictor of BI. The PR and MM met the criteria of generalizability, ***therefore, both variables could be considered as prominent and important variables which contribute in a formative manner to an individual's SN and BI.*** In addition, findings on the

norms referred to as the "mass media norm" provide evidence of its role in forming the direct norms towards the use of IB. Although, the "mass media norm", when compared to the norms of personal interaction, contributes less power in explaining SN, the finding is still valuable for this study and is a very important focus for the future research.

The possible explanation for the weak predictive power of the mass media in influencing a customer's IB-use SN could refer to the media itself that are available to customers in Yemen. It could be that Mass Media (MM) for IB are still utilized less by current IB service providers since this technology is still in its very early stages in that not many banks use this channel to promote and make people aware of their banking services. This argument can be supported by inspection of further relationships of MM, PR SN and BI. For instance, the relationship between MM and BI was r = .499   while the relationship between PR and BI was r =.39 implying that MM have a tendency to explain the variation of behavioural intention when compared to the SN variable. The omission of SN in one of the subsamples (Sample 2) confirms that SN, according to Hair et al. (2006), was a marginal predictor as shown by the low beta and t values in the overall model presented previously in Table 6.29

IV.   Control Beliefs Components Vs PBC

The control belief structure is consistent with Taylor & Todd's (1995a) decomposed into two dimensions; self-efficacy and facilitating conditions. In turn the facilitating conditions construct was broken down into three other dimensions, which include the resource facilitating condition, technology facilitating condition and government support.

In Ajzen's (2002) words,

Hierarchical model implies that although perceived self-efficacy and perceived controllability can be reliably distinguished, they should nevertheless be correlated with each other. Unfortunately, the studies that have provided evidence for the discriminant validity of self-efficacy and controllability have failed to examine convergence (p. 14)

The results of this study are inconsistent with previous studies in that it argued that self-efficacy measures accounted for additional variance in intentions, but controllability items predicted intentions only when combined with self-efficacy items (Ajzen, 2002). Findings presented in Table 6.15 on page 306 of stepwise regressions, show that the controllability factor, represented by three factors TFC, RFC, and GOVSP, contributes significantly to the variation of intention but when combined with self-efficacy they do not. The study finding on self-efficacy is in agreement with Taylor & Todd (1995) who hypothesized that self-efficacy is positively related to behavioural intentions. The hierarchal multiple regression provides a considerable explanation by showing that the three facilitating conditions components (TFC, RFC and GOVSP) on their own are salient predictors of the PBC. However, in combination with the Self-efficacy variable their effects are insignificant. Armitage & Conner (1999b) examined the relationship between specific beliefs and the separate measures of self-efficacy and controllability, and demonstrated the problematic nature of the distinction between them.

7.1.2 Research Question 2: What is the role of User's informational-based readiness in predicting IB adoption?

User's or customer readiness refers to people's propensity to embrace and use new technologies of banking over the Internet for accomplishing their needs from the banking dealing. In this connection, the answer to Research Question 2 could be obtained through the deep understanding of the issue related to both sub-questions Q2.1 and Q2.2.

Q2.1 How do the external factors (awareness, knowledge, experience, and exposure)

predict and explain bank customers' behavioural intention to use IB?

Empirically, this study's findings are displayed in Section 6.5 and the factor analysis of UIBR provides evidence that UIBR had four components which achieved sampling adequacy. In addition, the result of multiple regression strengthens the study's argument that the 4 UIBR dimensions when considered as dependent variables, will significantly affect a person's behavioural intention toward IB-use. The result was displayed in Table 6.24 and Figure 6.5 depicted the significant path coefficients at $p < 0.001$ of linked experience; knowledge; awareness and exposure as independent variables to account for $R^2 = .44$ percent of the variation in behavioural intention. The accuracy of the model was further confirmed by obtaining a very close adjusted R^2 of 0.429. Furthermore, the F-value was 70.207 exhibiting confidence level of 99 percent.

Furthermore, the comparison of adopters' overall readiness presented in Section 6.1.6 reveals that the 4 UIBR's dimensions are a helpful segmentation tool that assists in categorizing customers into different levels. For instance, the innovators were segmented as those with higher means of experience, exposure, awareness, and knowledgeable in term of IB-use.

Q2.2. How does the UR-TPB (User Informational-based Readiness for Internet Banking) model perform in comparison with the TPB (Theory of Planned Behaviour) model in explaining customers' intentions to use IB?

The trimmed model presented in diagram form (see Figure 6.9 page 333) shows the derived UR-TPB model. **The UR-TPB** which involved Relative advantage/ compatibility (Pi1X1), Readiness (PiRXR), Attitude (PiAXA), Observability (Pi3X3), Facilitating Technology Condition (Pi7X7), Perceived Behavioural Control (PicXc) and Self-efficacy (Pi10X10) accounted for 75 percent of the variation of a person's behavioural intention to use Internet banking. The model's accuracy judged by the

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adjusted R^2 =.75 and the examination of residuals indicates that the standard error of regression result was below the recommended level of 2.5 (Durbin-Watson = 1.974). The trimmed model explained substantial variance of Intention (Adjusted R^2 = 0.75), Attitude (Adjusted R^2 = 0.59) and moderate variance of Subjective Norm (Adjusted R2 = .53) and substantial variance of Perceived Behavioural Control (Adjusted R^2 = 0.63). In this study, direct determinants of BI obtained by the study's Trimmed Model will be regarded in the comparison of the model with the TPB's direct determinants of BI. Table 6.23 (see page 316) depicts that the TPB's Model of three direct determinants, that is Attitude, Perceived Behavioural Control (PBC) and Subjective Norms (SN) accounted for 72 percent of the variation in a person's behavioural intention to adopt internet banking. The accuracy of the model assumed because the adjusted R^2 almost demonstrated the same value 72 percent. In addition, the F test (F=308, *df* =3) shows that the result produced by this model's interval of confidence was 99 percent. In a broader view, the TPB as a direct predictor in this study perform well. For instance, in terms of predictive power, the direct predictors of intention in this study accounted for 72 percent of the variance which is a comparable to Taylor & Todd's (1995b, p.147) study where R^2 = 0.66 of the variation in intention explained, and to Taylor & Todd's (1995a) where R^2 = 0.60 of intention's variation explained. Conner & Armitage (2003) reported that, "in spite of broad support for the TPB, it has been argued that it might be possible to increase the predictive power of the model by incorporating additional variables" (P.198). Accordingly, The UR-TPB model (Trimmed Model) of a person's behavioural intention of direct determinants explaining 75 percent of the intention variation to use IB. Subjective norm in the Trimmed Model was excluded by the procedure of significance relation in the path analysis. Also, in the TPB of direct determinants, it failed to meet the criterion of generalizability as explained by validating regression results and Table 6.29.

7.1.3 Research Question 3

The answer to the third research question, "How do demographic variable explain a person's behavioural intention to use IB", was discussed in Section 6.3.9 through the procedures of testing hypothesis 9 (see pages 311-313). The study findings on the contribution of the demographic variable in the prediction of IB are weak. Therefore, they should not be used intensively in the IB segmentation strategy of adopters.

7.2 Conclusions

The findings of this quantitative study apparently lead one to conclude that the majority of the respondents to the survey are innovators and early adopters of Internet Banking. In addition, the innovators and early adopters' categories are represented by individuals with a higher level of awareness, experience, knowledge and exposure to Internet Banking. In contrast, rejecters are represented by individuals who have low levels of awareness, experience, knowledge and exposure to Internet Banking.

Unfortunately, the test of generalizability could lead one to conclude that Subjective Norm (SN) is the weakest psychological determinant of Intention in this study with respect to Internet banking adoption in Yemen. In the meantime, it could lead one to conclude that attitudes, readiness, and PBC are prominent direct predictors of Internet banking. The relative advantages combined with compatibility represent the Internet banking attributes of most interest to Yemeni bank customers followed by ease of use. The influence of both personal and media referents shows up as a prominent determinant of the Subjective Norm (SN). Self-efficacy is a prominent determinant of PBC, while facilitating conditions of technology, resources, and government support are marginal predictors.

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Although, customers perceived that the Relative Advantage / Compatibility (RAC) and ease of use (EOU) are significant and important attributes of Internet banking, the extent of actual usage of Internet banking by the bank customers in Yemen is still not strong. The finding on the observability attribute of conducting Internet banking could lead one to conclude that this innovation's attribute is an undesired attribute for Internet banking which affects negatively the customers' intention to adopt Internet banking. It was noted that customers' intention to adopt IB will be influenced by both personal and media norms. This study has fulfilled both of the objectives of the research and supported the theory of planned behaviour. The decrease of (awareness, knowledge, experience, exposure) at the adopter led to the decrease of intention to use the IB service. Since the number of the actual users of IB was very limited at the time of this study, further promotion is required to make customers aware of the existence of IB.

7.3 Limitations of the Study

This study represents a first (and admittedly approximate) description of the Internet Banking adoption in less developed countries (Yemen) where IB is still in its infancy and there is a lack of information on its use at the time of the study. The major IB literature is from well developed countries like Australia, Singapore, the USA and UK. Therefore, the literature is certainly not applicable to explain IB adoption in Yemen especially with the huge differences between the two settings in regard to the adoption rate and the cultural differences. One of the main objectives of this study was to draw the attention of researchers, policy makers and bankers to the importance of user readiness in adoption studies. The limitations of this study are threefold.

The first limitation is the *Sample Size*. Due to the confidentiality and other considerations, the banks refused to provide a list of mailing addresses of their clients. Therefore, the targeted sample of 1000 could not be reached by this study. This study

might have improved if the study could have obtained a large sample with a great pool of real active users of Internet banking services.

The Second limitation is concerned with the "*Factors affecting behavioural intention to use IB.* The study's results proposed numbers of significant factors affecting the adoption of Internet banking but it might be that there are also some factors not included in this study. Therefore, identification of additional factors to explain the intention to use IB may improve, expand and make this research more valuable. For instance, the research could be expanded to address factors of security and trust issues or might identify the impact of cultural factors. The non preparation of people psychologically and informational about the new method of Internet banking in the dealing with payment needs could be due to the habituation factor to the old styles in the transaction and a payment aspects.

The third limitation is *the area,* as highlighted in Chapter four, and concerning the time frame and financial resources of the research the survey *distributed* to customers in the region of Sana'a. The survey lacks comprehensiveness in terms of the coverage of the entire population. Therefore, further research could expand the survey to Yemeni bank customers of other governorates rather than being restricted to Sana'a only.

7.4 Implications of the Study

This section will undertake to present the practical implications of the study related to the adoption of Internet banking in the context of less developing countries.

7.4.1 Study Implications for the TPB

This study contributes to the social psychology literature by extending TPB in four key ways. Firstly, this study sheds light on the nature and role of normative beliefs antecedents of SN, which had still not been examined in the previous adoption studies

of IS. The study empirically shows that SN acts as a second-order formative[1] structure, formed by two distinct dimensions: (personal and media referents), and accordingly, normative belief is viewed as a two-dimensional construct which allows a more detailed examination of external normative beliefs. Previous studies were concerned only with the influence of referents that rely on the person-to-person interaction (personal). Secondly, this study sheds light on the nature and role of PBC which is, according to Pavlou & Fygenson (2006), still not well understood. Thirdly, the study empirically shows that user informational-based readiness is a new predictor of a person's behavioural intention to use IB. In addition, the four dimension of the UIBR construct were found to be a useful tool in customer segmentation. Finally, a formative structure permits a more detailed prediction of external, behavioural normative and control beliefs by allowing a distinct prediction of;

I.   IB attributes as perceived by the respondents and their role in the prediction of a person's attitude in formative structure.

II. Personal and media referents which, in turn, contribute to a better prediction of SN

III. Self-efficacy (SE) and facilitating conditions (controllability), thus are leading to a better prediction of PBC, and behavioural intention.

7.4.2 Implications for Public Policy

In parallel with the objective of this study, results obtained are of considerable use in deepening our understanding of the factors that increase or lessen a customer's behavioural intention to engage in IB-using behaviours. The proposed IB adoption extended model UR-TPB describes a concrete set of factors that policy makers and banks' mangers have to concern about them to facilitate customer's IB adoption and

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[1] Formative variables: Observed variables that "cause" the latent variable, i.e., represent different dimensions of it (Gefen et al., 2000)

increase the adoption rate for the IB. Furthermore, also it suggests that policy makers, bank managers and practitioners should pay particular concern to maximizing UIBR's attributes which are proven empirically to influence and contribute to improving customer attitudes and enhancing people's behavioural intention toward using IB. The external behavioural beliefs, namely relative advantage/compatibility, ease of use, UIBR and trialability represent specific valuable factors on which banks' managers and IS practitioners should focus their attention, efforts, and investments. These four factors may be used as tools to reform and shape customer's attitude toward higher IB adoption rates.

The external normative beliefs sourced by both media and personal referents represent valuable factors on which bank managers should focus their attention, and efforts to utilize both referents' channels of communication with the customer when they want to convey the effective messages to their current and potential customer's about IB specifically and new banking innovations. Both the external self-efficacy and facilitating conditions represent two distinct factors which have a relative impact on PBC. Public policy and officials could support IB by introducing mechanisms for influencing the proposed consumer self-efficacy beliefs and controllability.

7.4.3 Implications for Banks

Customers conducting their banking activities over the Web (IB) are a reality. In addition, it is the future trend. Therefore, banks and financial organization in order not to be left behind should prepare themselves to be at the level whereby they can successfully provide good quality banking technology. At the same time, they should not ignore it because enabling banking services over the Web by local banks means competing in the global banking industry market, growing in tandem with the needs of customers, expanding their services beyond the country's borders and contributing to

create a strong innovative culture in this industry in Yemen. IB is not only for foreign banks or for large banks, local banks have the opportunity to compete with those foreign ones and they should realize the characteristics of this innovation. Therefore with financial organizations enabling Internet banking activities, policy makers can benefit from the findings. Further empirical evaluations, however, are needed to replicate the findings in different contexts and surroundings. The study findings are worthwhile to banks and bankers because they empirically provide a solution as to how the two communication channels of PR and MM perform. From the marketing and promoting perspective, the study proved that the norms which come from personal interaction are powerful in influencing an individual's SN to use IB adoption. Therefore, this could be helpful for bankers to depend more on those personal referents suggested by this study in influencing and bringing other non-adopters to use this technology. In addition, MM is proven to be a good channel of interaction with individuals that bankers can depend more on to influence potential adopters toward further intentions to adopt IB.

7.4.4 Implications for Information Systems

The present study has implications for information systems research. It is noted that although the research is focused on the prediction of the adoption determinants and diffusion, in the digital era, the integration of variables that capture User's Informational-Based Readiness (UIBR) is becoming an important element in the prediction of the individual's intention towards a particular innovation best exemplified by IB adoption. The study's new construct of UIBR might be applicable to investigate adoption alongside other psychological determinants in different contexts and different innovations.

7.5 Contribution of the Study to the Adoption Literature

The practical benefit of this study is simply presented as an academic contribution *to the literature review* of adoption in the field of Internet banking and in the context of developing countries. This study addressed the gap in the literature from developing countries. It is a significant contribution to ease and elaborate further the understanding of IB adoption in one of the less developing countries. Theoretically, this study contributes to the theory by *integrating models* of Rogers and the TPB. In the meantime, the study looked at *IB from a holistic perspective*. Research has established a mix of TPB and Rogers' Framework as appropriate grounded and referenced theories to investigate the behavioural intention to use IB in a different environment of non-western countries. Ajzen's TPB framework variables that address the psychological behaviour like behavioural intention, attitude, SN, and PBC were utilized. Meanwhile, Rogers' (1995, p.207) variables determine the rate of adoption of innovations. For instance, Rogers' (1995) perceived attributes of an innovation, which are one important explanation of the attitude towards IB, explained 53 percent of the variance in attitude (Rogers claims that the innovation attribute can explain from 49 to 87 % of the adoption rate of innovation) which in this study fit Rogers expectation. The SN in TPB paid more attention to one type of communication channel's influence (referents) while Rogers' theory introduces two types of referents, mass media and interpersonal referents. The model for UR-TPB made use of the sort of referent provided by the TPB to explain the direct influence of norms, while Rogers' (1995) two types referents (communication channels) merged in this study model to explain the normative belief (indirect layer). This is reasonable to cover the nature of today's social systems norms in many countries, especially with the huge advances in the cross-border mass media in the world. Furthermore, the relationships between the communication channels and the attribute of innovation often interact to slow down or speed up the adoption (Rogers

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1995, p. 207). The UR-TPB model derived from the research model emphasize the importance of Rogers' attributes of innovation variables, two types of norms variables, and the control belief variable to explain the second layer variables of attitude, SN and PBC. The model also emphasizes the importance of UIBR's dimensions like awareness, knowledge, experience and exposure in the prediction of an individual's behavioural intention towards the use of IB. In addition, this study empirically showed that UIBR acts as a formative determinant formed by four distinct dimensions: awareness, knowledge, experience and exposure. While TPB is commonly used to model normative beliefs that depend on human referents, this study extends TPB normative belief to allow modelling the mass media referents and linking them to both SN and behavioural intention (BI). Finally, previous IB adoption studies do not use path analysis based on the OLS technique to look into the flow of influence in a causal/effect manner. This study introduces and utilizes ***path analysis based on the Ordinary Least Squares (OLS)*** for the first time in IB adoption studies.

7.6 Future Research

The field of IB is new and further research on IB should concentrate more on the exploration of the situation before the arrival or adoption of the Internet or other media of telecommunications for electronic banking rather than the after effects of IB. This study firmly believes and encourages researchers to adapt the formative items in a different context to do an appropriate belief elicitation to extract potentially more salient factors. This study attempted to identify the perceptions and readiness of users for IB, while other factors, which could be creating barriers, and the factors that can encourage them to proceed to e-banking activities remain uninvestigated.

The diffusion and adoption of IB in developing countries like Yemen are recent and require rigorous studies to predict the future of this technology at both the banks

and customer levels. More research is required on the effect of cultural and habituation factors on the diffusion and the adoption of IB in developing countries. It is important to study the determinants of IB adoption, the barriers and hindrances from the banks and financial houses' point of view. On the other hand, security and trust issues related to transactions over the Internet are a global concern and customers' perceptions of these issues are of much concern in the future studies. Due to the difficulties in understanding how individuals will view IB with respect to trust and secure channels for IB in this study, more research is required on the effect of security and trust barriers on the diffusion and the adoption of IB in the developing countries. Finally, research in the field of IB from developing countries is very sparse and the comparative studies among homogenous countries are required to understand the common set of IB determinants. The framework, together with the produced UR-TPB model, can be examined in other IS adoption research disciplines also applied to different environments with different populations for comparative purposes and the improvement of the model. This study sheds light on the nature and role of UIBR, which is still a new aspect in the adoption of innovation in IS.

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