

A systematic review of Internet banking adoption



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ABSTRACT

This paper presents a systematic review of 165 research articles published on the adoption of Internet banking (IB) between 1999 and 2012. The results show that interest in the topic of IB adoption has grown significantly during this period, and remains a fertile area for academic research into the next decade. The findings reveal that the IB adoption literature can be classified according to three main themes: whether the papers seek to describe the phenomenon (descriptive); whether they seek to understand the interplay between the factors that drive adoption (relational); or whether they seek to draw higher level conclusions through a comparison across populations, channels or methods (comparative). A comprehensive list of references is presented, along with an agenda for future research that targets identified gaps in the literature.

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1. Introduction

The rapid expansion of information and communication technologies has had a tremendous impact on all areas of human life (Schneider, 2006). A widely studied area of technological transformation is in retail financial services. The Internet has sparked an IT-based revolution in the financial services sector that has radically altered the way that banking services are delivered. This development, referred to as Internet banking (IB), has enabled busy people to complete their financial activities in a cost-effective and efficient manner at any time of the day, regardless of their physical location (Makris et al., 2009). IB also allows bank customers to engage in a vast array of financial services such as paying bills, checking account information, transferring funds, and utilizing investment and check services through bank websites (Tan and Teo, 2000).

There have also been benefits for the financial institutions. Banks spend a great deal of money on IB because it reduces costs relative to other forms of banking, and provides more timely and complete customer information (Gerrard and Cunningham, 2003). It also increases service quality which is necessary for survival in competitive markets (Rouibah et al., 2009). However, achieving these goals requires customers to adopt IB. Thus, financial service providers must aim to have, in the establishment and development of IB capabilities, a comprehensive understanding of how their customers feel about this technology (Lassar et al., 2005). An important factor that influences customer adoption and use of IB is their attitude toward the technology. By identifying the expectations and wants of customers, and understanding their motivations for adopting (or not adopting) IB, bank managers and policy-makers can develop strategies to improve the take up of such technology.

This review paper aims to explore the literature on IB adoption and to classify these studies based on their perspectives on banking. The paper will investigate different types of IB adoption studies, including different research perspectives, and the relationships among them. Finally, the paper will aim to offer suggestions for future research. The paper is organized as follows. The research method is described in next section, and then we introduce the review of research on IB technology and clarify the different adoption perspectives in the online banking adoption literature. The fourth section summarizes and classifies the different types of IB adoption studies. The paper then presents the results of the classification and, on the basis of the analysis undertaken. The paper concludes by highlighting weaknesses and gaps in the IB adoption literature that could be addressed by future research.

Systematic reviews represent an important milestone in the development of a research field. They provide an opportunity to step back and review the collective intelligence that has amassed from an often eclectic body of literature using different samples, methods and theories. This is important as the findings of isolated studies are frequently contradicted by subsequent studies (Ioannidis, 2005). Under even the most rigorous research conditions, a well-planned single study rarely provides definitive results. Systematic reviews that carefully categorize and pool findings can lead to valuable insights and clear research directions. While the use of systematic reviews is common within traditional scientific fields, and most notably within medical research, they are not as common within the social sciences. This paper, therefore, seeks to contribute to our understanding of banking technologies by undertaking a systematic review of IB adoption.

2. Review methodology

The concept of IB adoption can be understood as a combination of four fields: information technology, finance, marketing, and service management. Accordingly, this study reviewed the literature on IB adoption in databases related to these four fields, including: ScienceDirect, Emerald Fulltext, Springer, Infor-Sci IGI Global, Taylor & Francis, EBSCOhost, and Ingenta Journals. The search engines Google Scholar and Scopus were also used to ensure coverage of publications in other databases. The following criteria were used to search these sources and select the papers:

- The keywords Internet banking, adoption, and acceptance were used to search the titles and abstracts of the papers.
- Conference papers, masters theses, doctoral dissertations, textbooks and unpublished working papers were excluded because academics and practitioners generally use journals to acquire information and disseminate new findings. Therefore, journals represent the highest level of research (Nord and Nord, 1995).
- Different types of journal publications (peer-reviewed, published, in press), with available English full text versions, were all considered. It is noteworthy that the decision to include non-peer reviewed papers was important as it recognized the value of editorial and invited commentaries in shaping the research within a discipline.

This search resulted in 187 related articles published between 1999 and the first quarter of 2012. The full texts of these articles were carefully studied, and 22 articles were omitted from the list because their main topics did not concern IB adoption. Finally, 165 articles were selected for classification.

3. Classification of Internet banking adoption

The positioning of IB adoption within the broader Internet banking literature has been graphically depicted (see Fig. 1). This figure draws initially on the work of Akinci et al. (2004) who identified four interrelated research areas influencing the field of Internet banking (i) banking services, (ii) distribution channels, (iii) bank and bank managers' perspectives, and (iv) customers' perspectives. Studies on retail banking services investigate and classify the various financial services offered

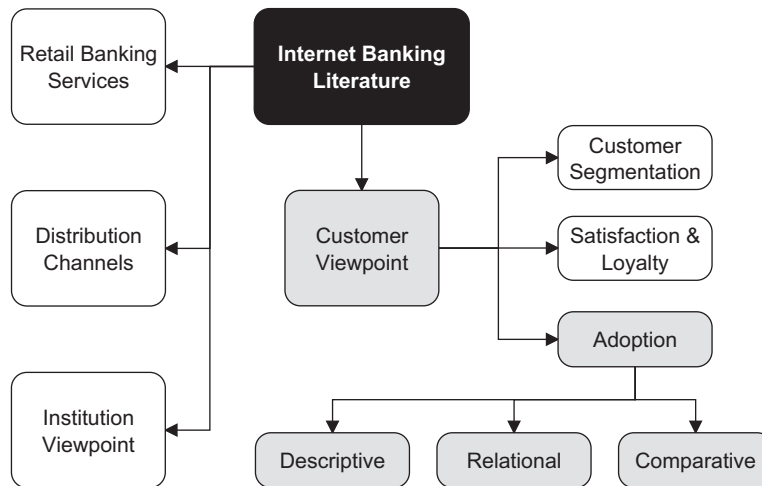


Fig. 1. Positioning IB adoption within the literature.

within the framework of IB. Studies on distribution channels include comparative investigations of applications and advantages of different distribution channels; and studies of the factors influencing channel and distribution strategies in banking service delivery.

Studies of bank and manager's perspectives, we refer to these collectively as institutional viewpoint within Fig. 1, are primarily concerned with manager attitudes to technologies such as the Internet, the strategic value in the applying and developing new distribution channels (including banks' adoption of IB technologies), and barriers and challenges to using IB service providers. Finally, the research on customer perspectives, which is the focus of the present study, concentrates on bank customers and their attitudes, motives, expectations, and beliefs regarding adoption.

The literature on the customer's viewpoint can be further decomposed into three groups. The first of these deals with the issue of customer segmentation. The concepts of attitudes and motivations regarding technology-based distribution channels are frequently used as segmentation variables to classify distinct groups of customers (see Durkin et al., 2008; Machauer and Morgner, 2001 as examples). The second group within the customer viewpoint, satisfaction and loyalty, concerns the attitudes of customers who use IB. This body of literature tends to focus on customer attitudes at a single point in time, and investigates the factors contributing to customer satisfaction with IB services and customer loyalty compared to other distribution channels or other banks (see Pikkarainen et al., 2006; Herington and Weaven, 2009 as examples). The third group of studies concerns IB adoption by customers. The main purpose of this branch in the literature is to explore the factors contributing to the adoption or non-adoption of IB. An in-depth analysis of studies of this type is the focus of the present study.

The systematic review of the IB adoption literature reveals three main groups of papers (i) descriptive, (ii) relational, and (iii) comparative. This classification builds on the work of Hernandez and Mazzon (2007) who identify two groups of IB

Table 1
Distribution of papers by classification.

Classification criteria	Number	% Of group	% Of total
Descriptive	51	100	31
Adopter characteristics	39	76	24
Adoption barriers/drivers	12	24	7
Relational	159	100	96
Technology acceptance model	63	40	38
Diffusion of innovation	24	15	15
Theory of reasoned action	14	9	8
Theory of planned behavior	13	8	8
Social cognitive theory	12	8	7
Decomposed theory of planned behavior	10	6	6
Perceived risk theory	8	5	5
Commitment-trust theory	7	4	4
Unified theory of user acceptance of technology	5	3	3
Extended technology acceptance model	3	2	2
Comparative	26	100	16
Population	12	46	7
Distribution channel	8	31	5
Method	6	23	4

Note: The total number of articles exceeds 165 as some papers used multiple theories to explore IB adoption.

adoption research (descriptive and relational). We add an additional category, comparative studies, to capture a group of recent studies that have sought to compare the different approaches to adoption research. A distribution of the number of papers for each of these groups is presented in Table 1, with a full listing provided in Appendix A for reference.

3.1. Descriptive studies

This group refers to studies that identify the characteristics and attitudes of IB adopters, barriers to adoption, and the appealing features that drive adoption. These studies rely on both primary and secondary evidence to describe the nature of IB adoption, but they do not seek to explain or theorize about the relationships among the various factors influencing adoption. Following is an overview of some exemplar studies of the descriptive type.

Sathye (Sathye, 1999) was among the first to examine IB adoption. His research shows that security concerns, a lack of awareness about IB and unreasonable prices are the most important reasons for non-adoption among Australian customers. Howcroft et al. (2002) add to the list of factors encouraging IB adoption revealing the importance of lower fees, recommendations by family/friends, 24-h access to services, time efficiency, good service quality and coverage in the popular media. They also confirm the importance of security concerns, and highlight difficulty of use, poor access to delivery channels, and lack of face-to-face contact as factors that discourage adoption. Other factors highlighted included accuracy, user friendliness, transaction speed, user experience, user involvement, and convenience (Liao and Cheung, 2002); reliability of the bank, and privacy (Akinci et al., 2004) also featured prominently among the research reviewed.

The factors influencing IB adoption appeared to be consistent across different cultures. For example, Laforet and Li (2005), in a study on the attitudes of Chinese customers toward IB, identify customers' perceptions of risks, technological and computer skills. Although they did observe that the traditional Chinese cash-carry banking culture as the main barriers to customer IB adoption. Gerrard et al. (2006) used content analysis to analyze open-ended questionnaire data to investigate non-adoption among Singaporean customers. Their research identified eight factors preventing customers from adopting IB, including risk, lack of perceived need, lack of knowledge about the service, inertia, inaccessibility, the lack of a "human touch", pricing concerns, and technology fatigue.

Laukkanen et al. (2009) investigated the reluctance of Finnish customers to use IB. To this end, they divide non-IB customers into four groups – non-resistors, functional resistors, psychological resistors and dual resistors. Their findings indicate that customers reporting both functional and psychological resistance to IB are more dissatisfied with the information and guidance offered by service providers than are those with only psychological resistance or no resistance to IB.

However, the research by Rotchanakitumnuai and Speece (2003) shows that the benefits and drawbacks of IB adoption among corporate customers were dissimilar to those of consumers. In particular, they found that corporate drivers included information quality, access to information, information sharing, and benefits from lower transaction costs. The major drawbacks included trust, legal support, and organizational barriers to adopting IB. That said, this was the only study in our sample to consider IB adoption from the perspective of businesses. More research is needed in this area.

3.2. Relational studies

These studies seek to understand how the different factors that affect IB adoption interact in their influence on adoption. The main distinguishing feature of these studies, compared to descriptive studies, is that they attempt to explain and predict the phenomena of IB adoption using models and theories. The dominant theories come from the field of social psychology and are as follows:

- Theory of reasoned action (TRA) (Fishbein and Ajzen, 1975).
- Theory of planned behavior (TPB) (Ajzen, 1985).
- Social cognitive theory (SCT) (Bandura, 1986).
- Commitment-trust theory (CTT) (Morgan and Hunt, 1994).
- Perceived risk theory (PRT) (Roselius, 1971).

The first two theories (TRA and TPB) posit that adoption behavior is driven by behavioral intentions which are a function of an individual's attitude and the influence of external factors (social norms). TPB differs from TRA in that it introduces behavioral controls into the mix in recognition that an individual's beliefs about the extent to which they can control a particular outcome is also important. TPB views the control that people have over their behavior as lying on a continuum from behaviors that are easily performed to those requiring considerable effort, resources, etc. Fishbein and Ajzen (1975) and Ajzen (1985) suggest that such controls are likely to play an important role in explaining the link between behavioral intentions and actual behavior, the difficulty of assessing actual controls has led to the use of perceived behavioral control as a proxy.

Social cognitive theory (Bandura, 1986) provides a framework for understanding, predicting, and changing human behavior. The theory identifies human behavior as an interaction of personal factors, behavior, and the environment. In the model, the interaction between the person and behavior involves the influences of a person's thoughts and actions. The interaction between the person and the environment involves human beliefs and cognitive competencies that are developed and mod-

ified by social influences and structures within the environment. Social cognitive theory is helpful for understanding and predicting both individual and group behavior and identifying methods in which behavior can be modified or changed.

The final two theories, commitment-trust theory (Morgan and Hunt, 1994) and perceived-risk theory (Roselius, 1971), represent deficit based perspectives on IB adoption. In the case of commitment-trust theory, it is argued that a failure to demonstrate commitment is likely to dilute trust, and as a consequence, favorable consumer actions. Likewise, perceived-risk theory highlights that adopters of new innovations must weigh the potential benefits against the inherent risks. In the case of IB adoption, these risks are generally of a performance or psycho-social nature.

Many researchers have attempted to use, develop, and adapt these theories to study the adoption of new technologies such as IB. The most influential of these are described below.

- Diffusion of innovation theory (IDT) (Rogers, 1983).
- Technology acceptance model (TAM) (Davis, 1989).
- Decomposed theory of planned behavior (DTPB) (Taylor and Todd, 1995).
- Extended technology acceptance model (TAM2) (Venkatesh and Davis, 2000).
- Unified theory of user acceptance of technology (UTAUT) (Venkatesh et al., 2003).

Diffusion of innovation theory views IB adoption as a social construct that moves through some population over time. Individuals are seen as possessing different degrees of willingness to adopt an innovation such as IB, with the popularity of innovation normally distributed over time. Breaking this normal distribution into segments leads to the identification of five adopter categories from early adopters to laggards. The rate of IB adoption is theorized to be impacted by a range of factors such as the relative advantage of a given technology over its predecessor, the compatibility of the innovation with existing systems and technologies, the barriers to trialing a new technology, and the complexity of the a innovation.

IDT was one of the earliest theories used to examine IB adoption. Liao et al. (1999) drew on IDT (and TPB) to examine IB adoption in Hong Kong in the late 1990s. The findings of their research reveal that attitude towards the technology and perceived behavioral control were most significant predictors of future use intentions. The combination of IDT with other theoretical perspectives (most notably TPB) was viewed as a popular way to operationalize IDT (Zolait and Ainin, 2008; Zolait and Mattila, 2009; Al-Majali and Mat, 2011).

The technology acceptance model is an adaptation of TRA for the field of IS. TAM posits that perceived usefulness and perceived ease of use determine an individual's intention to use a system with intention to use serving as a mediator of actual system use. Perceived usefulness is also seen as being directly impacted by perceived ease of use. In the case of IB adoption, TAM has provided a useful and popular lens, accounting for almost 40% of all papers in this category. The decomposed theory of planned behavior differs from TAM in that it models perceived usefulness and ease of use as mediating behavioral intentions, where compatibility with other banking channels and technologies serves as an antecedent for both perceived usefulness and ease of use.

TAM was first used to examine IB adoption by Bhattacherjee (2001). His research examined a post-acceptance application of TAM to understand the role of expectations in IB adoption and continued use among US banking customers. Other notable applications of TAM in the study of IB adoption are provided by Suh and Han (2002, 2003) who were the first to consider cross-national effects in their study of South Korean banking customers, and Vatanasombut et al. (2008) who integrate TAM and CTT to understand continuance intentions.

Attempts to extend TAM (e.g., TAM2) have generally taken one of three approaches: by introducing factors from related models, by introducing additional or alternative belief factors, and by examining antecedents and moderators of perceived usefulness and perceived ease of use. In this way, DTPB could be considered a relative of extended TAM group of papers. One interesting criticism of TAM (and its related frameworks) is the assumption that potential consumers are free to act and choose without limitation. In practice, there may be constraints that may limit the freedom to act. For example, in the specific case of IB adoption, the rationalization of traditional banking channels has forced many consumers to adopt IB over the past decade.

Good examples of TAM2 and DTPB are provided by Hernandez and Mazzon (2007) and Chirani et al. (2011). The first example (Hernandez and Mazzon, 2007) presents a study of banking customers in Brazil to show that while attitudes drive adoption intentions, and individual characteristics explained the translation of this intent into action. Likewise, Chirani's study of Iranian consumers in Guilan province reinforce the importance of compatibility of the banking system, and characteristics of users.

The unified theory of user acceptance of technology aims to explain intentions to use IB and subsequent usage behavior. The theory holds that four key constructs (performance expectancy, effort expectancy, social influence, and facilitating conditions) are direct determinants of usage intention and behavior. Gender, age, experience, and voluntariness of use are posited to moderate the impact of the four key constructs on usage intention and behavior. The theory was developed through a review and consolidation of the main models and theories regarding IS adoption, including the social psychology theories presented above.

In recent years, UTUAT has come to dominate the literature. One of the best examples of the application of this theory to IB adoption has been provided by Yuen et al. (2010) who used it to examine IB adoption across a sample of US, Australian, and Malaysian banking customers. Their research found that attitude toward IB was the most important factor followed by performance expectancy. Due to cultural differences between the developed and developing countries (e.g., uncertainty

avoidance, individualism, and power distance), perceived credibility of IB was found to be relevant only in the developed countries.

3.3. Comparative studies

This group of studies, which has been a focus in the literature in recent years, investigates IB adoption by concentrating on comparisons among key variables. These key variables can be represented by three groups of studies: population, distribution channel, and methods. The motivation for comparative studies that target specific populations stems from a recognition that the process of adoption is likely to differ based on demographic, economic, cultural, social, political, technological, and developmental variables and on expansions in services and different levels of customer IB adoption (e.g., Lichtenstein and Williamson, 2006; Zhao et al., 2008; Al-Somali et al., 2009; Prompattanakdee, 2009). The most noteworthy comparative population study is Sayar and Wolfe (2007). In the first part of their study, they investigate IB from a customer perspective and compare IB adoption studies in the UK and Turkey. In the second part, they compare the two countries with respect to IB services, focusing on three aspects: usability, reliability, and functionality. According to the authors, the most important factors related to customer IB adoption in these two countries are reliability and usability. They also argue that Turkish banks provide extensive services, while UK banks enjoy superior technological infrastructure for IB. They emphasize that cultural differences between the two countries and the technological preferences of Turkish banks are important variables for predicting differences in IB adoption and identify security concerns as the important difference between banks in the two countries.

Another comparative population study was undertaken by Mirza et al. (2009), who compares IB adoption by customers of governmental and private banks with respect to political and economic variables. Using nine variables, they investigate and compare IB adoption among customers of one private and one governmental bank in Iran. Their findings show that the private bank was more successful in encouraging its customers to use IB. They argue that because the majority of the Iranian banks are under government control, privatization could improve their performance. Im et al. (2011) examine the relationships between the concepts of the UTAUT model to determine how culture affects them. The comparison of Korea and the U.S. in this study reveals that the effects of effort expectancy on behavioral intentions and the effects of behavioral intentions on use behavior were greater in the U.S. sample.

Another important type of comparison study are those that focus on the use of different distribution channels by customers. For example, Howcroft et al. (2002) compare different financial service distribution channels such as bank offices, home visits, telephone, Internet, and the mail. According to their findings, customers will continue to treat bank offices as the most important distribution channel in the near future, but telephone and the Internet banking will ultimately replace them. Their qualitative study investigates the motives for and barriers to using IB and telephone banking. Examining six motives and five barriers, the authors conclude that in both IB and telephone banking, lower fees and improved levels of service are the most important motivating factors for use of these channels over traditional branch banking. Surprisingly, their research found that recommendations from family, friends, newspapers, and so on were the least important motivating factors for these using alternative delivery channels. They also find that access to equipment and complexity of the services are more important barriers for IB use than for telephone banking. In contrast, the lack of face-to-face interaction in IB and telephone banking is one of the least important barriers. This suggests that as long as the service expectation can be fulfilled, the channel of delivery is unimportant.

Dimitriadis and Kyrezis (2011) study of IB and telephone banking with a TAM model indicates that the effect of trusting intention on transaction intention is stronger for telephone banking than it is for IB and that the influence of the level of information on transaction intention is much stronger for IB than it is for telephone banking. They also argue that individuals are less familiar with using the phone for commercial transactions than they are with the Internet.

In another study, Laukkanen (2007) explains and compares customer value perceptions of IB and mobile banking. He finds that value perceptions are different for Internet and mobile channels and that efficiency, convenience, and safety are the key factors in determining customer value perceptions for the two delivery channels. He notes that while the main advantage of mobile banking is that it can be used anywhere and without a PC, its main drawback compared to IB is the difficulty of entering data.

The third group of comparative studies is made up of studies focused on methodological differences. They tend to use models and theories as a key distinguishing feature. As mentioned above, there are five basic theories and five derived models and theories that are typically used to explain IB adoption. One of the goals of this strand of research is to answer the following questions: “which of these models and theories has greater predictive value, and which is more valid?” It should be noted that this group of comparative studies is directly related to the other groups of studies that seek to describe and explain. For example, Shih and Fang (Shih and Fang, 2004) investigate two versions of TPB (pure and decomposed) and compare them to TRA to describe the effects of personal beliefs, attitudes, subjective norms, and perceived behavioral control on customers’ intentions to adopt IB. The results validate the models underpinning TPB and TRA, but indicate that the DTPB model has more explanatory power for behavioral intentions, attitudes, and subjective norms than the other two models.

Rouibah et al. (2009) compare the explanatory power of three well-known models of technology adoption (TAM, TPB, and TRA) in the context of IB, and their results show that the TPB model has the most exploratory power, followed by TRA and TAM. Additionally, after investigating the effects of variables in these models, the authors conclude that attitudes have the greatest effect on customer’s intentions to use IB. In particular, perceived usefulness was the most important, followed by

subjective norms, and perceived ease of use. However, this result is far from conclusive. Yousafzai et al. (2010) mixed theoretical and empirical study compares the three models (TRA, TPB, and TAM) for their ability to predict customer IB behavior. Their results indicate that TAM is superior to the other models, and highlights the importance of trust in understanding IB behavior. Likewise, Gerrard et al. (2006) had a contrary result, concluding from a descriptive comparison of the TRA, TAM, and IDT models, that none of these models had a particularly good fit.

In sum, it would appear that many of the important differences between the discussed comparative studies on IB adoption can be represented as comparative descriptive studies (population, channel) and comparative relational studies (methods). However, it is important to note that while comparison studies share similarities to descriptive and relational studies, in that they seek to describe and explain, they are also very different as they introduce other variables as the basis for understanding how these groups vary. More research using a broader set of theories and moderating variables would be beneficial, particularly in contrasting the requirements of the developing and developed world.

4. Results and analysis

Using the classification criteria introduced above, further analysis was undertaken to understand how the articles were distributed by year of publication, journal publication, and geographic region, and topic area. This analysis will provide insight into the development of IB adoption as an area of scholarship, with a view to identifying key trends and insights that will foster future research opportunities.

4.1. Distribution by year of publication

The distribution of articles from 1999 to 2012 is shown in Fig. 2. From this data we can see that there was an increasing trend in the number of IB adoption studies during this period. While IB systems were starting to emerge during the mid-1990s, the issue of customer adoption of IB was not addressed in the literature until 1999. The increasing number of studies is confirmed by the linear trend line in Fig. 2. From this trend, it would appear that the attention given to IB adoption has increased over time, and remains an important area of research. Though reliable data on the global growth of IB adoption is not readily available, if we use data on the growth of Internet users as a proxy, we can also see from Fig. 2 that the growth in articles appears to be tracking in line with global growth in Internet use ($r = 0.983$, $p < 0.001$). This would suggest that the topic of IB adoption is likely to remain an important area of scholarship in the years to come, particularly as the diffusion of the Internet is still very much a first-World phenomenon.

Time series analysis was employed to predict whether the trend observed in the data as likely to continue. To resolve this issue, we used the Holt-Winters exponential smoothing forecasting model. This model was selected because it assigns greater weight to more recent data than it does to older ones, which seems logical due to the steep slope of the publication trend, especially in the last four years. The results obtained from the application of this analysis indicate that, based on the present trend and without accounting for the influence of other variables, that the popularity of IB adoption will continue with the predicted number of papers published in 2012 to be 34, growing to 39 in 2013, 43 in 2014, and 48 in 2015. However, significant economic, political, cultural, and technological changes could alter this prediction.

Using the classification criteria discussed earlier in this paper as a starting point, we undertook analysis to investigate how the focus of the papers within our sample has changed over the reference period. From this analysis, we can see that relational studies constitute the largest number of papers, followed by descriptive and then comparative studies. A chronological distribution of the studies by classification criterion is provided in Fig. 3.

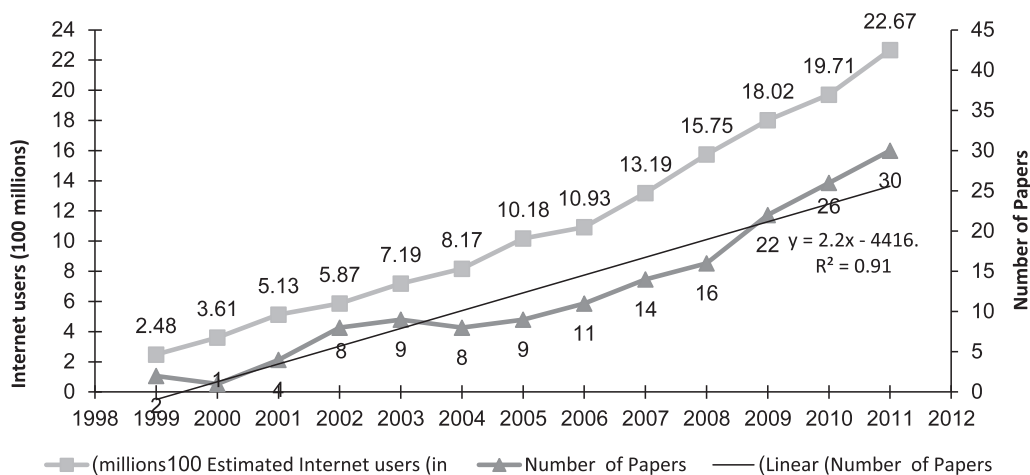


Fig. 2. Distribution of papers and Internet users by year.

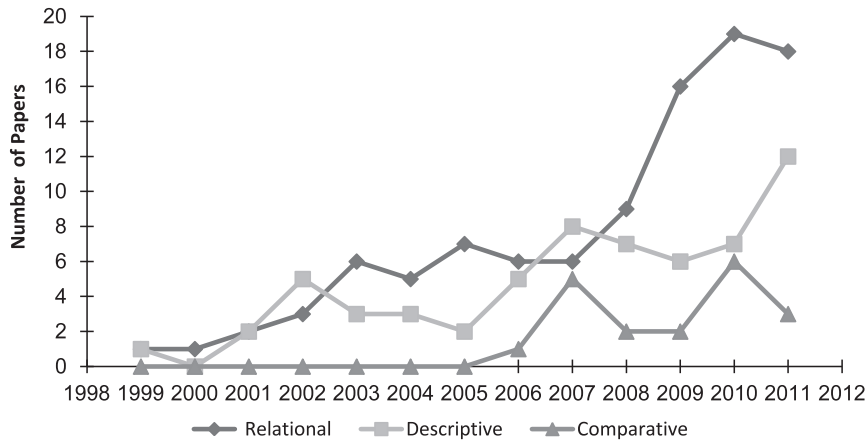


Fig. 3. Distribution of papers by classification criteria and year.

The graph shows a shift in publication away from descriptive studies toward relational studies of IB adoption. In other words, over time, the focus of IB adoption research has moved from description to explanation based on basic theories, with an increased emphasis on modeling the inter-relationships between the factors that influence IB adoption. This shift has been particularly evident in recent years. It is plausible that over time the applicability and accuracy of these theories and models has improved, which in turn, has contributed to their dominance in the study of IB adoption.

Another significant change observed in recent years is the amount of attention paid to comparative studies. As mentioned above, there are three groups of comparative studies based on population, distribution channels, and methods. These studies have been split quite evenly between comparative/descriptive studies (12) and comparative/relational studies (14). The comparative/descriptive studies were also split evenly between those investigating population issues (6) and those considering distribution channels (6). The comparative/relational studies included examples of all the dominant theories and models. The most popular were those using TAM to investigate IB adoption (8), followed by IDT (3), DTPB (2) and UTUAT (2). One study used both IDT and TAM (Gounaris and Koritos, 2008).

4.2. Distribution by journal

Table 2 shows the journals that publish the most articles on IB adoption. The journal that addresses this issue most often is the *International Journal of Bank Marketing* (30 articles), which has as its stated aim to consider adoption and implementation aspects of marketing management and marketing planning in the personal, corporate and international financial services sectors. Therefore, the combination of marketing, finance, and service management involved in IB adoption seems to have made this issue a priority for the journal. Notably, almost half (44%) of all articles investigated were published in just seven journals. The remaining articles were published across 72 journals (5 journals with 3 articles each, 11 journals with 2 articles each, and 56 journals with 1 article each).

However, the effect of journal articles on subsequent studies must be considered in the interpretation of the above findings. Because different articles have different impacts, the number of articles per journal alone is not a good criterion to evaluate the journals. To address this problem, the following discussion introduces two indices. The first is based on impact factors published by the Institute for Scientific Information (ISI) in their annual journal citations report. These impact factors were multiplied by the total number of articles published on the topic of IB adoption by the corresponding journal to obtain a

Table 2
Distribution of papers by journal.

Journal	Number of papers	%
International journal of bank marketing	30	18.18
Journal of Internet banking and commerce	21	12.73
International journal of information management	5	3.03
Internet research	4	2.42
Journal of services marketing	4	2.42
Journal of financial services marketing	4	2.42
Information and management	4	2.42
African journal of business management	3	1.82
Journal of retailing and consumer services	3	1.82
International journal of business and management	3	1.82
International journal of E-adoption	3	1.82

Table 3
Analysis of journals.

Journal	Number of papers	2010 IF (ISI)	NIF	NIF rank	Citation (total cited)	Citation rank
International journal of information management	5	1.554	7.77	2	182	4
Information and management	4	2.627	10.51	1	245	3
Internet research	4	1.150	4.60	4	258	2
Service industries journal	3	1.071	3.21	7	13	14
Electronic commerce research and applications	2	1.946	3.89	6	182	5
Journal of global information management	2	1.222	2.444	11	95	7
Management science	2	2.221	4.44	5	9	17
Decision support systems	1	2.135	2.135	12	63	8
International journal of electronic commerce	1	0.850	0.85	17	153	6
Journal of banking and finance	1	2.731	2.73	9	11	16
Journal of financial services research	1	0.762	0.762	21	34	10
Journal of organizational computing and electronic commerce	1	0.793	0.793	20	46	9
MIS quarterly: management information systems	1	5.041	5.04	3	574	1
Research policy	1	2.508	2.51	10	12	15
Technovation	1	2.993	2.99	8	33	11

Legend: IF: Impact factor; NIF: number of papers *IF. Data from ISI and scopus was accessed on 21/05/2012.

score for each journal (NIF). The NIF score for each journal that was indexed by ISI was calculated with the “top 10” presented in Table 3, along with a relative ranking based on the NIF scores. Of the 79 journals included in Appendix A, 32 were indexed by ISI, with the highest impact for IB adoption arising from papers published in *Information & Management*, the *International Journal of Information Management*, and *MIS Quarterly*.

An acknowledged limitation of the first approach is that it ignores historical performance, weighting more highly journals whose recent impact was highest. To address this limitation, we propose a second index that replaces the ISI impact factor with the raw citations reported in Scopus. While other citations sources were considered, a recent analysis by the Australian government in the lead up to their Excellence in Research initiative revealed that Scopus had the cleanest and most reliable data for journal evaluation purposes. Focusing only on the articles reported in Appendix A, it was observed that highest impact journal for IB adoption research was *MIS Quarterly* followed by *Internet Research* and *Information & Management*. In general, however, there was strong consistency in the top half of the table with the top four the same across both analyses.

Table 4
Distribution of papers by geographical region.

Geographical regions ¹	Number of papers	%	Population (millions) ²	Internet users (millions) ³	Internet penetration
Africa	11	6.47	1041.09	139.88	0.13
Eastern Africa	5	2.94	336.46	26.75	0.08
Middle Africa	0	0.00	126.87	3.24	0.03
Northern Africa	2	1.18	219.66	50.50	0.23
Southern Africa	2	1.18	56.51	7.29	0.13
Western Africa	2	1.18	301.58	52.10	0.17
Americas	16	9.41	944.68	509.41	0.54
Caribbean	0	0.00	41.43	12.42	0.30
Central America	1	0.59	155.79	50.84	0.33
North America	14	8.24	347.39	273.07	0.79
South America	1	0.59	400.07	173.09	0.43
Asia	100	58.82	4174.38	1130.05	0.27
Central Asia	0	0.00	68.34	16.63	0.24
East Asia	24	14.12	1568.03	676.06	0.43
South-East Asia	29	17.06	608.47	155.79	0.26
South Asia	22	12.94	1693.88	198.13	0.12
West Asia	25	14.71	235.66	83.44	0.35
Europe	39	22.94	823.26	465.25	0.57
Eastern Europe	1	0.59	378.85	136.79	0.36
Northern Europe	27	15.88	99.57	83.55	0.84
Southern Europe	9	5.29	153.99	90.30	0.59
Western Europe	2	1.18	190.85	154.61	0.81
Oceania	4	2.35	37.25	24.00	0.64
Australia and New Zealand	4	2.35	26.06	22.88	0.88
Melanesia	0	0.00	8.12	0.42	0.05
Micronesia	0	0.00	2.36	0.53	0.22
Polynesia	0	0.00	0.70	0.17	0.25
Total	170	100.00	7020.65	2268.59	0.32

Source: 1: United nations statistics division; 2/3: Internet world stats (accessed on 21/05/2012).

4.3. Distribution by geographic focus

The context of study is also likely to provide some interesting insights regarding the development of IB adoption research. As such, we undertook analysis to examine how the distribution of papers varied on the basis of the regions being investigated. This analysis examined the distribution of IB adoption papers at three levels: continent, geographic region, and country. The results of this investigation are presented in Table 4.

A review of the findings at the continent level indicates that 59% of the studies were conducted in Asia, 23% in Europe, 9% in America, 7% in Africa, and 2% in Oceania. At the level of geographical regions, most studies dealt with South-East Asia, Northern Europe, and West Asia. No studies were found for the Caribbean, Central Asia, Central Africa, and Oceania (except for Australia and New Zealand). At the country level, 44 countries were represented, and the most frequently studied countries were Malaysia (19), the UK (14), and the US (14). Eighteen countries were the subject of a single article, which was the lowest value in the sample.

As IB adoption requires access to infrastructure such as the Internet, we also sought to investigate whether there was a relationship between the availability of such infrastructure, and the number of studies undertaken. A useful measure of infrastructure availability used by the United Nations is the concept of Internet penetration – calculated by dividing the total population by the number of people with access to the Internet. Low values of this index in a geographical area imply that the Internet has not yet been fully developed and that this under-development may be one of the reasons that IB and its adoption are overlooked in research. Using the data provided in Table 4 within correlation analysis at the country level between the number of articles published and Internet Penetration revealed a non-significant statistical relationship ($r = 0.26$, $p = ns$). In sum, there was no observed relationship between the availability of supporting infrastructure and the number of studies undertaken in a given focal region.

5. Toward a research agenda

Considering the details of studies examined, the majority of the research reviewed targeted private banking customers, with a few exceptions such as Rotchanakitumnuai and Speece (2003), who study corporate customers. Rotchanakitumnuai and Speece (2003) argue that corporate customers provide banks with greater opportunities for profit and demand higher levels of commercial transactions with their banks than personal customers do. Therefore, they emphasize that the success of IB is largely dependent on its adoption among corporate customers, which, unfortunately, receives less consideration from researchers. Therefore, the differences in the demands and expectations of corporate and personal customers in the context of IB suggest that a focus on target populations in IB adoption studies is a significant gap in the literature.

Some studies consider the effects of additional variables related to IB adoption, such as age, gender, income level, occupation, and education (e.g., Lassar et al., 2005; Zolait and Ainin, 2008; Black et al., 2001). One of the few studies to investigate these variables' separate effects on IB adoption is Mattila et al. (2001), which investigates IB adoption among older customers. The results show that familial income and education levels significantly influence IB adoption among older customers and that the perceived difficulty of using computers combined with a lack of personalized service is the most important barrier to IB adoption among these customers. Based on this study, it can be argued that although studies include the effect of demographic variables on IB adoption, there is a lack of studies that specifically review the literature on each of these variables. Researchers might consider this issue in future studies.

Appendix A presents several studies that are classified in more than one group. During the classification of these studies, the present study aimed for accuracy, but the emphasis was on the most relevant criterion. However, this system was not intended to represent a mutually exclusive taxonomy, and the classification system was not intended to imply that there is no relationship between these issues. It is foreseeable that the criteria could be inter-related in some cases. Thus, future research could consider several research areas on IB adoption simultaneously.

As shown in Fig. 3, the trends in each type of article were investigated over time to analyze the chronological distribution of papers based on the classification criteria for IB adoption studies. In particular, data on the year of publication was decomposed further to consider impact of the classification criterion. Such decomposition could be applied to the data on source journal and geographic region to evaluate the breakdown by classification criterion in these areas too.

Likewise, other subject areas could be introduced to offer a more comprehensive scope for the analysis. However, due to the large number of possible combinations and associated data points, it was not possible to analyze them all in this study. For instance, we could have provided a comparative analysis of the journals that paid more or less attention to IB in recent years, or added additional databases related to other related subject areas. Regarding geographical region, researchers could investigate specific article publication trends in different countries over time and, while addressing the factors affecting these trends, offer solutions appropriate to the economic, cultural, and social conditions of their countries.

6. Conclusions

This study reviewed 165 papers published from 1999 to 2012 on customer adoption of IB. After examining these papers in detail, the studies were classified into three groups: descriptive, relational, and comparative studies. While descriptive studies examined IB adoption without reference to models or theories, relational studies generally use one of ten theories or

models to explain IB adoption. A discussion of comparative studies of IB adoption based on three variables – population, distribution channels, and methods – was shown to represent a strong emerging theme within the literature.

The articles were subsequently analyzed according to publication year, source journal, country under investigation, and combinations of these issues. Based on this analysis, the paper discussed the key trends in the IB adoption literature and outlined some fertile areas for future research attention. Key findings from this analysis were:

- That interest in IB adoption is likely to continue into the future.
- While relational studies have dominated the literature over the past decade, the emergence of comparative studies was seen as an emerging trend.
- The key journals publishing IB adoption literature were *Information & Management*, *MIS Quarterly*, *Internet Research*, and the *International Journal of Information Management*.
- The majority of IB adoption research has been undertaken in Asia, followed by Europe and the Americas. The top three geographic regions were South-East Asia, Northern Europe, and West Asia.

From this analysis, some important research opportunities for the future attention were identified, including:

- Investigating the factors influencing IB adoption in less-developed regions, particularly in parts of Africa, Asia, and South America, with particular consideration for the specific cultural aspects of these regions.
- Devoting additional attention to comparative studies in general, and comparative employing less frequently used theories in relational studies to better explain the factors affecting IB adoption.
- Studying the comparative effects of a broader set of descriptive variables (e.g., demographics, socio-cultural, political factors) as they impact IB adoption.
- Conducting additional studies on IB adoption among corporate customers.

The present study was also subject to a couple of limitations that require acknowledgment. For example, the focus of this paper was on adoption of IB. A significant body of literature relating to other consumer issues such as satisfaction, loyalty and segmentation was ignored. Distinguishing between studies of adoption and other types of consumer issues required great care and attention during searches for articles. It is possible that during the selection and coding process that some articles were inadvertently excluded.

A number of papers on the broader topic of electronic banking were excluded from this study. It must be acknowledged that IB is only one form of electronic banking, which also includes mobile banking, telephone banking, and ATMs. A limitation of the present study was the decision to only include journal articles, and to focus on IB rather than electronic banking in general or a comparison of IB with other forms of electronic banking. Future research could consider expanding the focus to include other forms of electronic banking adoption, and other sources of scholarly publications.

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Appendix A

Internet banking adoption literature.

Index	Author(s)	Year	Country	Class	Type	Theory
1 (Liao et al., 1999)	Liao et al.	1999	Hong Kong	R		TPB, IDT
2 (Sathye, 1999)	Sathye	1999	Australia	D	A	–
3 (Tan and Teo, 2000)	Tan and Teo	2000	Singapore	R		DTPB, SCT
4 (Bhattacharjee, 2001)	Bhattacharjee	2001	USA	R		TAM
5 (Black et al., 2001)	Black et al.	2001	UK	R		IDT
6 (Mattila et al., 2001)	Mattila et al.	2001	Finland	D	A	–
7 (Polatoglu and Ekin, 2001)	Polatoglu and Ekin	2001	Turkey	D	A	–
8 (Eastin, 2002)	Eastin	2002	USA	R/C	Ch	IDT, SCT
9 (Flohr-Nielsen, 2002)	Flohr	2002	Denmark, Finland, Norway, Sweden	D	A	–
10 (Furst, 2002)	Furst et al.	2002	USA	D	A	–
11 (Howcroft et al., 2002)	Howcroft et al.	2002	UK	D/C	Ch	–

Appendix A (continued)

Index	Author(s)	Year	Country	Class	Type	Theory
12 (Karjaluoto et al., 2002)	Karjaluoto et al.	2002	Finland	D	A	–
13 (Liao and Cheung, 2002)	Liao and Cheung	2002	Singapore	D	A	–
14 (Suh and Han, 2002)	Suh and Han	2002	South Korea	R		TAM
15 (Wungwanitchakorn, 2002)	Wungwanitchakorn	2002	Thailand	R		IDT, TRA
16 (Chau and Lai, 2003)	Chau and Lai	2003	Hong Kong	R		TAM
17 (Gerrard and Cunningham, 2003)	Gerrard and Cunningham	2003	Singapore	R		IDT
18 (Gopalakrishnan et al., 2003)	Gopalakrishnan et al.	2003	USA	D	A	–
19 (Mattila et al., 2003)	Mattila et al.	2003	Finland	D	A	–
20 (Mukherjee and Nath, 2003)	Mukherjee and Nath	2003	India	R		CTT
21 (Ramayah et al., 2003)	Ramayah et al.	2003	Malaysia	R		TAM
22 (Rotchanakitumnuai and Speece, 2003)	Rotchanakitumnuai and Speece	2006	Thailand	D	A	–
23 (Suh and Han, 2003)	Suh and Han	2003	South Korea	R		TAM
24 (Wang et al., 2003)	Wang et al.	2003	Taiwan	R		TAM, SCT
25 (Akinci et al., 2004)	Akinci et al.	2004	Turkey	D	A	–
26 (Al-Sabbagh and Molla, 2004)	Al-Sabbagh and Molla	2004	Oman	R		TAM, DTPB
27 (Brown et al., 2004)	Brown et al.	2004	Singapore, South Africa	R/C	P	DTPB, SCT
28 (Centeno, 2004)	Centeno	2004	Spain(EU15 and ACCs)	D/C	P	–
29 (Chan and Lu, 2004)	Chan and Lu M	2004	Hong Kong	R		TAM (2), TPB, SCT
30 (Kyung and Prabhakar, 2004)	Kyung and Prabhakar	2004	USA	D	A	–
31 (Pikkarainen et al., 2004)	Pikkarainen et al.	2004	Finland	R		TAM
32 (Shih and Fang, 2004)	Shih and Fang	2004	Taiwan	R/C	M	TRA, DTPB
33 (Brown and Molla, 2005)	Brown and Molla	2005	South Africa	R/C	M	TPB, IDT
34 (Durkin and O'Donnell, 2005)	Durkin and O'Donnell	2005	UK	D	A	–
35 (Eriksson et al., 2005)	Eriksson et al.	2005	Estonia	R		TAM
36 (Jaruwachirathanskul and Fink, 2005)	Jaruwachirathanskul and Fink	2005	Thailand	R		DTPB
37 (Laforet and Li, 2005)	Laforet and Li	2005	China	D/C	Ch	–
38 (Lai and Li, 2005)	Lai and Li	2005	Hong Kong	R		TAM
39 (Lassar et al., 2005)	Lassar et al.	2005	USA	R		TAM, IDT, SCT
40 (Lee et al., 2005)	Lee et al.	2005	USA	R		IDT, TRA
41 (Wan et al., 2005)	Wan et al.	2005	Hong Kong	R		TRA
42 (Bauer and Hein, 2006)	Bauer and Hein	2006	USA	D	A	–
43 (Cheng et al., 2006)	Cheng et al.	2006	Hong Kong	R		TAM
44 (Corrocher, 2006)	Corrocher	2006	Nigeria	D	A	–
45 (Gerrard et al., 2006)	Gerrard et al.	2006	Singapore	D/C	M	–
46 (Kassim and Abdulla, 2006)	Kassim and Abdulla	2006	Qatar	R		CCT
47 (Khalfan et al., 2006)	Khalfan et al.	2006	Oman	D	A	–
48 (Lichtenstein and Williamson, 2006)	Lichtenstein and Williamson	2006	Australia	D	D	–
49 (Littler and Melanthiou, 2006)	Littler and Melanthiou	2006	UK	R		PRT
50 (McKechnie et al., 2006)	McKechnie et al.	2006	UK	R		TAM
51 (Ndubisi and Sinti, 2006)	Ndubisi and Sinti	2006	Malaysia	R		IDT
52 (Shih and Fang, 2006)	Shih and Fang	2006	Taiwan	R		TRA
53 (Shu-Fong et al., 2007)	Shu-Fong et al.	2007	Malaysia	R		TAM

(continued on next page)

Appendix A (continued)

Index	Author(s)	Year	Country	Class	Type	Theory
54 (Amin, 2007)	Amin	2007	Malaysia	R		TAM, SCT
55 (Booi and Riquelme, 2007)	Booi and Riquelme	2007	Australia	D	A	–
56 (Durkin, 2007)	Durkin	2007	UK	D	A	–
57 (Hamid et al., 2007)	Hamid et al.	2007	Malaysia, Thailand	D/C	P	–
58 (Hernandez and Mazzon, 2007)	Hernandez and Mazzon	2007	Brazil	R		TAM (2), DTPB
59 (Kivijarvi et al., 2007)	Kivijarvi et al.	2007	Finland, Portugal	D/C	P	–
60 (Kuisma et al., 2007)	Kuisma et al.	2007	Finland	D/C	Ch	Mean-End Theory
61 (Laukkanen, 2007)	Laukkanen	2007	Finland	D/C	Ch	Mean-End Theory
62 (Ndubisi, 2007)	Ndubisi	2007	Malaysia	R		TAM, SCT
63 (Nor and Pearson, 2007)	Nor and Pearson	2007	Malaysia	R		IDT
64 (Sayar and Wolfe, 2007)	Sayar and Wolfe	2007	UK, Turkey	D/C	P	Three-dimensional model
65 (Sudha et al., 2007)	Sudha et al.	2007	Malaysia	D	A	–
66 (Yiu et al., 2007)	Yiu et al.	2007	Hong Kong	R		TAM, IDT
67 (Calisir and Gumussoy, 2008)	Calisir and Gumussoy	2008	Turkey	D/C	Ch	–
68 (Celik, 2008)	Celik	2008	Turkey	R		TAM, TPB
69 (Durkin et al., 2008)	Durkin et al.	2008	UK	D	A	–
70 (Eriksson et al., 2008)	Eriksson et al.	2008	Estonia	R		IDT
71 (Gounaris and Koritos, 2008)	Gounaris and Koritos	2008	Greece	R/C	M	TAM, IDT
72 (Grabner-Krauter and Faullant, 2008)	Grabner-Krauter and Faullant	2008	Austria	D	D	
73 (Laukkanen et al., 2008)	Laukkanen et al.	2008	Finland	D	A	–
74 (Maenpaa et al., 2008)	Maenpaa et al.	2008	Finland	D	A	–
75 (Nor and Pearson, 2008)	Nor and Pearson	2008	Malaysia	R		DTPB
76 (Ozdemir et al., 2008)	Ozdemir et al.	2008	Turkey	R		TAM
77 (Padachi et al., 2008)	Padachi et al.	2008	Mauritius	D	A	–
78 (Qureshi et al., 2008)	Qureshi et al.	2008	Pakistan	R		TAM
79 (Singhal and Padhmanabhan, 2008)	Singhal and Padhmanabhan	2008	India	D	A	–
80 (Vatanasombut et al., 2008)	Vatanasombut et al.	2008	USA	R		CTT, TAM
81 (Zhao et al., 2008)	Zhao et al.	2008	China	R		PRT
82 (Zolait and Ainin, 2008)	Zolait and Ainin	2008	Yemen	R		TRA, IDT
83 (Abu-Shanab and Pearson, 2009)	Abu-Shanab and Pearson	2009	Jordan	R		UTAUT
84 (Aldas-Manzano et al., 2009a)	Aldas-Manzano et al.	2009	Spain	R		TAM, PRT
85 (Aldas-Manzano et al., 2009b)	Aldas-Manzano et al.	2009	Spain	R		PRT, IDT
86 (Alhudaithy and Kitchen, 2009)	Alhudaithy and Kitchen	2009	UK	D	D	
87 (Al-Somali et al., 2009)	Al-Somali et al.	2009	Saudi Arabia	R		TAM, SCT
88 (Hua, 2009)	Hua	2009	China	R		TAM
89 (Laukkanen et al., 2009)	Laukkanen et al.	2009	Finland	D	A	–
90 (Lee, 2009)	Lee	2009	Taiwan	R		TAM, TPB, PRT
91 (Lee and Chung, 2009)	Lee and Chung	2009	South Korea	R		TAM, SCT
92 (Makris et al., 2009)	Makris et al.	2009	Greece	R		TAM
93 (Mirza et al., 2009)	Mirza et al.	2009	Iran	D	A	–
94 (Mirza et al., 2009)	Mirza et al.	2009	Iran	D/C	P	–
95 (Ozdemir and Trott, 2009)	Ozdemir and Trott	2009	Turkey	R		TAM, IDT, PRT

Appendix A (continued)

Index	Author(s)	Year	Country	Class	Type	Theory
96 (Peng et al., 2009)	Peng et al.	2009	China	R		TAM
97 (Polasik and Wisniewski, 2009)	Polasik and Wisniewski	2009	Poland	R		TAM, IDT
98 (Poon et al., 2009)	Poon et al.	2009	Malaysia	R		TAM
99 (Prompattanapakdee, 2009)	Prompattanapakdee	2009	Taiwan	R		TAM
100 (Rouibah et al., 2009)	Rouibah et al.	2009	Malaysia	R/C	M	TRA, TPB, TAM
101 (Thulani et al., 2009)	Thulani et al.	2009	Zimbabwe	D	A	–
102 (Yousafzai et al., 2009)	Yousafzai et al.	2009	UK	D	A	–
103 (Zolait and Mattila, 2009)	Zolait and Mattila	2009	Yemen	R		TRA, TAM, TPB, IDT
104 (Zolait et al., 2009)	Zolait et al.	2009	Yemen	R		TRA, TAM, TPB, IDT
105 (Abu-shanab et al., 2010)	Abu-shanab et al.	2010	Jordan	R		UTAUT
106 (Al-Majali and Nik Mat, 2010)	Al-Majali and Nik Mat	2010	Jordan	R		DTPB
107 (Alsajjan and Dennis, 2010)	Alsajjan and Dennis	2010	Saudi Arabia, UK	R/C	P	TAM, TRA, CTT
108 (Boyacioglu et al., 2010)	Boyacioglu et al.	2010	Turkey	D	A	–
109 (Campbell and Frei, 2010)	Campbell and Frei	2010	USA	D	A	–
110 (Chau and Ngai, 2010)	Chau and Ngai	2010	UK	R		TRA, TAM, SCT
111 (Cheng and Yeung, 2010)	Cheng and Yeung	2010	Hong Kong	R		TAM
112 (Chong et al., 2010)	Chong et al.	2010	Vietnam	R		TAM
113 (Dimitriadis and Kyrezis, 2010)	Dimitriadis and Kyrezis	2010	Greece	R/C	Ch	TAM, CTT
114 (Dixit and Datta, 2010)	Dixit and Datta	2010	India	D	A	–
115 (Durkin, 2010)	Durkin	2010	UK	D	D	–
116 (Featherman et al., 2010)	Featherman et al.	2010	USA	R		TAM
117 (Khare et al., 2010)	Khare et al.	2010	India	R		TAM
118 (Malhotra and Singh, 2010)	Malhotra and Singh	2010	India	D	A	–
119 (Nor et al., 2010a)	Nor et al.	2010	Malaysia	R		IDT
120 (Nor et al., 2010b)	Nor et al.	2010	Malaysia	R/C	P	TAM
121 (Safeena, 2010)	Safeena et al.	2010	India	R		TAM
122 (Sanchez Sanchez and Jean-Baptiste, 2010)	Sanchez Sanchez and Jean-Baptiste	2010	France	D/C	P	–
123 (Suki, 2010)	Suki	2010	Malaysia	R		IDT
124 (Tan et al., 2010)	Tan et al.	2010	Malaysia	R		TAM, TPB
125 (Wu et al., 2010)	Wu et al.	2010	Taiwan	R		TAM
126 (Yousafzai et al., 2010)	Yousafzai et al.	2010	UK	R/C	M	TRA, TPB, TAM
127 (Yuen et al., 2010)	Yuen et al.	2010	USA, Australia, Malaysia	R/C	P	UTAUT
128 (Zahid et al., 2010)	Zahid et al.	2010	Pakistan	R		TAM
129 (Zhao et al., 2010)	Zhao et al.	2010	China	D	D	–
130 (Zolait, 2010)	Zolait	2010	Yemen	R		DTPB, TPB
131 (Aslam et al., 2011)	Aslam et al.	2011	Pakistan	D	D	–
132 (Akhlaq and Shah, 2011)	Akhlaq and Shah	2011	Pakistan	R		IDT
133 (Al-Majali, 2011)	Al-Majali	2011	Jordan	R		TRA
134 (Al-Majali and Mat, 2011)	Al-Majali and Mat	2011	Jordan	R		IDT, TAM
135 (Alnsour and Al-Hyari, 2011)	Alnsour and Al-Hyari	2011	Jordan	R		TAM
136 (Amini et al., 2011)	Amini et al.	2011	Iran	R		TAM, SCT

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Appendix A (continued)

Index	Author(s)	Year	Country	Class	Type	Theory
137 (Chirani et al., 2011)	Chirani et al.	2011	Iran	R		TAM2, DTPB
138 (Dash et al., 2011)	Dash et al.	2011	India	R		TAM
139 (Dimitriadis and Kyrezis, 2011)	Dimitriadis and Kyrezis	2011	Greece	R/C	Ch	TAM
140 (Echchabi, 2011)	Echchabi	2011	Morocco	R		TAM
141 (Foon and Fah, 2011)	Foon and Fah	2011	Malaysia	R		UTAUT
142 (Gilaninia et al., 2011)	Gilaninia et al.	2011	Iran	R		TAM
143 (Im et al., 2011)	Im et al.	2011	South Korea, USA	R/C	P	UTAUT
144 (Mamode-Khan and Emmambokus, 2011)	Mamode Khan and Emmambokus	2011	Mauritius	D	A	–
145 (Mangin et al., 2011)	Manginet al.	2011	Canada	R		TAM
146 (Mansumitrchai, 2011)	Mansumitrchai and AL-Malkawi	2011	Mexico	D	D	
147 (Musiiime and Ramadhan, 2011)	Musiime and Ramadhan	2011	Uganda	D	D	
148 (Mwesigwa and Nkundabanyanga, 2011)	Mwesigwa and Nkundabanyanga	2011	Uganda	D	D	
149 (Narayanasamy et al., 2011)	Narayanasamy et al.	2011	Malaysia	D	A	–
150 (Nasri, 2011)	Nasri	2011	Tunisia	D	A	–
151 (Norzaidi et al., 2011)	Norzaidi M.D., Nor I.M., Sabrina A.A.	2011	Malaysia	D	A	–
152 (Omar et al., 2011)	Omar et al.	2011	Pakistan	D	A	–
153 (Onyia and Tagg, 2011)	Onyia and Tagg	2011	Nigeria	D	D	
154 (Sadeghi and Farokhian, 2011)	Sadeghi and Farokhian	2011	Iran	R/C	P	TAM, TRA, TPB
155 (Safeena et al., 2011)	Safeena et al.	2011	India	R		TAM
156 (Shah, 2011)	Shah	2011	India	D	A	–
157 (Sundarraaj and Manochehri, 2011)	Sundarraaj and Manochehri	2011	Qatar	R		TAM, IDT
158 (Winley, 2011)	Winley	2011	Thailand	R		TAM
159 (Xue et al., 2011)	Xue et al.	2011	USA	D	A	–
160 (Yaghoubi and Bahmani, 2011)	Yaghoubi and Bahmani	2011	Iran	R		PRT, TPB
161 (Chiou and Shen, Forthcoming)	Chiou and Shen	2012	Taiwan	R		TAM
162 (Hanafizadeh and Khedmatgozar, 2012)	Hanafizadeh and Khedmatgozar	2012	Iran	R		PRT
163 (Mansumitrchai and Chiu, 2012)	Mansumitrchai and Chiu	2012	UAE	D	D	
164 (Patsiotis et al., 2012)	Patsiotis et al.	2012	Greece	D	D	
165 (Yousafzai and Yani-de-Soriano, 2012)	Yousafzai and Yani-de-Soriano	2012	UK	R		TAM, technology readiness model

Legend: D: Descriptive (A: Adopter characteristics, D: Drivers of adoption), R: Relational (see “Theory” column), C: Comparative (Ch: Channel, M: Method, P: Population).

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