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TECHNOLOGY ADOPTION ON BANK SERVICES; A SYSTEMATIC LITERATURE REVIEW

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Abstract

Objectives: This paper explains, synthesizes, reviews the main findings, and provides suggestions for future research to deepen and enrich understanding of technology-based banking services (banking technology). **Methods:** This research uses a systematic literature review or structured review as a research methodology, which will analyze scientific articles based on widely used methods, theories, and constructs. **Results:** The results shown that TAM as an established concept is the model most often used in research in the context of technology-based banking services. However, this does not guarantee that only the TAM construct (PU, PEOU, Social Influence, and Attitude) is able to explain individual attitudes and intentions in adopting and using banking technology. Therefore, exploration is needed within a phenomenological framework to find other values (besides the TAM construct) to enrich scientific insights. In addition, a comparative study is also needed to see the role of the cultural dimension in influencing the adoption and use of technology in a country. In turn, our study is not without limitations. The ability to access reputable journals has been a major factor in our study covering only 20 scientific articles over the last ten years. The number is relatively small, making our study unable to examine other antecedents (besides those mentioned in table 4.5) used in the context of technology banking. Implications: Our study has implications for the development of studies in the context of banking technology, where our study can be taken into consideration for developing an integrated model that covers all perspectives in the context of technology adoption and use.

Type of Paper: Empirical.

Keywords: Technology Bank Services, Systematic Review, Technology Acceptance Model.

INTRODUCTION

Banks are faced with changing demands to realize the importance of service modernization and diversification by taking into account technological developments. The presence of Fintech (Financial Technology) as a combination of finance and technology has created a new model of financial transactions by combining innovative ideas and sophisticated technology. The development of telecommunications and advances in mobile technology encourage the growth of the financial industry (Yoon & Joung, 2020) by adopting more up-to-date and sophisticated services such as mobile banking (m-banking) (Le et al., 2019). M-banking can make banking transactions easier in everyday life.

In recent years, acceptance of m-banking has increased rapidly due to several factors, such as increased competitiveness among financial institutions and advances in technology (Gokmenoglu & Kaakeh, 2022). The increase in smartphones has also contributed to expanding the demand for m-banking services (Glavee-Geo et al., 2017). In addition, the physical distancing policy due to the Covid-19 pandemic has also changed the method of financial

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transactions by reducing cash payments to digital money. Unfortunately, the use of m-banking is not as high as expected compared to the potential benefits for customers and the banking industry (Shaikh & Karjaluoto, 2015; Rahmayanti et al., 2021). Researchers also claim that m-banking adoption is still in its early stages.

The use of Fintech services is determined by the user's intention, where the behavioral intention itself is determined by the attitude towards the behavior and the perceived usefulness (Davis, 1989). Attitudes are positive and negative feelings that consumers get towards a technology (Schierz et al., 2010). Davis (1985) in the Technology Acceptance Model explains that the decision to use a new technology is determined by perceived usefulness and perceived ease of use, which are believed to be the basis for determining the technology acceptance model.

However, the presence of technology does not seem to be welcomed. Even though banks have been adopting cellular services at a relatively fast pace, there are still challenges on the consumer side. Banks face resistance from skeptical consumers (Souiden et al., 2021) because of concerns about security, the ability to use technology, and the availability of electricity and internet networks (Alhassan et al., 2020) so they are reluctant to switch to "new services." Therefore, banks need to continuously assess customers' readiness to adopt technology-based banking in order to be able to offer adequate services and provide the best value for consumers and service providers.

This paper takes inventory and assesses the most significant determinants and barriers to consumer use of Fintech. Based on a systematic review of Fintech, this study aims to answer several questions: 1) What are the differences in the conceptual and theoretical frameworks used to explain consumers' use of technology-based banking services? 2) What are the main predictors and barriers to consumer adoption of technology-based banking services? 3) What are the most common consequences of implementing technology-based banking services? The answers to these questions will lead to the ultimate goal of this study model which will be a better future research agenda in increasing understanding and enriching insights regarding the adoption and use of technology-based banking services.

Following the previous systematic review studies, this paper is organized as follows. The second part presents the method used to identify relevant articles regarding technology-based banking services. The third section describes the general characteristics of the selected articles. The fourth section intends to broaden the theoretical field by outlining definitions, identifying theories, and conceptual frameworks used in the context of technology-based banking services. The fifth section outlines the antecedents used in scientific articles. Finally, this research ends with research implications and several further research agendas.

Theoritical Framework

Identification of the factors that influence the use of technology-based banking services has been carried out by relying on a number of theories in the field of information technology and information systems (A. A. Shaikh & Karjaluoto, 2015a). Some use the TAM (Technology Acceptance Model), for example Wentzel et al. (2013), Shaikh et al. (2022), and Usman et al. (2022). Then Tam & Oliveira (2016) and Baabdullah et al. (2019) uses the TTF (Task

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Technology Fit) theory, and some use UTAUT (Unified Theory of Acceptance and Use of Technology), for example Singh & Sharma (2022) and Mansour (2022).

Recording to TAM, Lee & Chung (2009) used the TAM model to examine the factors influencing the continuing intention to use m-banking and the international context. Shaikh & Karjaluoto (2015) found that TAM has become the most frequently used model as a theoretical basis for predicting consumer intentions to adopt m-banking and its basic constructs are perceived usefullness (PU) and received ease of use (PEOU). Then Shaikh & Karjaluoto (2015) developed the TAM construction by adding several factors that shape consumer intentions and decisions to adopt m-banking, including relative advantages, personal innovation, perceived risk, perceived cost of use, compatibility, awareness, lifestyle, and perceived security.

A number of studies have confirmed the explanatory power of the TTF model. Tam & Oliveira (2016) found that TTF and use are important precedents of individual performance. Rahi & Abd Ghani (2021) combine TTF and TCT (Technology Continuance Theory) to explain the continuity of customer intentions to use e-banking. As a result, the factors of user satisfaction and perceived benefits (PU) show a moderate level of influence in determining the continuing intention of e-banking users. Satisfaction is influenced by the perceived benefits of the e-banking user's intention to continue using it.

UTAUT ranks third as a theoretical basis used to predict user intentions towards technology-based banking services. Mansour (2022) investigated user behavior towards m-banking adoption by integrating UTAUT and D&MIS and found that Effort expectancy, Facilitating condition, information quality, performance expectancy, service quality, social influence explained 61.3% of the variance in user intention to adopt mobile banking sharia. Singh & Sharma (2022) found PU and social influence (SI) to be the main determinants of behavioral intention to use FinTech services, with SI having a significant negative influence. Meanwhile PEOU and SI significantly influence actual use but are not determined by behavioral intention (BI) and PU. Behavior is significantly influenced by technology.

A study conducted by Muñoz-Leiva et al. (2017) have supported the role of PU and PEOU in customer acceptance of m-banking. Results similar to those of Muñoz-Leiva et al. (2017) was also found by (I. M. Shaikh et al., 2020) in the context of Islamic banks. Another study by Baabdullah et al. (2019) found that perceived privacy, perceived security, PU, and TTF affect the sustainability of users' intentions to use m-banking. Yaakop et al. (2021) found PU, PEOU, TTF, and perceived credibility had a significant effect on the adoption of digital money during the co-19 pandemic.

RESEARCH METHODOLOGY

The research within this literature review framework contributes significantly to the conceptual, methodological, and thematic development of different domains (Paul & Criado, 2020). The literature review carefully identifies and synthesizes the relevant literature to compare and contrast the findings of previous research within a domain. As such, review

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articles provide readers with an up-to-date understanding of the research topic, help identify research gaps, and signal future research avenues.

Systematic Literature Review is a research method and process that aims to identify and critically assess relevant research as well as to collect and identify data from the research (Liberati et al., 2009). Relevant studies were analyzed based on pre-defined inclusion criteria to answer the research questions. Explicit and systematic methods used when analyzing relevant related research can minimize bias so as to provide reliable findings to draw conclusions or decisions (Moher et al., 2009).

Inclusion and Exclusion Criteria

We follow Rhaim and Amara (2019) regarding criteria for delimiting the scope of the methodology. Inclusion and exclusion criteria were determined to select scientific articles that were relevant to the research objectives. Table 1 shows these criteria.

Table 1: Criteria for Inclusion and Exclusion

Criteria	Rasionalisation
Criteria for inclusion	
Topic: Articles where financial technology banking services are mentioned explicitly as the main topic	Adoption of technology-based banking services is the main concept of this research. With these criteria, we believe that articles that focus on this topic can be identified.
Theoretical framework/foundation: Articles that use a theoretical framework or conceptual framework are used in research	Most of the articles that discuss technology-based banking services at least adoption one behavior model or technology adoption model. The first requirement of this study aims to identify the theoretical framework used in the article.
Document type: scientific articles published in international journals indexed Q3-Q1	Guarantee the quality of the selected articles
Period of publication: in the last 10 years (2022 – 2018)	Relevance to current conditions
Criteria for Exclusion	
All forms of publication other than research articles published in academic journals	Publications such as books, conference proceedings, and theses are issued for time efficiency.
Articles other than those related to business-to-business contexts or any context other than banking services	This can ensuring homogeneity and consistency. The context of online shopping, e-learning, hotel reservation, etc is excluded
Articles written in languages other than English	This criterion was added to exclude non-English publications to make it easier to understand articles

Scientific Article Search Strategy

Scientific articles included in the research population are focused on journal publications only. Thus, scientific articles in the form of peer-review or proceedings are excluded. The initial search was conducted to provide a limitation on the scope of the scientific literature search. A

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systematic search for scientific articles was carried out using Watase.web (https://www.watase.web.id/1_entangwatase_html) as a research tool.

The proposed framework for systematic literature review analysis is based on the adoption of technology-based banking services by consumers. The technology-based banking services in question are mobile banking, internet banking, QRIS (Quick Response Indonesian Standard), e-wallet, e-payment.

The main sources of information used to obtain scientific articles are Scopus, ScienceDirect, Emerald which are indexed Q3 – Q1. The first search begins by entering the keyword "Financial Technology" with the year of publication 2013–2023.

Furthermore, abstract review allows the exception of scientific articles whose research domain is not Technology-based Banking Services. Then, articles published by two publishers or contained in more than one database, one copy is issued. Unreached or inaccessible scientific articles were also excluded. Figure 1 summarizes the scientific article search strategy:

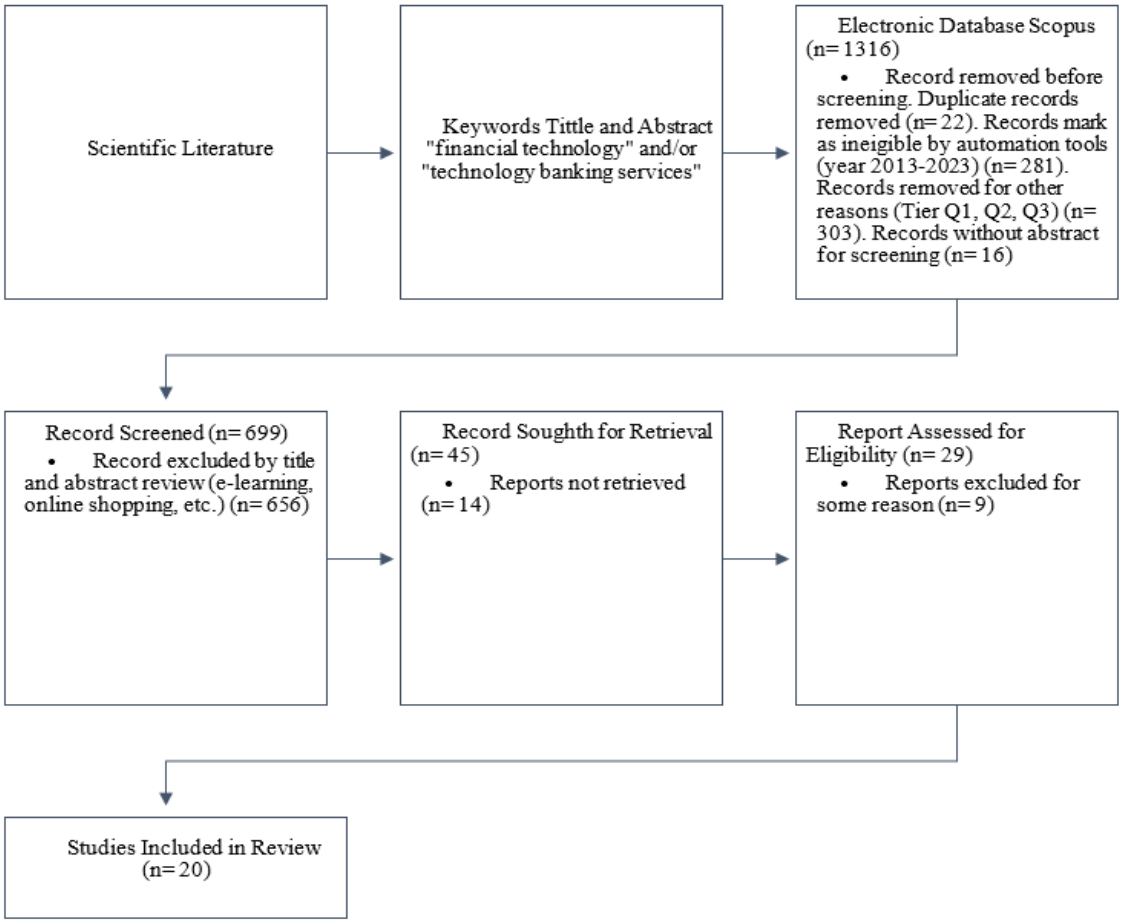

Figure 1: Scientific Article Search Strategy

Source: watase.web (2023). Data is processed.

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Search scientific articles with the keywords "financial technology" and/or "technology banking services" and produce 1,316 articles contained in the Scopus database. The next step is to check the title, keywords, and abstract of each article to check whether all inclusion and exclusion criteria are met. This procedure resulted in the removal of 656 articles from the list. Some of these removed articles dealt with ATM adoption, m-shopping, app adoption, mobile services in general, m-commerce, etc. The remaining 45 articles continue for in-depth reading This step ensured that the 20 articles retained matched all criteria and were eligible for consideration in this systematic review.

Then the 20 articles are summarized in a working paper to show complete references for each article, sample size, country context, model/framework used, research methodology, determinants of banking technology adoption, and other additional information. The next two steps of this systematic review consist of an evaluation of the selected articles and a summary of the research findings.

RESULTS AND DISCUSSION

General Characteristics of the Selected Articles

Table 1 showed that studies on fintech in banking services have been published in eight different journals. In first place is occupied by The International Journal of Bank Marketing with six articles (28.5%), followed by Technology in Society and Journal of Financial Services Marketing (14.2%). In third place is International Journal of Quality & Reliability Management, Foresight, Journal of Islamic Marketing, and Digital Policy, Regulation and Governance (9.5%). The last position is occupied by the Journal of Enterprise Information Management (4.7%). Regarding the ranking of ABS journals in 2018, 4 articles (19%) were published in journals with classification 1, 17 articles (80.9%) were published in journals with classification 2.

Table 2: List of journals have published on fintech banking services (as of 2018 - 2023)

No	Publisher	Journal	Tier	Count	%
1	Emerald	Technology in Society	Q1	3	14,2%
2	Emerald	Journal of Enterprise Information Management	Q1	1	4,7%
3	Emerald	International Journal of Quality & Reliability Management	Q2	2	9,5%
4	Emerald	International Journal of Bank Marketing	Q2	6	28,5%
5	Emerald	Foresight	Q2	2	9,5%
6	Emerald	Journal of Islamic Marketing	Q2	2	9,5%
7	Emerald	Digital Policy, Regulation and Governance	Q2	2	9,5%
8	Emerald	Journal of Financial Services Marketing	Q2	3	14,2%

Table 2 shown the classification of the selected articles. Of the 20 articles selected, 7 (33.3%) discussed Internet Banking, 5 (23.8%) in the e-Money area, 4 (19%) in the Mobile Banking area, 2 (9.5%) in the QRIS area , 2 (9.5%) in the NCF area, and 1 (4.7%) in the Service Quality area. Of the 21 articles selected, all use consumers/customers as research subjects.

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Table 2 also shown that 15 articles (71%) use Intention to Use in the areas of Mobile Banking, Internet Banking, NCF, and QRIS. 5 articles (23.8%) used Actual Use in the Internet Banking and Moble Banking areas. 4 articles (19%) used Continued to Use in the Mobile Banking and Internet Banking areas.

Trends in Publications and Countries Investigated

Research on fintech in banking services began in 2005, but experienced obstacles until it was finally interrupted in 2007 and 2008 (Souiden et al., 2021). Basically, m-banking services have been around since the late 1900s when the German company "Paybox" partnered with Deutsche Bank to launch the first service. This first service was then deployed and tested in most European countries such as Germany, Spain, Sweden, Austria and the United States (A. A. Shaikh & Karjaluoto, 2015b).

As shown in Figure 2, research trends have experienced ups and downs with the highest number in 2020 and 2021 of 5 articles (23.8%). The increasing research interest in m-banking implies the gradual adoption of this new service by the banking industry. Most of the article publications were made in the context of Malaysia with 7 articles (33.3%), followed by India with 6 articles (28.5%), then Indonesia with 5 articles (23.8%). These three countries are developing countries in Asia which are adopting the internet in banking services so that many researchers are interested in researching this topic. It can also explain the challenges consumers from developing countries face when adopting new services such as m-banking. Multi-country studies were not founded in the articles in this study. This may be explained by the difficulty in collecting research data in more than one country or because comparative studies are more challenging in terms of conceptualization and analysis.

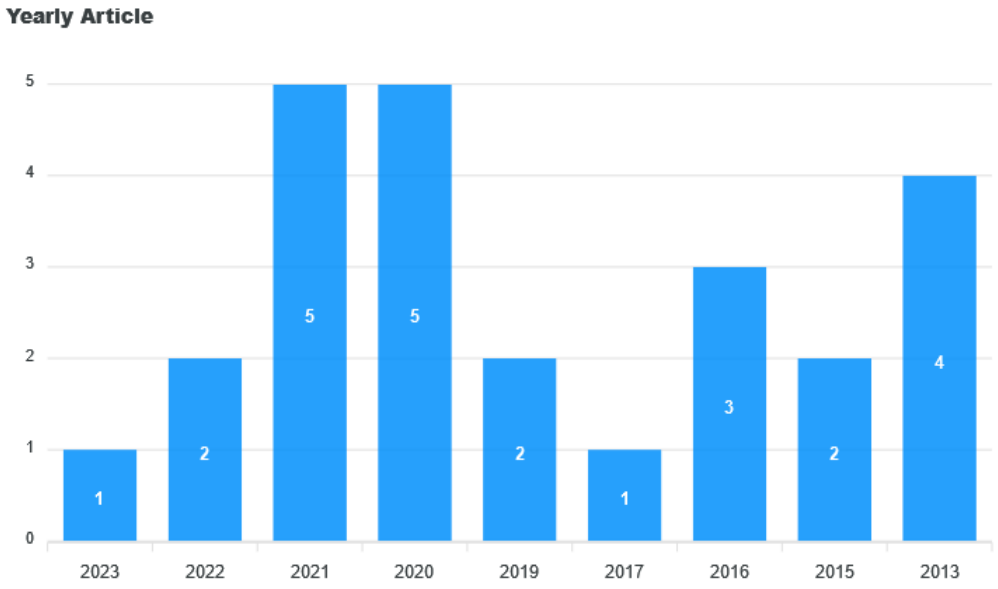

Figure 2: Publications' Trends

Source: Watase. web (2023). Data processed

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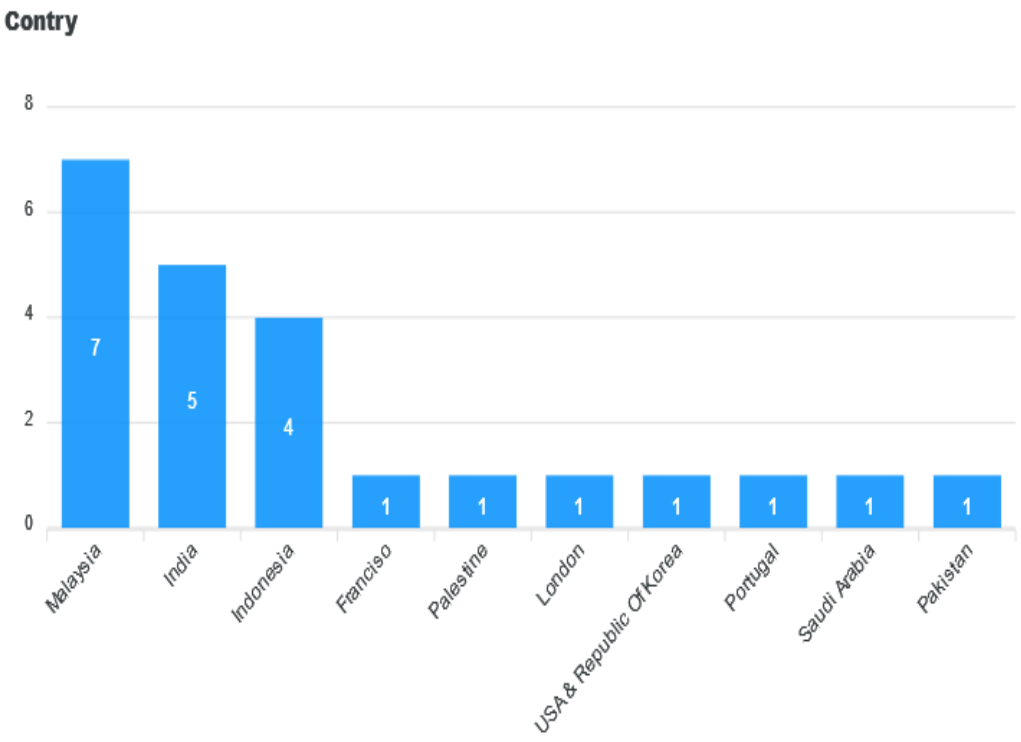

Figure 3: Investigated Country

Source: Watase. web (2023). Data processed

Distribution of Articles by Analytical Method

Most of the studies (16 articles or 76.19%) on FinTech in banking services use the partial-least square equation (PLS) model and SPSS with 4 articles or 19.04%. Over the past two decades, structural equation modeling (SEM) has become the most commonly used method for many researchers investigating complex relationships between latent constructs.

Regression or multiple regression analysis was used in seven articles (9.21%), while some studies used other techniques such as ANOVA and t-test. Cross-sectional data design is the most widely used data type. The longitudinal and panel designs do not exist, indicating the potential difficulty of this method to be implemented in marketing disciplines in general and in the banking industry in particular. As for the qualitative approach, it is only carried out in studies in the form of a literature review.

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Table 4: Literature Review Classification

No	Source	Context Area Study	Focus on	Subject Area	Research Subject	Research Object
1	Ahmad et al. (2019)	Technology Acceptance Model (TAM)	Service Quality	Internet Banking	Consument	Intention to Use
2	Astari et al. (2022)	E-wallet usage in transactions during the Covid-19 pandemic	Banking Services	E-money	Consument	Actual Use
3	Baabdullah et al. (2019)	Saudi Banking Costumers	Important factors that could predict	Mobile Banking	Consument	Continued Intention to Use
4	George and Kumar (2013)	Technology Acceptance Model	Customer Satisfaction	Internet Banking	Consument	Actual Use
5	Mansour (2020)	Islamic Mobile Banking	acceptance and use of technology	Mobile Banking	Consument	Intention to Use
6	Marakarkandy et al. (2017)	Internet Banking	integration of relevant antecedents into TAM to be Augmented TAM	Internet Banking	Consument	Intention to Use
7	Nambiar and Bolar (2022)	Financial Technology	Cardless Cash Technology	Mobile Banking	Consument	Intention to Use
8	Natakusumah et al. (2023)	Religiosity	Relogiosity	QRIS	Consument	Intention to Use
9	Ooi and Tan (2016)	Mobile Commerce	Near Field Communication (NFC)	Near Field Communication (NFC)	Consument	Intention to Use
10	Rahi and Abd (2021)	Internet Banking User's Continuance Intention	Internet Banking	Internet Banking	Consument	Continued Intention to Use
11	Rahi et al. (2020)	Internet Banking	Internet Banking	Internet Banking	Consument	Continued Intention to Use

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12	Rahmayanti et al. (2021)	Continuous Usage Intention	e-Wallet	e-Money	Consument	Continued Intention to Use
13	Ramos-de-Luna et al. (2015)	Mobile Payment	NFC Payment System	Near Field Communication (NFC)	Consument	Intention to Use
14	Shaikh et al. (2020)	Islamic FinTech's Services	Islamic Financial Technology	Internet Banking	Consument	Intention to Use
15	Singh et al. (2020)	Financial Technology	Financial Technology Adoption	Internet Banking	Consument	Actual Use
16	Tam and Oliveira (2016)	Mobile Banking	Performance impact	Mobile Banking	Undergraduate Student	Actual Use
17	Thakur (2013)	Consumer Behavior	e-commerce	E-Money	Consument	Intention to Use
18	Usman et al. (2021)	Sharia E-banking	Shariah compliance	Internet Trading	Consument	Intention to Use
19	Wentzel et al. (2013)	Financial Technology	Technology enabled service adoption	Bank Services	Consument	Actual Use
20	Zhong et al. (2021)	Financial Technology	facial recognition payment	E-Money	Consument	Intention to Use

Table 5: Publications by country/region investigated, adopted innovation model, and main statistical tools

Author's	Country	Model/Framework	Main Method of Analysis
Ooi and Tan, 2016	Malaysia	TAM	SmartPLS
Zhong et al., 2021	South Africa	TAM	SmartPLS
Wentzel et al., 2013	South Africa	TAM	SPSS
Shaikh et al., 2020	Malaysia	TAM	SmartPLS
Marakarkandy et al., 2017	India	TAM	SmartPLS
Usman et al., 2021	Indonesia	TAM	SmartPLS
Ahmad et al., 2019	USA & Republic Of Korea	TAM	SmartPLS
George and Kumar, 2013	London	TAM	SPSS

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Thakur, 2013	India	TAM	SPSS
Natakusumah et al., 2023	Indonesia	TAM	SmartPLS
Ramos-de-Luna et al., 2015	Franciso	TAM & TPB	SmartPLS
Astari et al., 2022	Indonesia	TAM & TPB	SmartPLS
Abroud et al., 2013	Malaysia	TAM & TRA	Amos
Rahmayanti et al., 2021	Indonesia	TAM & TRA	SmartPLS
Baabdullah et al., 2019	Saudi Arabia	TAM & TTF	SmartPLS
Singh et al. (2020)	India	TAM & UTAUT	SmartPLS
Tam and Oliveira, 2016	Portugal	TTF	SmartPLS
Rahi and Abd, 2021	Pakistan	TTF & TCT	SmartPLS
Rahi et al., 2020	Malaysia	TTF & TCT	SmartPLS
Mansour, 2020	Palestine	UTAUT & DeLone and McLean IS Success	SmartPLS

Scoring Fields of Theory

The collection of articles identified in this study is used for a systematic review of technology-based banking services. This study follows an approach recognized and adopted by earlier scholars such as Arksey & Malley (2005).

Terminology and Definitions

The terms and concepts that conclude the adoption of technology in banking services vary widely and have continued to evolve since their inception. Internet Banking is a pioneer of research that investigates the use of technology in the banking sector. Following this research papers are the use of the terms electronic, online, digital, then mobile banking.

Recent studies have begun to abandon the term Internet Banking and more and more Digital (Putri et al., 2022) and Mobile (Liu et al., 2010) terminology are used to refer to internet usage in banking services. Even though the terminology continues to develop and change from time to time, the intended meaning remains almost the same. For example Internet Banking is defined as the use of the internet as a channel for sending long-distance banking services via the world wide web (Nasri and Charfeddine, 2012). Electronic Banking represents a wide range of banking services ranging from Automated Teller Machines (ATMs), cash deposits, to virtual accounts for direct payments, electronic fund transfers, and computer banking, as well as internet banking and m-banking (Hoehle et al., 2012). Meanwhile, mobile banking is defined as a text-based banking service using a mobile device (Baabdullah et al., 2019b).

Table 6 summarizes the terminology of technology-based banking services used in the 20 articles included in the study. The majority of studies use Internet banking terminology 7

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(35%), e-money 6 (30%), mobile banking 3 (15%), internet trading 1 (5%), near field communication 1 (5%), and bank services 1 (5%). This also shows internet banking as a banking service that is more widely used by consumers compared to other banking services.

Table 6: Terminology of technology-based banking services

No.	Terminology	Total	Authors
1	e-money	6	Thakur, 2013; Rahmayanti et al., 2021; Zhong et al., 2021; Astari et al., 2022
2	Internet banking	7	George and Kumar, 2013; Marakarkandy et al., 2017; Shaikh et al., 2020; Singh et al., 2020; Ahmad et al., 2019; Rahi and Abd, 2021; Rahi et al., 2020
3	Mobile banking	3	Tam and Oliveira, 2016; Baabdullah et al., 2019; Mansour, 2020;
4	Internet trading	1	Abroud et al., 2013
5	Near field communication (NFC)	1	Ramos-de-Luna et al., 2015; Ooi and Tan, 2016
6	Bank services	1	Wentzel et al., 2013

Source: watase.web (2023), data processed

Electronic banking is the process of delivering traditional banking products without having to visit conventional bank branches, for example through automated teller machines (ATMs), internet banking, credit and debit cards or others. The term m-banking consists of various benefits, such as helping customers to access various banking transactions (balance checks, fund transfers, bill payments, cardless cash withdrawals) as well as reducing costs and time, thereby being able to maximize the level of perceived usefulness in using the service. the. The use of m-banking can also help banks to reach customers who live in areas with weak internet infrastructure or difficulties in setting up bank branches (Shareef et al., 2012; A. A. Shaikh & Karjaluoto, 2015b; Komulainen & Saraniemi, 2019).

Theories and models used to explain internet adoption in banking services

Previous studies investigating consumer adoption of banking services have often relied on well-established theories and models to explain consumer behavior or behavioral intentions. Among these models, Technology Acceptance Model (TAM) is considered as one of the main theoretical frameworks in 16 articles (76.2%), followed by Task-Technology Fit (TTF) in 4 articles, (UTAUT), and DeLone and McLean IS Successin 1 article. In addition, other behavioral models are considered either alone or in combination with innovation adoption models to explain consumer adoption of m-banking. Among these models are Theory of Reasoned Action (TRA) and Theory of Planned Behavior (TPB) in 2 articles, as well as Technology Continuance Theory (TCT).

Several studies use extensions or variations of these models or combine different models to better understand and explain technology adoption in banking services. For example, Ooi &

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Tan (2016) added a mobile construct, namely mobile perceived security risk (MPSR), mobile perceived compatibility (MPC), mobile perceived trust (MPT), and mobile perceived financial resource (MPFR) to increase overall predictability. Zhong et al. (2021) added coupon availability and Gender difference. Coupon availability as a benefit of getting a good deal and is shaped by the retail price. Coupons can provide companies with two benefits: they provide more value to customers by adding a price advantage and play an important role in brand promotion. Gender differences can perceive technological features differently which in turn will influence technology adoption decisions.

The next article combines TAM and UTAUT. For example S. Singh et al. (2020) investigated the actual use of banking services. PU, PEOU, and Social Influence (SI) are used as antecedents of Behavioral attributes and add technological attributes such as responsiveness and security. Ramos-de-Luna et al. (2016) and Astari et al. (2022) combined TAM and TPB to explain behavioral intention. Attitude toward using (ATU) is used as a variable that explains bahavioral intention to use (BIU).

Anticedents in the context of technology-based banking services

Although the focus of this section is on the antecedents of technology adoption in banking services, several articles use consequences to assess their impact on consumers' use of technology-based banking services. For example, satisfaction felt by consumers, attitudes, and intentions to continue using.

With respect to the antecedents of internet adoption in banking services, the review reports on various factors that are common and frequently used. To facilitate our understanding, these antecedents can be categorized into five main perspectives: (1) attribute-based perspective of m-banking, (2) customer-based perspective, (3) social influence-based perspective, (4) trust-based perspective, and (5)) barrier-based perspective. This study uses watase.web to identify the antecedents used and the direction of the research as shown in table 4.5.

Table 7: Antecedents of technology-based banking services

Perspective	Anticedent	Dependent	No. of Studies	Sig
M-banking Attributes Perspectives	Perceived usefuless (PU)	Attitude	6	6
		Trust	3	3
		Satisfaction	5	4
		Behavior	6	5
	Perceived ease of use (PEOU)	Perceived usefulness	4	3
		Attitude	5	3
		Satisfaction	4	4
		Intention	1	1

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		Behavior	7	7
	Facilitating Condition	Attitude	1	1
		Intention	11	10
		Behavior	1	1
	Compatibility	Perceived usefulness	4	4
		Perceived ease of use	1	1
		Attitude	5	5
		Intention	1	1
		Behavior	6	5
	TTF	Perceived usefulness	3	3
		Intention	3	3
		Behavior	2	2
Based on Customers Perspective	Self-efficacy	Performance	3	3
		Perceived usefulness	4	4
		Perceived ease of use	1	1
		Risk	1	1
		Attitude	5	5
		Intention	4	4
	Attitude	Intention	12	10
	Satisfaction	Attitude	1	1
		Intention	2	2
		Behavior	2	2
Social Impact Perspectives	Social influence	Perceived usefulness	1	1
		Attitude	5	5
		Intention	10	10
		Behavior	3	3
Perspectives Based on Trust	Trust	Perceived usefulness	3	3
		Perceived risk	2	2

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		Attitude	2	2
		Satisfaction	2	2
		Intention	12	10
		Behavior	3	3
	Perceived security	Attitude	2	2
		Trust	1	1
		Intention	3	3
	Perceived privacy	Attitude	2	2
		Trust	2	2
		Intention	3	3
Obstacle Perspectives	Perceived risk	Perceived usefulness	3	3
		Perceived ease of use	1	1
		Attitude	3	3
		Intention	11	9
		Behavior	3	2

M-Banking Attributes Perspectives

The m-banking-based perspective is the most commonly used approach in the literature on technology-based banking services. This is based primarily on the use of concepts related (perceived or expected) to the characteristics of the banking itself. Perceived usefulness (PU) of TAM refers to customer perceptions of the benefits of using technology-based banking services. PU is defined as a potential user's belief that the use of a particular tool or device will improve their performance (Davis, 1989). Wu & Ke (2015) link PU to attitude and trust to provide a comprehensive framework for understanding online shopping behavior through technology-based banking services. The framework was developed based on the TAM model, personality traits, and a barrier-based perspective.

The MPW construct has become one of the strongest indicators of adoption of internet-based banking services. Adams et al. (1992) found that PU is affected by many different variables depending on the environmental context. PU as one of the fundamental constructs of TAM does not fully reflect the specific influence of technological context factors. However, several previous studies found the effect of PU on attitudes towards internet use. For example, Marakarkandy et al. (2017), Rahi & Abd Ghani (2021), and Rahmayanti et al. (2021) found that PU contributed to attitudes towards internet banking use.

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Another key factor in the context of banking technology is TAM's perceived ease of use (PEOU). PEOU is similar to the effort expectancy of UTAUT and the complexity of DOI. PEOU is defined as the extent to which technology is easy to use (Davis, 1989). As discussed by Davis (1989), PU and PEOU are potentially important determinants of system/technology use. However, voluntary use of technology is a problem in finding the relationship between PU and PEOU on the use of information technology.

Customer Perspective

The customer-based perspective refers to the characteristics, traits, attitudes, emotions, and culture of customers which can be important factors in the context of using technology-based banking services. One of the most frequently discussed concepts is self-efficacy which is defined as an individual's determination in his or her ability to act independently with purpose. Self-efficacy is related to an individual's ability to successfully complete certain tasks (Upadhyay et al., 2022). Self-efficacy in the articles covered in this paper was found to be used 4 times (significant), 1 time (significant), 1 time (significant), 5 times (significant), and 4 times (significant) each to explain PU, PEOU, risks, attitudes, and intentions to use technology-based banking services.

Another concept used is attitude which is used 12 times (10 is significant) to explain the intention to use technology-based banking services. In addition, satisfaction is used 1 time (significant), 2 times (significant), and 2 times (significant) which respectively explain attitudes, intentions, and behavior in using technology-based banking services. Mixed results were found with respect to direct and moderate effects of age and gender. Indeed, some studies have found no effect of age and gender. For example, in research conducted by Tam & Oliveira (2016), Baabdullah et al. (2019), Marakarkandy et al. (2017), and S. Singh et al. (2020).

Perspective Based on Social Impact

The social influence-based perspective focuses on the concept of social influence used in UTAUT, which is similar to the subjective norm in TPB. Social influence refers to an individual's perception that other people (family, friends, and colleagues) think that he or she should adopt a given technology (Komulainen & Saraniemi, 2019). Social influence was used 1 time, 5 times, 10 times, and 3 times, all of which were significant in explaining PU, attitudes, intentions, and behavior in using technology-based banking services.

Perspective Based on Trust

A trust-based perspective refers to the use of a belief model (Oliveira et al., 2014). Trust 3 times (significant), 2 times (significant), 2 times (significant), 2 times (significant), 12 times (10 significant), and 3 times (significant) which describes each PU, perceived risk, attitude, satisfaction, intention, and behavior. Trust is also often used as a moderator variable. Trust is a prerequisite for the context of using technology-based banking services because of the uncertainty in these services (Souiden et al., 2021).

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Another concept is perceived security, which is an individual's belief in using technology as a transaction tool (Bradley et al., 2017). Perceived security is used 2 times (significant), 1 time (significant), and 3 times (significant) to describe attitudes, beliefs, and intentions, respectively. The next concept that is often used is perceived privacy. Perceived privacy is defined as the level of user confidence about the protection of data provided to technology services (Alshurideh et al., 2021). Perceived privacy is used 2 times (significant), 3 times (significant), and 3 times (significant) to describe attitudes, beliefs, and intentions to use technology-based banking services, respectively.

Barrier Perspective

A barrier-based perspective consists of factors that act as barriers to the use of technology-based banking services (Yuan et al., 2016). Perceived risk is a vital construct in technology research because it determines consumer decisions to adopt new innovations (Ooi & Tan, 2016). Perceived risk refers to consumer perceptions of risk protection in using technology-based banking services. Schierz et al. (2010) founded that perceived risk is considered important, interestingly Ooi & Tan (2016) founded perceived risk did not affect the adoption of banking technology. Perceived risk is used 3 times (significant), 1 time (significant), 3 times (significant), 11 times (9 significant), and 3 times (2 significant) to explain PU, PEOU, attitude, intention, and behavior respectively in using technology-based banking services.

CONCLUSION, IMPLICATION, AND FUTURE RESEARCH AGENDA

Based on 20 selected articles published between 2013-2023, this paper explains, synthesizes, reviews main findings, and provides suggestions for future research to deepen and enrich understanding of technology-based banking services (banking technology). It is hoped that this review will provide benefits for scholars and practitioners to understand the acceptability of technology from a consumer perspective, as well as stimulate future research agendas.

Previously, Tam & Oliveira (2017) reviewed 64 articles published during 2002-2016 to redefine m-banking and reviewed the body of literature. Our studies differ in many methodological and theoretical perspectives. First, our review is based on systematic literature using watase.web as a tool for collecting literature and synthesizing selected literature based on predetermined criteria. Second, our study is based on manuscripts published by leading journals (Q1, Q2, Q3) and does not include conference papers. Third, our study categorizes the antecedents of commonly used banking technology adoption. Fourth, our study is not limited to m-banking, but covers the terminology used to refer to technology-based banking services (internet banking, mobile banking, e-money, e-wallet, QRIS).

This review proves the superiority of the TAM model as an established concept to explain technology adoption. The TAM concepts that are most often used and provide significant results to explain both intentions, behavior, or attitudes to using technology are PU, PEOU, Social Influence, and Attitude. The TAM model has been widely used in research on information technology (IT). However, this actually creates the illusion of progress in the

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accumulation of knowledge because it locks the door for the emergence of other theories that can enrich scientific insights.

Therefore, multi-perspective studies are needed. Although technology-based banking services is a field of study that has occupied high ranking academic journals, most of these studies fall into the areas of marketing or consumer behavior and management information systems. Most of these studies use a quantitative approach (eg, Ooi & Tan (2016); S. Singh et al. (2020; Astari et al. (2022))). One drawback of the quantitative approach to this field is that individual intentions and behavior are reduced to the question items provided in the questionnaire. Qualitative research and a phenomenological perspective can be considered for use in research, so as to be able to explain the dominance of several theories and variables that have been widely used in the last ten years and discover other values felt by consumers that have not been reported in previous research and therefore require further exploration. carry on.

Cross-country studies are also considered because there are no comparative studies on the use of technology-based banking services in two or more countries, for example developed and developing countries. Even though the literature study has used cross-country studies, however, the results were found to be less representative. The development of a conceptual framework is needed to show the impact of the cultural dimension on the adoption factor and its relationship to attitudes, behavior or intentions to use technology-based banking services. The cultural framework that can be used is for example the six dimensions of national culture from Hofstade which have been used in Lok's research (2015), but are not comparative studies. Hofstade's cultural dimensions in Lok's research (2015) are Uncertainty Avoidance (UA), Individualism (INV), Masculinity (MAS) and Power Distance (PD), and Confucian Dynamism (CD).

Finally, our study is not without limitations. The ability to access reputable journals has been a major factor in our study covering only 20 scientific articles over the last ten years. The number is relatively small, making our study unable to examine other antecedents (besides those mentioned in table 4.5) used in the context of technology banking.

Our study has implications for the development of studies in the context of banking technology, where our study can be taken into consideration for developing an integrated model that covers all perspectives in the context of technology adoption and use. Hopefully this will enable the emergence of new models and antecedents that are able to explain consumer intentions and behavior in using banking technology.

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