KnE Social Sciences | Brawijaya International Conference on Business Administration, Taxation, and Tourism | KNE Publishing

Research Article

A Systematic Literature Review on Decomposed Theory of Planned Behavior (DTPB) in Technology Adoption

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Abstract.

This systematic literature review, conducted in accordance with the PRISMA 2020 guidelines, aims to identify the determinants of Attitude (ATT), Subjective Norm (SN), and Perceived Behavioral Control (PBC) within the framework of the Decomposed Theory of Planned Behavior (DTPB) across journal articles published between 2018 and 2024. The review addresses two research questions: (1) What are the determinants of ATT, SN, and PBC in the DTPB framework? and (2) Which technologies have been studied using the DTPB approach? The findings reveal that ATT, a primary antecedent to intention and behavior, is commonly influenced by factors such as compatibility, perceived ease of use, perceived usefulness, complexity, and relative advantage. SN, which reflects social pressure to perform a behavior, is shaped by peer influence, superior influence, student influence, external influence, and family or parental influence. PBC, referring to the perceived ease or difficulty in performing a behavior, is influenced by self-efficacy, facilitating conditions, resource facilitating conditions, and technology facilitating conditions. This review demonstrates the effectiveness of DTPB in explaining the complex dynamics of technology adoption. Understanding the determinants of ATT, SN, and PBC can guide researchers and practitioners in developing more effective strategies to promote technology diffusion and overcome adoption barriers. Additionally, the review highlights the diverse range of technologies examined using the DTPB framework, noting that the influence and interaction of these determinants can vary depending on the specific technology being studied.

Keywords: decomposed theory of planned behavior (DTPB), determinants of attitude, determinants of perceived behavioral control, determinants of subjective norm, technology adoption

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Published: 25 June 2025

Publishing services provided by Knowledge E

Selection and Peer-review under the responsibility of the BICBATT 2024 Conference Committee.

1. Introduction

The rapid progress of technology has profoundly changed the methods by which individuals and organizations embrace new innovations. Technology adoption is a multifaceted, intrinsically social, and changing process in which people develop unique yet susceptible conceptions of technology, guiding their choices in adoption. Therefore, effectively promoting technology adoption requires addressing cognitive, emotional, and contextual factors [1].

A comprehensive examination of ideas and paradigms for technology adoption were presented by several researchers to add to the existing body of the literature [2]. The aim of this review was to identify and describe the conceptual bases, potential applications, and other information relevant to these models with particular emphasis on their possible relevance for newer electronic payment technologies based on single platforms. While the Information Technologies (IT) adoption research has come a long way over the years, it still faces challenges and several unanswered questions, a systematic literature review by several researchers to summarize key contributions, major themes, gaps, limitations and opportunities for future work in the area of IT adoption research [3].

Most Information Systems (IS) implementations demonstrate a low success rate at best and are usually quite costly. Research in the IS field has thus far enabled us to make sense of both the process and the outcome of the process. Early studies in this regard were directed at identifying factors that facilitated IS usage. An endless list was compiled, little of which proved to be practical. It then dawned that the factors, in order to have some pragmatic value, should be integrated into a model to study IS usage easily. In 1985, Fred Davis introduced the Technology Acceptance Model (TAM). It assesses how well perceived usefulness and simplicity of use may mediate the link between external factors, or system attributes, and the likelihood of system usage, which is a measure of system success. Despite its value, TAM must be incorporated within an expanded model that incorporates factors related to societal and processes of human change as well as the acceptance of the innovation model itself [4].

Several literature reviews have delved into the complexities of information and technology adoption. Researchers proposed a comprehensive framework that integrated the Technology Acceptance Model (TAM) and the Technology-Organization-Environment (TOE) framework to explain enterprise-level technology adoption [5]. Many models and frameworks have been formulated to assist us in comprehending how users embrace new technology as researchers and developers attempt to predict how much of their technology will be adopted [6].

Researchers have applied various theoretical frameworks to deepen their understanding of what determines technology adoption. There are two of the most famous and widely applied models are the Theory of Reasoned Action (TRA) and Theory of Planned Behavior (TPB), which were first proposed by Ajzen [7]. Although the TPB is a sound foundation from which to predict behavioral intentions and actual behaviors from attitudes, subjective norms, and perceived behavioral control, its application in

technology adoption studies inspired the development of the Decomposed Theory of Planned Behavior (DTPB) by Taylor and Todd [8]. DTPB extends TPB by incorporating more specific belief structures into the theory.

Researchers conducted an extensive systematic literature review on TPB, hence providing remarkable insight into the theory and its applications [9]. The rapid diffusion of technology in all aspects of life has thus sparked the interest of the researcher fraternity in a big way. Mobile technology, particularly, has grown rapidly for a considerable number of years and continues to grow hence improving convenience and comfort levels both in professional and personal spheres of life. Although several models and hypotheses have been put out to clarify the uptake of consumer technology, DTPB has emerged as a particularly interesting theoretical framework in the area of Information Systems.

The review by several researchers is quite useful because it gives a good overview of the TPB framework and its application in technology adoption across diverse contexts. It provides a thorough grasp of the principles of the theory and how they apply to current challenges presented by contemporary technology adoption [10].

DTPB extends TPB's predictive power further by decomposing the three fundamental constructs Attitude (ATT), Subjective Norm (SN), and Perceived Behavioral Control (PBC) into more fine-grained elements in order to account for the unique complexities of technology acceptance [8]. Such an approach has made DTPB is especially pertinent when discussing the adoption of technology, where individuals are influenced in their attitudes and behaviors through a variety of technological attributes and external conditions. By using DTPB, researchers are able to better apprehend the drivers of technology acceptance and hence focus on the precise strategies that need to be taken regarding promoting the use of emerging technology across several industries.

In this context, the DTPB remains a significant framework relating general intentions to be-have to more specific factors influencing the adoption of technology. Its theoretical explanatory power is sound; more importantly, empirical research has also shown that it can effectively explain a variety of technology-related behaviors in various domains [11].

This adoption of technology has become such a crucial aspect of modern society, influencing many aspects of the life cycle of human beings, from education and healthcare to business and entertainment. Understanding what drives or hinders technology

adoption is valuable for both policy makers, researchers, and practitioners alike. In such a context, DTPB has emerged as a very useful theoretical framework.

Based on the context described above, the researcher develops some research questions:

1. What are determinants of Attitude (ATT), Subjective Norm (SN) and Perceived Behavior Control (PBC) in DTPB Model?
2. What technologies already use the DTPB approach?

The literature review aims to provide a broad foundation upon which the preceding research on DTPB in the context of adopting technology is based. This paper tries to synthesize and analyze relevant studies, aiming at valued insight into major factors contributing to technology adoption, identification of potential gaps in research, and some suggestions for further research in this direction. In other words, this article is a sort of "roadmap" containing the summary of various studies on what factors or determinants make people willing or unwilling to intend and behave in the adoption of a new technology. Gaining an understanding of the factors driving the decisions to adopt or not to adopt a new technology will effectively allow us to design better products, services, and policies.

2. Literature Review

2.1. Decomposed theory of planned behavior (DTPB)

In the research of the Decomposition Theory of Planned Behavior (DTPB), developed by Taylor and Todd [8], is an enhanced version of the Theory of Reasoned Action (TRA) developed by Fishbein and Ajzen [12] and the Theory of Planned Behavior (TPB) by Ajzen [13, 14].

According to TRA, one's intention towards a behavior is influenced by ATT and SN. ATT is the viewpoint of a person about a behavior, which can be favourable or unfavourable, and SN are the social pressures to engage in or refrain from engaging in a specific conduct. Thus, ATT occupies a crucial role for an individual in predicting the resulting intention [15].

Ajzen [7] who argues that TRA is insufficient for assessing different skills, resources, and opportunities with which to predict individual behavior hence the development of TPB by incorporating perceived behavioral control into the model. The extent to which

a person executes an action is not determined solely by his/her intention. It is also determined by the ability, psychology, opportunities, and resources required for the execution of the behavior. Under the same framework, PBC is employed to account for those cases in which a person lacks complete control over his/her behavior.

As indicated by TPB, social behavior in society is caused by something and takes place in a methodical manner. An intention must be established before a behavior may occur. These subsequently are also influenced by ATT, SN, and PBC. The TPB is designed to provide an elaboration on how belief structures are related to factors influencing individual intentions [16]. Combining the TPB and the Technology Acceptance Model (TAM) produces the DTPB, which describes a decomposition approach to the TPB in that the DTPB focuses on the constructs of ATT, SN, and PBC.

If TPB asserts comprising a mix of behavioral intention and perceived behavioral control determines an individual's behavior, the DTPB elaborates ATT, SN, and PBC further by breaking them down into the more specific belief constructs highlighted in Figure 1. DTPB maintains that behavioral intention is the central determinant of behavior, while ATT, SN and PBC directly influence Behavioral Intention (BI) [17].

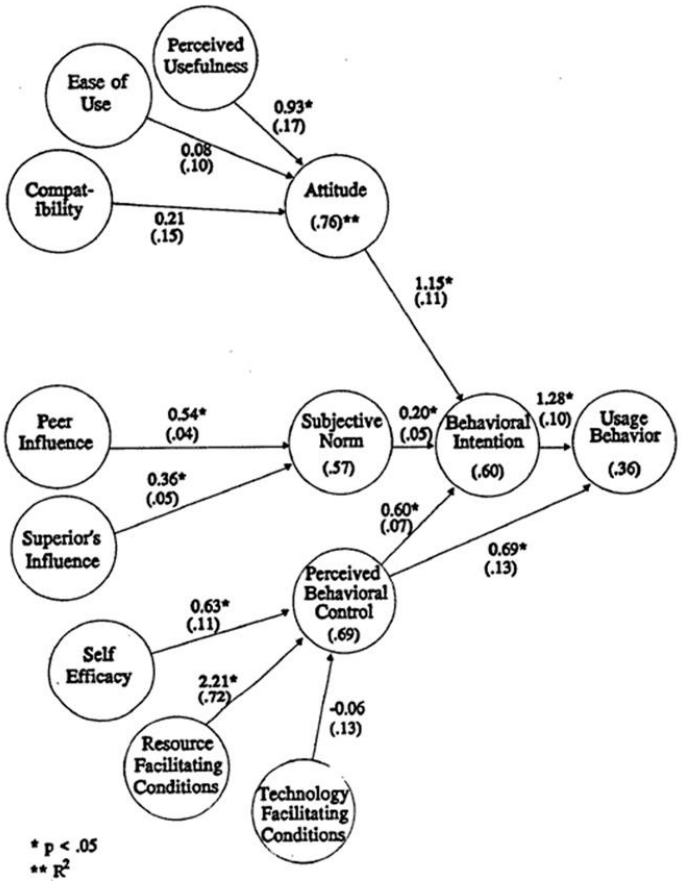

Figure 1: Decomposed theory of planned behavior models. Source: Taylor and Todd [8].

According to Taylor and Todd [8] advantages of belief decomposition include illumination and improvement of relationships already present, giving a collection of beliefs useful across different contexts, and by focusing on particular beliefs that might affect adoption and use, the administrative model is rendered more relevant. These are the factors that could be handled through system design and strategies of implementation accordingly [16].

As explained by Researchers [18] in the context of ATT, DTPB adopts the TAM proposed by Davis [19]. This model proposes that technology acceptance involves consideration of ease of use, which assesses the extent to which technology is considered easy to understand and use. In addition, perceived usefulness assesses the extent to which technology is considered better than existing ones and a person's perception of how much technology will improve their performance [20]. Compatibility refers to how well a piece of technology fits with a person's requirements, values, lifestyle, and work style [16].

SN reflects the influence of important people in an individual's life or reference groups on a person's decisions to take action. In DTPB, SN are divided into two reference groups: interpersonal and external influences originating from Diffusion of Innovation (DOI) Theory by Rogers [21]. External influences refer to various external factors or non-personal influences such as mass media reports, expert opinions, and other such influences an individual takes into account to adopt the behavior whereas interpersonal would be through friends, family members, colleagues, superiors, or some experienced person who is well-known to potential adopters [22].

PBC refers to people's perceptions of how easy or difficult it is to perform a desired behavior [7]. The concept of PBC is broken down into two aspects, namely self-efficacy and facilitating conditions. Self-efficacy refers to a person's confidence in their capacity to carry out the conduct needed to achieve a certain goal, as explained in the concept of Social Cognitive Theory (SCT) by Bandura [23, 24].

Meanwhile, facilitating conditions are defined based on the work of Triandis [25] in the Theory of Interpersonal Behavior (TIB) and refer to resources such as time and money, as well as technological possibilities such as the availability of applications and smartphones. These conditions, which often act as barriers to consistent action, have been identified as part of the factors influencing usage behavior [26].

3. Methods

Literature reviews are carried out in most introductory and the discussion portions of case studies, research reports, and publications with expert opinions. Selection bias might also be a problem in all of the above types of literature reviews, as usually authors tend to incorporate just original research in a certain field and only those that best fit their personal opinions or their research findings. A systematic review, on the other hand, is a review designed to locate all the studies relevant to a specific question and then offer an objective, fair, and balanced synopsis of the literature. Negative studies are explicitly taken into consideration while developing the procedures to find papers for inclusion in systematic reviews are published in low impact factor journals, or in conference proceedings, not indexed in bibliographic databases, but whose results may outweigh those of the more easily identifiable positive studies [27].

The PRISMA statement was published in 2009 to guide systematic reviewers in transparent reporting of why a review was done, what was done, and what was found. It has been in use for 10 years and thus required revision and expansion of the items to reflect new advances in the methodology and terminology of systematic reviews. The 2020 PRISMA statement takes the place of the 2009 statement. It incorporates updated guidelines for reporting which reflects the development in methodological expectations since the original PRISMA statement. The elements' appearance and organization have been changed to make adoption easier. Procedures and findings of the systematic review in order for readers to evaluate the reliability and relevance of the review findings, the methods and outcomes of the systematic review should be presented in enough detail. It was developed with the purpose of helping authors in the systematic and transparent reporting of a systematic review. Very recently, it has been updated to PRISMA 2020, incorporating recent advances in the methodology and terminology of systematic reviews [28].

The protocol used for systematic literature review is as follows [29, 30]:

1. Identification
2. Screening
3. Included

A detailed protocol was developed for the establishment of a sound dataset in this systematic literature review, as expressed by the flow diagram in Figure 2, representing

the analytical methodology alongside the inclusion criteria. Two major sources available to locate relevant research journal articles were the database of Scopus and Google Scholar. Scopus and Google Scholar remain two of the most popular scientific search platforms among researchers, academics, students, and other professionals alike. Both provide extensive access to different types of scientific publications, such as journal articles and books with their free services. With Publish or Perish Software, both the Google Scholar and Scopus search panels will enable us to conduct Google Scholar and Scopus searches, and analyze the results.

The journal articles were filtered out, using a strategic search strategy, to include keywords “Decomposed Theory of Planned Behaviour” in the title and keyword fields based on specific criteria. To increase the temporal relevance of the findings, the search was limited to dated publications between the years 2018 to 2024.

The search identification yielded a total of 48 relevant journal articles, out of which 20 were identified from Scopus and 28 from Google Scholar databases. However, after careful examination, 13 of the identified articles from the two databases were found to be duplicated/overlapping and hence needed to be removed. Furthermore, one of the journal articles was incomplete in terms of its authorship.

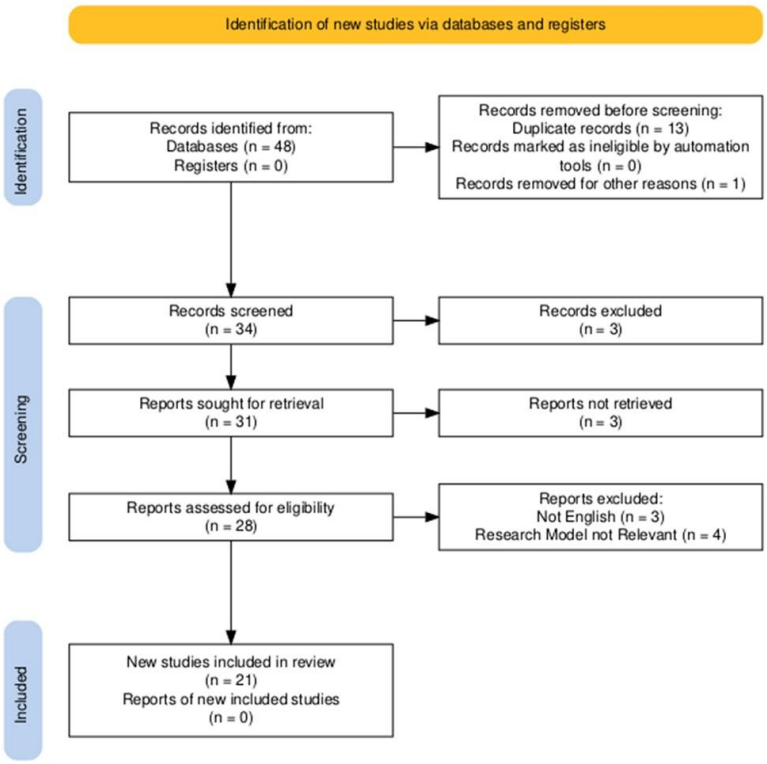

Figure 2: PRISMA 2020 flow diagram. Source: Haddaway et al. [30] & Author’s work (2024).

The subsequent phase of the research involved a rigorous screening process for the 34 journal articles passed the initial identification and underwent rigorous screening. Data integrity was ensured by removing documents that did not meet the specific criteria for journal articles; books and three erratic or retracted articles were removed, reducing the corpus to 31 relevant documents.

The second step involved an elaborate attempt at retrieving the selected journal articles through vigorous downloading procedures. This effort notwithstanding, three articles could not be downloaded, and a total of 28 were available for further analysis.

The screening process's last phase then included the careful checking of each journal article's eligibility to be included in the study. Following a careful review of the downloaded articles, it was noted that three articles in a language other than English proved difficult to understand and thus needed exclusion. Furthermore, four other articles were considered irrelevant to the conceptual framework of decomposed theory of planned behavior and thus removed.

After an exhaustive process of identification and screening, 21 journal articles were found to be suitable for in-depth analysis in this literature review. Their inclusion had to strictly meet the predefined inclusion criteria.

4. Results

The following sections describe the results of systematic reviews of the literature with respect to the methodology's criteria.

TABLE 1: Reviewed article.

No	Year	DTPB Context
1	2018	It represents an enriching addition to the ever-emerging studies in sustainable tourism through the application of a robust theoretical framework with a view towards comprehending those factors that influence the adoption of sustainable practices by tourism businesses. This research can also provide strategic guidelines toward the promotion of more sustainable and responsible tourism practices worldwide. This study examines how accommodation managers' adoption of water-related innovations is influenced by their sustainability using DTPB [14].
2	2019	This study contributes to the literature by mapping factors affecting university students' adoption of WhatsApp for learning purposes using the DTPB. Any challenges identified could be addressed, and efforts could also focus on exploiting positive determinants in order to improve the effective integration of mobile instant messaging applications into higher education. The study examined how Mzuzu University students studying information and communication technology and land management used WhatsApp using the DTPB [18].

Table 1: Continued.

No	Year	DTPB Context
3	2019	This paper investigates the factors affecting patients' intentions to adopt EHRs. The authors use the DTPB as their conceptual framework for decomposing the determinants of BI into belief-based components. The proposed model analyzes how perceived usefulness, perceived ease of use, SN, PBC, security and privacy concerns, and perceived health literacy influence the attitude and intention of patients to adopt EHRs. The study will delve deeper into patients' perspectives with a view to informing strategies that will enhance effective implementation and utilization of EHR systems. Using DTPB, this study will investigate the factors that influence the adoption of EHR by consumers [31].
4	2019	This study attempts to point out some of the factors that would influence consumer behavior in regard to a B2C electronic commerce transaction. Guided by the DTPB, they try to predict and investigate salient factors that will outline people's intentions to perform or not perform online buying and selling activities. Specifically, the study has combined elements of the TAM with some belief theories to develop an analytical framework. Key determinants investigated are attitudes toward e-commerce, SN, and PBC decomposed into more specific beliefs. Conjointly, the findings will give insight into how these factors interact with each other in determining intentions of consumers to engage in e-commerce. This study's objective is to predict and identify the variables that affect behavioral intention in e-commerce using DTPB [32].
5	2019	This study aims to explain the factors that determine pre-service English teachers' BI in adopting augmented reality for education. Based on the DTPB, this study investigates whether ATT, SN, and PBC significantly influence BI. Key findings highlight how positive attitudes about AR, perceived support from both their peers and institutions, and confidence in resources and skills are each associated with an intention to integrate AR into teaching practices. This study examined the factors that predict pre-service English teachers' intentions to include Augmented Reality (AR) into their next language classes using DTPB [33].
6	2020	The present study investigates those factors that shape the intention of teachers to embed digital literacy into their teaching practices. The current study utilizes the DTPB framework to analyse the impact of ATT, SN and PBC. Results highlight the importance of favorable attitudes toward digital literacy, social pressures from colleagues and administrators, and the confidence of teachers in their resources and capabilities to integrate digital tools. Based on the DTPB, this study investigated the variables that affect teachers' intentions to include digital literacy into their lessons [17].
7	2020	This paper investigates the factors that determine the acceptance of Islamic equity-based mortgage products by potential customers. Based on the extended version of DTPB, the study examines how ATT, SN, and PBC, along with additional constructs of religious obligation and perceived usefulness, influence consumer intentions. The findings show that ATT, perceived usefulness, and religious obligation are the significant drivers of acceptance; therefore, the development of Islamic financial products should be in line with consumer beliefs and practical benefits. This study looks at the factors that might influence customers' decisions to adopt equity-based products, namely Islamic mortgages called mushārakah mutanāqisah (MM) using DTPB [34].
8	2020	It seeks to account for the factors that shape or influence the integration of digital literacy into classroom practices by EFL teachers. By operationalizing the DTPB, this study discusses how ATT, SN, and PBC over behaviour all combine to determine teachers' BI toward integrating digital literacy. The findings bring to the fore the role of positive beliefs about digital tools, social pressures from peers and institutions, and the availability of resources and training in driving these intentions. Using DTPB perspectives, this study aims to investigate teachers' opinions about the incorporation of digital literacy in EFL classrooms [35].

Table 1: Continued.

No	Year	DTPB Context
9	2020	The article focuses on factors in the intention to use SISKEUDES, one of the financial management information systems for village governments in Indonesia. In the study, through an extended version of the DTPB, ATT, SN, and PBC are found to be key determinants in users' intention to adopt this system. The aim of this study is to examine the factors influencing interest in using the village fund information system (SISKEUDES) using the DTPB Model [36].
10	2021	This article journal examines the factors that affect the intentions of working adults to use microlearning. The DTPB was applied by identifying key determinants of ATT, SN, and PBC as elements affecting the adoption of microlearning. This paper emphasizes how understanding these factors will lead to effectively promoting microlearning among professionals. The DTPB was validated with working adults in this study to determine the important elements influencing microlearning use decisions and to evaluate the tool's capacity to predict intentions to engage in microlearning [37].
11	2021	The article seeks to identify drivers for the adoption of Big Data Analytics (BDA) technologies in disaster management. Using the DTPB, ATT, SN, and PBC have been found to be major antecedents to adoption intention. They point out that positive attitude to BDA, stakeholder pressure from outside, and resources/ knowledge are considerable drivers for the implementation decision of the BDA technologies at the disaster management level, helping policy and practice thus reinforce disaster response capabilities. Before a catastrophic event occurs, this study first analyzes a number of antecedents of employing BDA technologies that facilitate offline and real-time decision-making using DTPB [38].
12	2022	This work explores those factors that influence entrepreneurs' intentions to develop businesses based on a platform. Using the DTPB, this study finds that PBC, ATT, and SN will have a positive effect on the intention to create the initiatives of the platform economy. Highlighted in this research is the emphasis that drivers for such entrepreneurship are not just economic benefits but rather individual and collective wellbeing. Through the use of DTPB, the study seeks to improve knowledge of the deconstructed beliefs that underlie the control, social-normative, and attitudinal components that comprise Platform Economy (PE) behavioral intention in light of digitalization and wellness [39].
13	2022	The authors' study targeted those factors that condition K12 teachers' intentions to adopt STEM education. Using an integrated theoretical framework, DTPB, the survey of 532 teachers in China showed that the emotional and cognitive readiness of teachers to apply STEM education impacts directly on a teacher's intention to use STEM education in service. Furthermore, behavioral readiness indirectly affects intention through self-efficacy. Based on the DTPB and teacher preparedness, this study created an assumption model of the factors influencing teachers' intents to teach STEM (Science, Technology, Engineering, and Mathematics) Education [40].
14	2022	This paper examines the impact of winning national EBHC competitions on Taiwanese clinicians' adoption and use of EBHC. Based on the DTPB, the authors found perceived usefulness, compatibility, peer and superior influence, self-efficacy, resource facilitating conditions, ATT, SN, PBC, and intentions all were positively related to the clinical application of EBHC. The study has highlighted that 33.3% of participants reached the final adherence stage, which means that strategies to improve adherence rates after competition are needed. This study used the DTPB to examine how doctors and nurses behaved and adhered to the clinical use of Evidence-Based Healthcare (EBHC) following competition participation [41].
15	2022	The COVID-19 pandemic has affected people's intentions to adopt mobile banking services. Based on the DTPB, the main factors affecting users' decisions to adopt mobile banking during the pandemic include ATT, SN, and PBC. As obtained from the results, this pandemic influenced the aforementioned factors; thus, people's intention to adopt mobile banking services was changed significantly. The purpose of this study is to assess how this disruption has affected consumers' intentions to use Mobile Banking Services (MBS) provided during the pandemic using DTPB [42].

Table 1: Continued.

No	Year	DTPB Context
16	2023	The study examines factors influencing the intentions of individuals to pursue a career in social entrepreneurship. Through the DTPB, this research identifies ATT, SN, and PBC - self-efficacy - as key determinants in decision-making. It emphasizes that those aspects will have a great influence on the development of intentions to establish a social enterprise and give grounds for understanding such influences in relation to encouraging attempts at social entrepreneurial activity. The main goal of the study is to determine the factors that affect entrepreneurs' choices when they decide to pursue a social enterprise using DTPB [43].
17	2023	The authors, in this paper, developed five educational modules and serious games using three-dimensional virtual reality technology. This research examined the effectiveness of this innovative approach on enhancing students' intentions to avoid the use of illegal drugs. Employing DTPB, this study examines how the various factors affect students' behavioral intentions towards preventing drug use. Based on the DTPB, the objective is to determine the factors associated with high school students' desire to continue using 3D virtual reality learning and evaluate the user acceptability of an immersive 3D virtual reality program for reducing illegal drug use [44].
18	2023	The factors that determine university faculty's intentions to publish in open access journals are analyzed in the following article. Using the DTPB, the main predictors of faculty members' decisions to engage in OA publishing are identified, such as ATT, SN, and PBC of the behaviour. The findings give useful insights into the institutions in order to increase OA practices among academic staff. The purpose of this study is to evaluate faculty members' publishing practices in Open Access (OA) journals from the standpoint of the DTPB [45].
19	2024	In the article, analyze the factors that impact individual investment intention and behavior pertaining to crypto assets. This research focuses on how ATT, SN, and PBC determine investors' choices in the context of Turkey by applying the DTPB. The findings contribute to the important implications of psycho-driven motives underlying investments in crypto assets and further develop an understanding of investor behaviour in emerging economies. The study uses the DTPB to conduct a thorough investigation on crypto asset investments in Turkey, a developing nation [15].
20	2024	The authors investigated the factors that influence the adoption of Islamic credit cards in Pakistan. DTPB was used to analyze data from 499 respondents comprising current users of ICCs and potential adopters. It was reported that positive ATT, compatibility, PBC and religiosity significantly increase the intention of adopting ICCs while complexity negatively influences the adoption intentions of ICCs. In contrast, social influence, trust, and satisfaction do not have a meaningful impact on ICC adoption intentions in Pakistan. The research implications are useful for policymakers and banking professionals who intend to propagate Islamic credit card services in the region. The purpose of this study is to look at the factors that influence Pakistan's adoption of Islamic Credit Cards (ICC) using DTPB [46].
21	2024	The article analyzed the factors that influence the intention of European tourists to visit Thailand as a holistic wellness destination. This study, using SEM and DTPB, found that health awareness significantly influences attitude toward wellness tourism, while electronic Word of Mouth (eWOM) does not have a significant effect on SN. Additionally, quality of life and well-being play the role of mediators that affect tourists' BI. These findings give important lessons to be learnt for developing wellness destination marketing strategies in Thailand. Using the DTPB, the study sought to determine whether European travelers intended to travel to Phuket, Thailand as a location for holistic wellbeing [47].

Source: Author's work (2024).

From the review of journal articles as shown in Table 1 above, 15 articles were obtained from the Scopus database, while the remaining 6 journal articles were obtained from the Google Scholar database. For the year of research related to DTPB, the results

showed that 1 article was published in 2018, 4 articles were published in 2019, 4 articles were published in 2020, in 2021 there were 2 articles published, in 2022 there were 4 articles published, for 2023 there were 3 journal articles published, while in 2024 there were 3 journal articles related to DTPB published.

These findings support the notion of consistent interest in DTPB research over the years, with journal articles being almost published every year. This trend suggests that DTPB continues to be relevant and finds application in diverse research contexts. The fact that the rate of publication is steady will establish that DTPB still serves as a helpful framework for making sense of and analyzing behavioral intentions and the adoption of technology.

The fact that a number of journal articles on DTPB have been published every year shows, at the final analysis, the evidence that the theory is of importance in academic studies. This sustained interest represents strength in both the theory and the ability of the theory to apply to a wide variety of technological and behavioral investigations. Future research will be able to continue with the established base and further explore and expand the applications of DTPB into new and emerging fields.

5. Discussion

5.1. Determinants of attitude

A person's attitude (ATT) is their assessment, whether favorable or unfavorable, of carrying out the desired behavior and reflects personal beliefs about adopting technology [20]. According to research by Taylor and Todd [8], ATT was determined to be one of the most significant predictors of intention. Previous studies also confirmed that librarian attitudes are positively related to social media usage intentions. Previous studies have shown that most librarians are positive about using social media for their libraries. However, staff willingness is an important factor in successfully integrating social media in their libraries [48].

ATT is well-defined as the extent to which an individual views the action in issue favorably or unfavorably [7]. According to research [49], ATT, in this respect, plays the most important role in determining users' intentions towards the use of e-government services. Individual attitudes may be either positive or negative. People with a positive ATT towards an e-government system are more likely to adopt it, whereas negative attitudes will lead to non-adoption.

In summary, ATT significantly impacts the intention to adopt new technologies. Understanding these ATT and addressing any negative perceptions is essential for successful technology integration. From the results of the literature review, it was found that there are several variables that are determinants of the ATT variable in the DTPB theoretical model as displayed in the following Table 2.

Table 2: Decomposed attitude.

Variable	No. of Studies	Percentage (%)
Compatibility	19	30%
Perceived Ease of Use	15	24%
Perceived Usefulness	15	24%
Complexity	3	5%
Relative Advantage	3	5%
Perceived Enjoyment	2	3%
Confidence	1	2%
Effort Expectancy	1	2%
Health Consciousness	1	2%
Performance Expectancy	1	2%
Security & Privacy Concerns	1	2%
Trust	1	2%

Source: Author's work (2024).

Based on the data in Table 2, the variables most frequently used to decomposed ATT variable in the context of research journal articles related to the DTPB in 2018 - 2024 are the Compatibility variable with 19 journal articles, Perceived Ease of Use and Perceived Usefulness with 15 journal articles, Complexity and Relative Advantage with 3 journal articles each using this variable.

Therefore, these results support the fact that Compatibility is the strongest contributor to developing attitude in the context of technology adoption within the framework of DTPB. Strong presence of Perceived Ease of Use and Perceived Usefulness further puts into notice how crucial these factors are in driving individuals' attitudes. Although Complexity and Relative Advantage are less frequent in investigation, their inclusion in the literature would still put forward the implication that they are a concern.

Understanding the determinants of ATT will help the designer or developer to create technologies that are most likely to be adopted. For example, one must design an intuitive and user-friendly interface, paying attention to needs, values, and lifestyles, and make the benefits and advantages of the technology salient.

Overall, the present analysis shows that explaining the manifold elements in the attitude of technology adoption requires consideration of many facets. By identifying and focusing research attention on these key variables, a more informed understanding of the determinants of ATT will be developed, which can usefully be brought to bear on the creation of more effective strategies to enhance technology adoption. Theoretically, as well as practically, such holistic insight is deemed instrumental in advancing technology adoption.

5.2. Determinants of subjective norm

The subjective norm (SN) is the perception a person has from other people's viewpoints about the behavior he intends to do and the amount of social support he gets. This norm emphasizes the subjective views or support that individuals believe they will receive from those closest to them. Research by Taylor and Todd [8] reveals SN has a significant impact on intention.

SN has been proven to make a unique contribution in the case of social media adoption by public libraries according to a study conducted recently [48]. It showed that SN does affect social media usage intentions; however, the magnitude is quite small compared to other factors in TPB. This is despite the relatively low effect of SN; best practices and experience sharing among the staff can still help build those norms and participation in social media activities. Marketing by libraries via social media is effective and economical compared to other traditional marketing techniques, such as posters and community newsletters, which take more effort and time to achieve. In addition, social media can help libraries reach the target audiences much faster, while it also allows them to monitor visitor responses and respond more effectively to feedback. This means that SN at work could be facilitated in cases where librarians increase the awareness of the staff regarding the benefits through internal workshops and training pertaining to social media marketing, thus motivating their participation in diverse social media activities.

According to Venkatesh et al. [11], SN is the extent to which a person believes that the majority of those who matter to them believe they ought to engage in the activity in issue. In the context of Digital Informal Learning (DIL), previous research argued that students were influenced in their use of digital media for learning due to the influence of significant people in their lives; these could be peers, instructors, or superiors [50].

In other words, SN are very significant in developing intentions or behavior. Grasping and improving these subjective norms can imply a better and wider acceptance of innovative methods and technology. The findings of the literature review demonstrated that several variables influence the SN variable of the DTPB theoretical model as shown in the Table 3 below.

Table 3: Decomposed subjective norm.

Variable	No. of Studies	Percentage (%)
Peer Influence	10	29%
Superior Influence	9	26%
Student Influence	3	9%
External Influence	2	6%
Family/Parental Influence	2	6%
Normative Belief / Influence	2	6%
Electronic Words of Mouth	1	3%
External Agents	1	3%
Internal Agents	1	3%
Interpersonal Influence	1	3%
Mass Media Influence	1	3%
Perceived Support School Staff	1	3%
Religiosity	1	3%

Source: Author's work (2024).

The results of the review of journal articles related to the decomposed SN variable that are often used in research journal articles related to the DTPB in 2018 - 2024 as shown in Table 3 are the Peer Influence variable with 10 journal articles, followed by Superior Influence with 9 journal articles, then Student Influence with 3 journal articles, while the External Influence, Family/Parental Influence, Normative Belief/Influence variables each have 2 journal articles that use these variables in research related to DTPB.

These findings give emphasis to Peer and Superior Influence as the most frequent in driving subjective norms within the framework of DTPB. Relatively lower frequencies of Student Influence and other variables suggest these factors may be less central in certain contexts. However, the presence of these factors within the literature does mean they remain relevant for consideration when trying to understand subjective norms.

Other strategies that a designer or implementer could utilize in developing the likelihood of the adoption of technology could be creating positive social norms by utilizing

social media, influencer marketing, and word-of-mouth and developing a relationship with users, using strong customer support to enhance motivation to comply.

Furthermore, the literature review underlines the prominence of social influences in studies relating to technology adoption. If the crucial variables that create the SN are identified by the researchers, they will be able to comprehend much better the nature of the social factors that impinge upon and influence the intentions and behaviors of individuals. This overall analysis would provide useful insights into future research and practical applications with regard to enhancing the adoption of technology through targeted interventions.

5.3. Determinants of perceived behavioral control

The other construct of TPB - apart from attitudinal or normative belief - which has been identified, is Perceived Behavioral Control (PBC), which refers to a person's assessment of how simple or complex an activity is to execute [13]. In the context of technology, Taylor and Todd [16] describes PBC as encompassing perceptions of internal and external factors that influence behavior, such as past experiences, availability of resources like money and time, and level of technological skills.

Research by Taylor and Todd [8] reported that considering the product is an expensive and technical one, PBC is of no particular influence on the intention of consumer adoption behavior. In such cases, the PBC tends to be low which will vary depending on things like income and technical capability. Contrarily, in information technology use, PBC significantly influences intention.

Researchers provide evidence that PBC has a significant effect on the intent of librarians to use social media in public libraries. These have a close relation with the level of skills and level of knowledge required when managing social media. Librarians who have had extensive knowledge and social media users with prior experience are likely to utilize it for library services, while those with limited skills may be reluctant [48].

Poor social media management skills may also be an important barrier to marketing. Besides, this implies that training or workshops for equipping the skills of the library staff in using social media for marketing is an important objective. In fact, it is a critical factor in securing technology adoption in the library environment [48].

Researchers defined PBC as a person's opinion about whether the opportunity and abilities needed to carry out a particular behavior are available. It reflects the degree

to which persons feel capable of controlling their own behavior. PBC plays a significant role in determining both intentions or actual behavior since the individuals' perceptions of their abilities may make a big difference in the actions taken [50]. Results from the literature review, as can be seen in Table 4 below, showed that several variables influence the PBC variable in the DTPB theoretical model.

TABLE 4: Decomposed perceived behavioral control.

Variable	No. of Studies	Percentage (%)
Self-efficacy	19	39%
Facilitating Conditions	9	18%
Resource Facilitating Conditions	9	18%
Technology Facilitating Conditions	8	16%
Affordability	1	2%
Economic Skills	1	2%
Self Sufficiency	1	2%
Social Skills	1	2%

Source: Author's work (2024).

A review of the journal articles from 2018 to 2024 for the decomposed variable of PBC within the framework of the DTPB, as represented in Table 4, reveals that the Self-Efficacy variable has been the most reviewed, appearing in 19 journal articles. This is followed by the variables of Facilitating Conditions and Resource Facilitating Conditions, each appearing in 9 journal articles. Moreover, the variable Technology Facilitating Conditions is discussed in respect to the research of DTPB in 8 journal articles.

Findings together point toward the centrality of Self-Efficacy for explaining the construct of PBC within the DTPB framework. Strong Facilitating Conditions or Resource Facilitating Conditions indicate a greater influence of environmental factors. At the same time, technology facilitating conditions are increasingly included in behavioral investigations.

In the context of adoption technology, designers and implementers can enhance perceived behavioral control by offering training programs that improve users' self-efficacy through tutorials and help desk support. Additionally, design user-friendly and intuitive interfaces that would be easier for users to navigate and understand. Organizations will see increased adoption and usage rates for technologies developed based on these emphasis areas.

The review reveals that such a wide-ranging set of factors have been taken into account in PBC research and emphasizes the multifaceted nature of behavioral control and its implications for understanding and predicting behavior within the DTPB model. This provides a broad analysis that is instructive for future research directions and practical applications across diverse fields.

5.4. Technology adoption using DTPB

The DTPB presents a broad framing of technology adoption. Its elaborate approach therefore locates specific factors that could then be addressed in targeting the usage of new technologies, making it a relevant model both academically and practically. A review of the literature from research journal articles in the databases of Scopus and Google Scholar indicated that out of 21 articles, 13 articles (61%) applied Decomposed Theory of Planned Behaviour (DTPB) regarding technology. This indicates that there is considerable interest in the application of DTPB to understand technology adoption and Actual Behaviour.

Journal articles on a technology that have been studied using DTPB include those related to Adoption of WhatsApp in learning by Nyasulu and Chawinga [18], Adoption of Electronic Health Record (EHR) by Mathai et al. [31], Behavioral Intentions Towards E-Commerce by Anggraini et al. [32], Intentions to Use Augmented Reality by Karacan [33], Intentions to integrate digital literacy by Sadaf and Gezer [17]; Laksani et al. [35].

Further studies conducted by Widagdo et al. [36] related to Intention to use village fund information system, Adoption of Big Data Analytics (BDA) Technologies in Disaster Management by Zaman et al. [38], intention to adopt Mobile Banking Services (MBS) by Nadeem et al. [42], user experience assessment of a 3D virtual reality instructional application aimed at preventing high school pupils from using illicit drugs by Guo et al. [44], Faculty members' actions while publishing in Open Access (OA) journals by Khokhar et al. [45], Investor intention, investor behavior and crypto asset investment by Pilatin and Dilek [15], and factors influencing Islamic Credit Card (ICC) adoption by Jawaid et al. [46]. These studies highlight the versatility and applicability of the DTPB framework across various technological contexts, under-scoring its value in both theoretical and practical domains.

Its relevance and utility in the examination of factors that influence intentions and behaviors related to technology are underlined by the prevalence of DTPB across the studies. Essentially, DTPB decomposes the variables impacting behavioral intentions

into a complete framework of how ATT, SN, and PBC combine in technology adoption. Moreover, the consistent use of DTPB across the studies further underlines robustness as a theoretical model. These studies give in-depth insights that can also be used by researchers to find ways of improving better strategies for increasing awareness and interest in the adoption of technology, reducing the major barriers, and improving facilitating conditions.

As shown through the review of related literature, DTPB represents one of the most used and useful models for studying technology-related behaviors. This wide application would suggest that DTPB offers significant explanatory power and practical implications for the understanding and influencing of technology adoption across a variety of contexts.

DTPB describes how a person's intention in relation to adopting technology is influenced by a few key factors. A person's attitude regarding technology such as beliefs about the usefulness, ease of use, and compatibility influences his likelihood of adopting the technology. If a person considers people important to them advocating or supporting the use of technology, then he is more likely to adopt the technology. People who feel capable and confident that they can use technology easily will adopt it. Knowing the factors that affect one's intention to adopt technology could help intervene more effectively to accelerate the adoption of technology and maximize its benefits to society. The government can institute policies that encourage such adoptions by increasing public awareness through training and providing infrastructure that would support it.

6. Results

Using the PRISMA 2020 principles, the present systematic literature review has tried to shed light on the determinants of the Decomposed Theory of Planned Behaviour (DTPB) framework, in terms of Attitude (ATT), Subjective Norm (SN) and Perceived Behavioural Control (PBC), and identify various technologies that have successfully applied this theoretical approach.

PRISMA 2020 flow diagram is an essential tool for any systematic literature review that is expected in an academic contribution. It gives a clear and systematic way of recording the study selection process, thus allowing for transparency and reproducibility. Use of the PRISMA 2020 flow diagram enables the researcher to track in a systematic way how many at each step, records were located, screened, evaluated for eligibility, and included

to the review, along with the justifications for any exclusions. This graphic display clarifies the review process by making it easier for readers to under-stand how studies were selected and why certain studies were excluded. It also helps to identify potential biases and helps to ensure that the review process is thorough and comprehensive.

From the analyses done, it was discovered that aspects that influence DTPB constructs are indeed multidimensional. ATT, one of the key predictors of intention and behavior, on the other hand is primarily influenced by the compatibility, perceived ease of use, perceived usefulness, complexity, and relative advantage of the technology. These dimensions provide a subjective perception and evaluation about any given technology.

By contrast, SN, reflecting social pressure and expectations, is the aspect of Peer Influence, Superior Influence, Student Influence, External Influence, and Family/Parental In-fluence. These social factors should, therefore, be vital in shaping the intentions of the individual through the reflection of significant referents' apparent approval or disapproval.

It would be PBC, representing perceptions of ease or difficulty in adopting the technology. This would be accounted for with Self-Efficacy, Facilitating Conditions, Resource Facilitating Conditions, and Technology Facilitating Conditions. These determinants bring forth that both the internal capabilities and external support are equally critical in facilitating technology adoption.

In addition, it was established from the review that DTPB has been applied by a relatively diverse set of technologies. These include educational technologies, healthcare systems, information systems, and sustainable practices. Thus, the holistic approach of DTPB for the comprehension of technology adoption has been useful both to scholars and practitioners alike.

In sum, this review has identified the role that DTPB plays in uncovering the complicated dynamics of technology adoption. By comprehending the determinants of ATT, SN, and PBC, both academics and practitioners will be able to develop better strategies that facilitate technology adoption and reduce impediments. Future research should examine interactions among the mentioned constructs within particular technological contexts and test potential moderating and mediating factors for further extension of the model's applicability. Although the DTPB is a fairly robust framework for explaining technology adoption, it needs to be remembered that these demographic factors of age, education, and cultural background do shape how technologies are perceived

and adopted. Future research into such demographic nuances will go towards more rounded explanations of technology adoption behaviour.

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