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Implementation of the Unified Theory of Acceptance and Use of Technology (UTAUT) Model during the Pandemic Era: A Systematic Literature Review (SLR)

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ABSTRACT

The pandemic's unique situation has sparked interest for investigation, particularly in understanding ICT user behavior using the Unified Theory of Acceptance and Use of Technology (UTAUT) model. This article presents a systematic literature review (SLR) aiming to identify UTAUT model applications during the pandemic, explore contexts and methods used, assess global involvement, and understand factors influencing ICT adoption. Following the Reporting standards for Systematic Evidence Syntheses (ROSES) protocol, 70 articles were comprehensively analyzed out of 801 obtained from Scopus, ScienceDirect, and Google Scholar. The review revealed 249 researchers from 44 countries conducting empirical studies on ICT adoption with UTAUT during the pandemic. Dominant contexts were education, healthcare, and mobile technology. Notably, confirmed performance expectancy emerged as the main factor influencing ICT adoption intention, supported by 48 studies (68.57%). Additionally, facilitating conditions' effects were confirmed by 37 studies (52.86%), while effort expectancy and social influence effects were each confirmed by 35 studies (50%). The findings underscore the importance of education, healthcare, and mobile technology during crises, urging attention from governments, policymakers, technology managers, and academics. Individuals demonstrated strong motivation to utilize technology for work facilitation, regardless of resource availability, knowledge, comfort, or social influence from the newly adopted systems or technologies during the pandemic. Furthermore, countries affected by the pandemic could adopt successful systems or technologies from researchers' home countries to foster ICT adoption during future crises**.**

Keywords: *ICT adoption, UTAUT model, Systematic Literature Review (SLR), ROSES protocol, COVID-19.*

INTRODUCTION

Background of the Study

The idea of Information and Communication Technology (ICT) emerged in the 1970s and has been in intensive practice for two decades. Computers, smartphones, gadgets, and information technology affect almost every aspect of the lives of the middle and upper classes around the world (Joshi & Pande, 2022). Several aspects have felt the impact of ICT, such as the health (Apolinário-Hagen et al., 2019; Garavand et al., 2019; Okour et al., 2019; Zhou et al., 2019), banking (Akturan & Tezcan, 2012; Alalwan et al., 2016; Baptista & Oliveira, 2015; Chaouali & Souiden, 2019), education (Abdullah & Ward, 2016; Anderson et al., 2020; Ivenicki, 2021), mobile technology (Koenig-Lewis et al., 2015; Oliveira et al., 2016; Salloum & Al-Emran, 2018; Teo et al., 2005), and other aspects.

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The use of ICT continues to grow exponentially. It has recently experienced a huge, unexpected spike, due to the COVID-19 pandemic. The pandemic has resulted in many countries implementing lockdown policies to prevent the virus spreading more widely. Consequently, activities that require meetings and human interaction, including colleges, schools, malls, temples, offices, airports, and train stations are closed (Pandey & Pal, 2020). These conditions force many organizations to undergo major changes, rethink key elements, and adopt technology for their business continuity while facing a constantly changing landscape of new policies and procedures (Dwivedi et al., 2020). For academic institutions, adopting and integrating teaching and learning methods through social media platforms and new technologies is the right choice when the pandemic paralyzes the education sector (Akande et al., 2020). In the Indonesian context, for example, the implementation of the study from home policy as one of the crisis management efforts during the pandemic (Hidayat et al., 2020).

The new situation due to this pandemic is uncharted; many people turn to remote work due to health policies. Not only the challenges arising from the COVID-19 pandemic but also how to react and overcome them are very essential issues to investigate (Maison et al., 2021). This condition attracts the authors to collect empirical evidence related to changes in this way of interacting. Several theories and models contribute to the proof of ICT adoption; one of them is well-established, the UTAUT model.

The UTAUT model, which is developed by Venkatesh et al. (2003), has been widely used in ICT adoption as a theoretical lens by researchers conducting empirical research on user intentions and behaviors (Williams et al., 2015). At the time of conducting this research, the original article (Venkatesh et al., 2003) had been cited 40,748 times. In a systematic study that has been conducted (Williams et al., 2015) from 2004 to 2011, 174 articles were confirmed using the UTAUT model.

This model has been shown to provide superior explanatory power compared to other technology acceptance models. Thus, it is considered a well-developed and comprehensive technology acceptance model (Puriwat & Tripopsakul, 2021). At least 70% variance has been successfully observed to explain the behavioral intention of using related technology systems (Taiwo & Downe, 2013).

The model is constructed through a process of unifying eight basic theories (Table 1), Venkatesh et al. (2003) found seven constructs as significant determinants of technology use intention in one or more individual models. However, UTAUT stipulates 4 (four) constructs that have been agreed to directly influence ICT adoption, namely performance expectancy, effort expectancy, social influence, and facilitating conditions with the main moderators, namely gender, age, voluntariness, and experience (see Figure 1). Therefore, through a systematic review, this study examines the implementation of the UTAUT model in various dimensions during the COVID-19 pandemic.

Research Gap of the Existing Studies Related to the Implementation of the UTAUT Model

Some of the literature related to studies based on SLR of ICT adoption through examining the UTAUT model is very limited, such as research conducted by Williams et al. (2015), which has a SLR limited to the period from 2004 to June 2011. While the research conducted by Tamilmani et al. (2021) was done from March 2012 to March 2017 and only reviews the UTAUT2.

Furthermore, some studies focus on particular contexts, for example Al-Saedi et al. (2019) only focus on the review of mobile payment adoption, Alghatrifi and Khalid (2019) discusses the study of IPV6 adoption, Tamilmani et al. (2018) examine predictors of mobile app adoption, Vassli and Farshchian (2018) analyzes the acceptance of health-related ICTs among the elderly in the community, Carcary et al. (2018) explores the determinants of adoption of the Internet of Things (IoT), and other studies which examine the implementation of TAM and UTAUT in their reviews (such as Al-Qaysi et al., 2020; Rouidi et al., 2022; Souiden et al., 2021).

Table 1: The construction of the UTAUT with eight theories

Theory	Core Construction
Theory of Reasoned Action (TRA)	Attitude Toward Behavior, Subjective Norm
Technology Acceptance Model (TAM)	Perceived Usefulness, Perceived Ease of Use, Subjective Norm
Motivational Model (MM)	Extrinsic Motivation, Intrinsic Motivation
Theory of Planned Behavior (TPB)	Attitude Toward Behavior, Subjective Norm, Perceived Behavioral Control
Combined TAM and TPB (C-TAM-TPB)	Attitude Toward Behavior, Subjective Norm, Perceived Behavioral Control, Perceived Usefulness
Model of PC Utilization (MPCU)	Job-fit, Complexity, Long-term Consequences, Affect Toward Use, Social Factors, Facilitating Condition
Innovation Diffusion Theory (IDT)	Relative Advantage, Ease of Use, Image, Visibility, Compatibility, Results Demonstrability, Voluntariness of Use
Social Cognitive Theory (SCT)	Outcome Expectations Performance, Outcome Expectations Personal, Self-efficacy, Affect, Anxiety

Based on previous research studies, there has not been a systematic study that has examined ICT adoption during the COVID-19 pandemic, which could affect technology acceptance and use. Previous studies under normal conditions did not consider changes in user behavior and preferences during a pandemic. This review is important to discover the determinants that drive people's intention and acceptance of ICT during a crisis. Changes in lifestyle, work, and social interactions that occur quickly and surprisingly can become new variables to strengthen factors that existed previously in the UTAUT model, such as perceived usefulness, perceived ease of use, social norms. Even under stressful conditions, feelings of isolation and anxiety tend to be factors that can be considered influencing technology adoption and use.

This study seeks to fill these gaps through a SLR, because according to Robinson and Lowe (2015), traditional literature reviews have a number of weaknesses, including the fact that they are incomplete, highly susceptible to reviewer bias, and rarely account for differences in study quality. Many authors select articles to support their research, so traditional literature review practices often suffer from problems of vagueness and bias (Hayrol et al., 2021c).

In contrast, a thorough systematic review can improve quality, replicability, reliability and validity (Xiao & Watson, 2017). In addition, SLR helps in research fields related to complex research questions because it involves various epistemological and conceptual approaches and various sources of information (Hayrol et al., 2021b). Therefore, the answers to the questions that have been formulated aim to show the trend of the UTAUT model as one of the established models combined with other constructs and models, contribute to expanding the scope of the

UTAUT model, provide recommendations for practitioners, policy makers, and technology developers on how to increase the adoption of relevant technologies in pandemic situations, and complement previous reviews of UTAUT theory development such as those initiated by Williams et al. (2015) and Tamilmani et al. (2021).

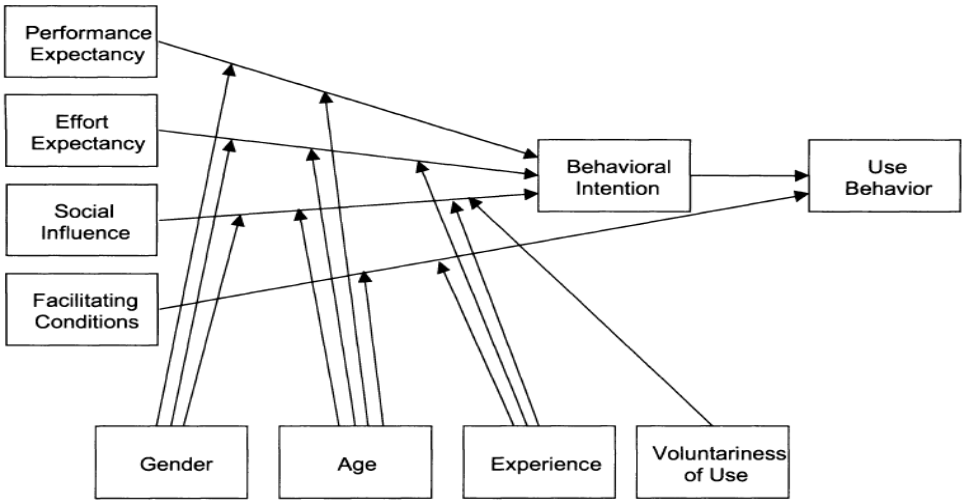

Figure 1: UTAUT model

METHODOLOGY

Review Protocol-ROSES

This SLR followed the ROSES guidelines developed by Haddaway et al. (2018). ROSES is a systematic review method for non-health fields, especially environmental management. In addition, ROSES also accommodates other types of synthesis, both narrative and qualitative synthesis, and the purpose of the method is the significance of this review, namely raising high standards for systematic behavior and more transparent and higher quality maps (Haddaway et al., 2018). It becomes a differentiator from other methods. Based on these guidelines, the SLR flow used was 1. Formulating research questions, 2. Systematic search strategies, including identification, screening, and eligibility stages, 3. Quality appraisal, 4. Data extraction and analysis, and 5. Conclusion (Hayrol et al., 2021c).

Formulate Research Questions

Research questions are the core of SLR and motivating topics (Fisch & Block, 2018). Research questions were asked based on relevance to the selected theme. The research questions in this SLR are:

Q1 : What are the primary contexts and methods used in the research being analyzed?
Q2 : What countries have been most active in research during the pandemic?
Q3 : What are the main factors influencing the adoption of ICT in the construction of UTAUT during the pandemic?
Q4 : How has technology acceptance research progressed during the pandemic?

Systematic Search Strategy

There are three processes in the systematic search, namely identification, screening, and eligibility as proposed by (Hayrol et al., 2021a) to sort articles that are relevant to the topics discussed according to the transparent SLR method.

a. Identification

The data sources used were Scopus, ScienceDirect, and Google Scholar. These three data sources were the primary sources of the search because they had the advantage of being more comprehensive. Although there is speculation that the citation data on Google Scholar has reached a high level of completeness (Mingers & Lipitakis, 2010; Prins et al., 2016), there is no scalable and reliable method to extract the data from Google Scholar, and the metadata of this platform is still very limited (Martín-Martín et al., 2018). Therefore, these data sources were complementary. The data would be obtained from Google Scholar if Scopus and ScienceDirect are not available.

Based on the search results of three data sources, 801 articles were generated. Searching related articles used several methods, including using the keyword system, the phrase search function, and the Boolean operator. The keywords used were relevant to the title of this systematic review, namely “UTAUT” OR “UTAUT model” OR “UTAUT2” AND “Pandemic” OR “Corona” OR “COVID-19”. Based on the search by Scopus, data obtained as many as 248 articles, ScienceDirect as many as 441 articles, and Google Scholar as many as 112 articles (see Table 2).

Table 2: The series of the search process

Data Source	Search Process
Scopus	TITLE-ABS-KEY ("UTAUT" OR "UTAUT MODEL" OR "UTAUT2" AND "PANDEMIC" OR "COVID-19" OR "CORONA")
ScienceDirect	("UTAUT" OR "UTAUT MODEL" OR "UTAUT2" AND "PANDEMIC" OR "COVID-19" OR "CORONA")
Google Scholar	Use Advanced Search, in “with all of the words” menu and “with the exact phrase” menu use keyword: First search: UTAUT and Pandemic, Second search: UTAUT and Covid-19, Third search: UTAUT and Corona In which the words occurred in the title of the article

b. Screening

This SLR screened 801 selected articles using automatic selection criteria based on sorting functions available in the data source. Screening restriction was conducted with several criteria, especially the timeline was chosen based on articles published after January 2020, because empirical research was needed, which was directly related to activities during the pandemic. Furthermore, the type was limited to articles written in English, and the topic was relevant to the implementation of the UTAUT model during the pandemic era. This process excluded 720 articles that were not suitable for the inclusion criteria and removed 11 duplicate articles. The remaining 70 articles were included in the eligibility process (see Table 3).

Table 3: The criteria of inclusion and exclusion

Criteria	Inclusion	Exclusion
Timeline	Published after January 2020	Published before January 2020
Document Type	Journal Article	Review articles, book chapters, books, conference proceedings
Language	English	Non-English
Topic	Relevant to the implementation of the UTAUT model during the pandemic era	Irrelevant to the implementation of the UTAUT model during the pandemic era

c. Eligibility

This process was conducted manually because there were no adequate tools to perform it automatically. The researchers examined the selected articles through identification and screening steps, including reading the title, abstract, or tend to examine the article as a whole to ensure that it suited to the inclusion and exclusion criteria established earlier. A total of 70 articles were selected based on the eligibility process (The complete flow is shown in Figure 2).

Table 4: The criteria of inclusion and exclusion

Criteria	Inclusion	Exclusion
Timeline	Published after January 2020	Published before January 2020
Document Type	Journal Article	Review articles, book chapters, books, conference proceedings
Language	English	Non-English
Topic	Relevant to the implementation of the UTAUT model during the pandemic era	Irrelevant to the implementation of the UTAUT model during the pandemic era

Quality Appraisal

The quality appraisal aimed to select articles that have gone through the eligibility test to ensure that the selected research methodology and analysis are appropriate. The assessment was done by referring to The Mixed Methods Appraisal Tool (MMAT) developed by (Hong et al., 2018). This guide contains a form consisting of several questions as a reference for assessing selected articles (see Table 4). The MMAT helps to ensure criteria such as suitability of research questions to provide adequate data, qualitative adequacy, data collection to answer research questions, coherence between qualitative data sources, data collection, analysis, and interpretation (Hayrol et al., 2021a).

Questions were adjusted according to the method used in the articles being assessed. Each article was checked one by one to obtain information that was relevant to the question. The results of the analysis would get a checklist (or “yes” answer) in each column if the article was relevant to the answer and a cross (or “no” answer) if it was irrelevant. The result of each assessment depended on how many checklists/crosses were obtained. Articles included in the review must at least obtain three answers to a checklist/ “yes” (3 out of 5 questions) based on the agreement between researchers. It clarifies that all researchers agree that the selected articles must have the minimum standards of quality requirements (Hayrol et al., 2021c) (Quality assessment report can be seen in Appendix Table 1).

RESULTS

Main Contexts and Research Method

The main context of research during the pandemic and its relevance to the implementation of the UTAUT model is dominated by the seven core areas described in detail in the next chapter. Based on the classification of research fields of 70 articles, 52.86% of them analyzed the field of education, 17.14% in the health sector, 11.43% in the field of cellular technology, 8.57% related to the business sector, 4.29% in the economic and social sector, 2.86% related to the corporate environment, and the rest are about entertainment and government of 1.43% each.

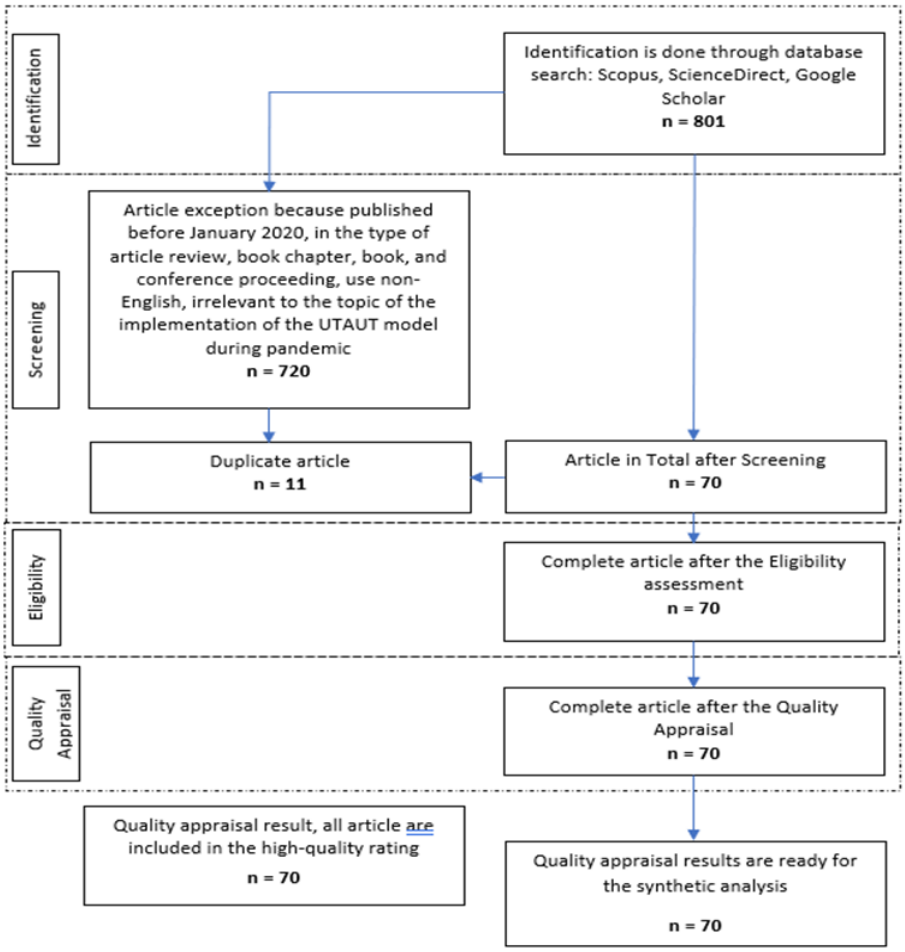

Figure 2: The flow diagram of the search process

The research is mostly dominated by the context of distance learning as much as 11.43% (8 studies), e-learning 5.71% (4 studies), digital payment around 4.29% (3 studies), and the rest explore technology acceptance to harmonize the new normal pattern and avoid being exposed to the COVID-19 virus through social distancing policies. The related research includes the use of cellular technology applications and network technology, such as the application of video conferencing, telemedicine, food delivery apps, contact tracking apps, and others.

Table 4: The guideline of the MMAT quality appraisal

Research Design		Assessment Criteria
Qualitative	QA1	Is a qualitative approach appropriate to answer the scientist's question?
	QA2	Is the qualitative data collection method adequate to answer the scientist's questions?
	QA3	Are the findings sufficient to derive from the data?
	QA4	Is the interpretation of the results sufficiently supported by the data?
	QA5	Is there any coherence between qualitative data sources, collection, analysis, and interpretation?
Quantitative	QA1	Is the sampling strategy relevant to answering the scientist's question?
	QA2	Does the sample represent the target population?
	QA3	Do the measurements correct?
	QA4	Is the risk of nonresponse bias low?
	QA5	Is statistical analysis appropriate to answer the scientist's question?
Mixed Methods	QA1	Are there sufficient reasons to use a mixed methods design to answer the scientist's question?
	QA2	Are the different scientific components effectively integrated to answer the scientist's questions?
	QA3	Are the outputs from the integration of the qualitative and quantitative components adequately interpreted?
	QA4	Are discrepancies and inconsistencies between quantitative and qualitative results adequately addressed?
	QA5	Do the different scientific components follow to the quality criteria of each of the methodological traditions involved?

Source: (Hong et al., 2018)

The number of samples that have been observed in the context of implementing the UTAUT model during the pandemic was 38,088 respondents of various backgrounds, such as students, college students, end-user applications, tourists, patients, teachers, residents, and so on (Appendix Table 2). Most of the studies used quantitative methods (98.6%) and the rest used mixed methods.

The Contribution of Country

A total 249 of researchers who contributed to research during the pandemic came from 44 countries, 15 of which included countries that involved five or more researchers. Chart 1 shows that Indonesia is among the highest (No.40), followed by Malaysia (No.29), Philippines (No.27), Jordan (No. 23), Saudi Arabia (No.19) and Thailand (No.18). Then Pakistan (No.9), Brazil and China (No.8), Finland, Ethiopia, Canada, and Lithuania (No.6) and Vietnam and Poland (No.5).

Meanwhile, based on primary data sources by country, our findings show (Table 5) that the implementation of the UTAUT model during the pandemic was taken from primary data sources from 28 countries. Indonesia (No.8) is the most countries that collect primary data, followed by Jordan (No.6), Saudi Arabia (No.6), Malaysia (No.5), Thailand (No.5), and then China (No.5). while the Philippines (No.4), Pakistan (No.3), Bangladesh (No.3), Vietnam (No.3), and India (No.3). Finland and South Korea were used only twice for primary data collection, while Romania, Iraq, Spain, Brazil, Greece, Lithuania, Singapore, Ghana, Ethiopia, Canada, Belgium, Poland, Zimbabwe, Qatar and Germany were used only once for primary data collection.

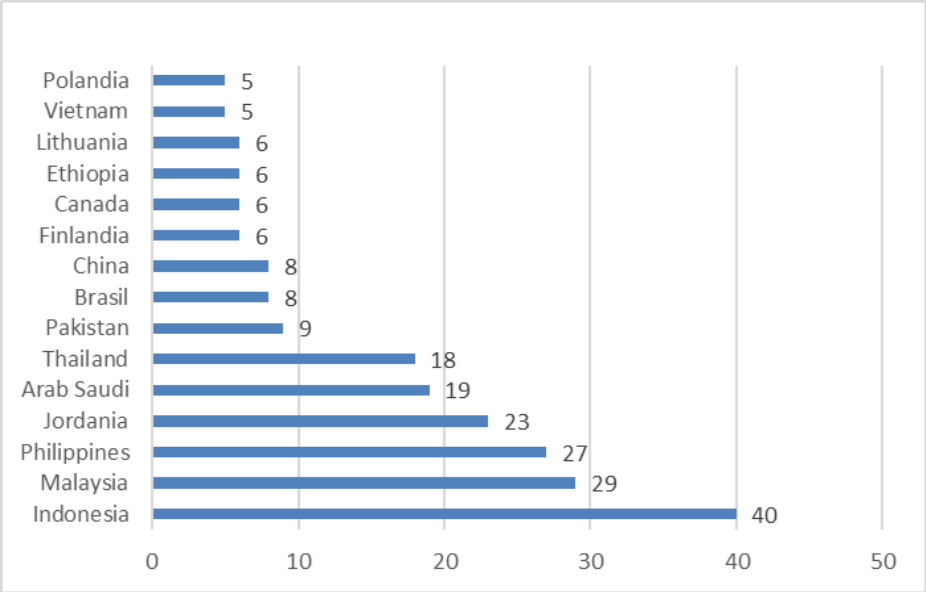

Figure 3: Researcher's country of origin

Table 5: Most countries for primary data collection

Country	No	Country	No
Indonesia	8	Philippines	4
Jordania	6	Pakistan	3
Saudi Arabia	6	Bangladesh	3
Malaysia	5	Vietnam	3
Thailand	5	India	3
China	5	Total	70

The Main Factors Influencing the Adoption of Interaction/Technology in the UTAUT Construction Model during the Pandemic

Based on the results of 70 studies during the pandemic, 68.57% of studies found that acceptance of ICT in the form of Behavioral Intention (BI or other constructs) was significantly influenced by the Performance Expectancy (PE) factor. 47.14% are influenced by Facilitating Conditions (FC), while the Social Influence (SI) and Effort Expectancy (EE) constructs directly affect 50% of Behavioral Intentions (BI or other constructs) (see Appendix Table 3).

Advances in Technology Research Acceptance

The findings show that in unforeseen circumstances, such as the outbreak of COVID-19, the UTAUT model can still develop by integrating relevant structures, leading to better outcomes and increased technology adoption. Several studies have expanded the basic UTAUT variables by

combining theories or other constructs. This review is described in the application classification, integration, extension (Tamilmani et al., 2021), and modifications of UTAUT, which are described in various fields of study, including the fields of entertainment, health, education, government, economics, social, corporate environment, and cellular technology.

The application is intended for an empirical study that only uses the UTAUT standard model and its moderators in its research. Integration means that empirical study integrates the entire basic UTAUT or UTAUT2 model or part of the model with at least one other theory in the research. The extension does not include external theory, yet it includes external variables or constructs through a combination of several mechanisms, such as new exogenous, endogenous, moderation, mediation, internal, or external mechanisms that maintain all or part of the basic model of UTAUT or UTAUT2 (Tamilmani et al., 2021). While the modification is intended the UTAUT model is used as a guide to find new similar terms while maintaining the indicators and concepts of the basic UTAUT model. Based on the findings, it shows that 57.14% of studies carried out extensions, 21.43% of studies carried out integration, 18.57% carried out applications, and 2.86% of studies modified the basic UTAUT model.

a. Combination in the Business Sector

Several researchers have expanded the study of the UTAUT model, among others are (Zanetta et al., 2021), evaluated the use of the Food Delivery App (FDA) by adding the constructs of Solidarity with the Food Service, Frequency of Using FDAs, and Risk Perception. Meanwhile, two other similar studies related to the FDA, which were conducted by Puriwat and Tripopsakul (2021) added the Perceived Fear of COVID-19 construct and (Chotigo & Kadono, 2021) tended to use the UTAUT2 model combined with external factors of Application Quality and Satisfaction to examine and compare factors driving Thai consumers to use FDA before and during the COVID-19 pandemic. These three studies attempted to adapt the research context to the pandemic conditions.

Other expanded research, such as Shoheib and Abu-Shanab (2022) combined the UTAUT2 with Social Commerce Constructs (SCC) and Perceived Value (PV) constructs; Park and Ahn (2021) added the constructs of Price Value (PV), Security, Aesthetics, and User Satisfaction (US) in analyzing consumer perceptions of the use of cellular technology; Habib and Hamadneh (2021) combined the constructs of Consumer Trust and Perceived Risk in the basic UTAUT model (a combination of the UTAUT network model and the expansion of the construct in the business sector can be seen in the Appendix Figure 1).

b. Combination in the Entertainment Sector

There is only one study in the entertainment field related to the application of the UTAUT model conducted by Yoelianto and Tjhin (2022), which measured new constructs that influenced behavioral intentions to use on-demand subscription videos such as Subscription Video on Demand (SVOD). The UTAUT model was combined with Corona Fear, Price Value, Content, and Social Isolation variables. Some essential recommendations in this research include those related to quality, quantity, and suitability of services, increasing efficiency through the use of historical data, and the need for policies for managers to set special packages for customers (see Appendix Figure 2).

c. Combination in the Health Sector

Research that combines UTAUT in the health sector is relatively high during the pandemic and the second highest after research in education, and there are 12 related studies. The first context regarding the use of the Contact Tracing application conducted by Tomczyk et al. (2021) which combined UTAUT and UTAUT2 with the Health Belief Model (HBM), Protection Motivation Theory (PMT), and Theory of Planned Behavior (TPB); Alshami et al. (2022) added the construct App-related privacy concern; Walrave et al. (2021) combined UTAUT with constructs of Innovativeness, App-related Privacy Concern, and COVID-19 Related Stress; while Nguyen and Nguyen (2022) added the constructs of Perceived Risk and Trust (Appendix Figure 3).

In another context, two research focusing on telemedicine Rahi et al. (2021) combined UTAUT with two other theories, namely The DeLone & McLean IS Model (Informant Quality, System Quality, and Service Quality) and The Protection Motivation Theory (Perceived Vulnerability, Perceived Severity, and Response Efficacy). Meanwhile Shiferaw et al. (2021) added the constructs of Attitude and Self Efficacy to the study. In the context of Medical Education Learning, Prasetyo et al. (2021) added the constructs of Learning Value and Instructor Characteristics; Alharbi (2021) researched the use of digital healthcare platforms to increase Information Quality and Trust. An interesting study was conducted by Sora et al. (2021), which was not only adding constructs but modifying the UTAUT model into Perceived Telepsychology Advantages, Perceived Telepsychology Barriers, Telepsychology Usefulness, Intention to Use Telepsychology, and Telepsychology Use.

The last two studies Nguyen (2022) added the constructs of the interactional psychology approach (FFM), namely Neuroticism, Extraversion, Openness to Experience, Agreeableness, and Conscientiousness; while Pagaling et al. (2022) and Cruz et al. (2022) used used the standard of the UTAUT.

d. Combination in the Education Sector

The most research was found in the education sector compared to other fields during the pandemic, which showed 37 contexts. However, images were not available for 12 studies, nine of which used only the existing UTAUT model without adding other variables, and the other three studies modified the primary construct.

Most researchers study distance learning during the pandemic. Research conducted by Asvial et al. (2021) added the Attitude and Perceived Cost variables; Cao et al. (2021) combined the Social Impact Theory (SIT) (Social Impact, Compliance, Identification, and Internalization); Sakka and Namaziandost (2022) added the Perceived Value and Expected Cost factors; Acharjya and Das (2022) added Attitude, Technology Anxiety, Computer Anxiety, and Use Behavior; and Al-Harazneh et al. (2022) added the constructs of System Quality, Information Quality, E-Learning System Use, COVID-19, E-Learning Effectiveness, and Student Satisfaction.

Other studies are also included, such as Jevsikova et al. (2021) added the constructs of Individual Engagement and Pandemic Context (Trust, Technology Anxiety, Work Engagement) and several moderators such as Pandemic Anxiety, Pedagogical Experience, Technological Experience; Muangmee et al. (2021) combined Social Distancing as an independent variable; Mussa and Sazalli (2021) added one of TAM variable (Attitude) and SCT variable (Self-Efficacy) as

a mediator; Azizan et al. (2022) combined UTAUT with Task Technology Fit (TTF) (see Appendix Figure 4).

Furthermore, the study which was conducted by Ardiansyahmiraja et al. (2021) added the Social Presence construct; Lutfi et al. (2022) combined with the DeLone and McLean Model; Badwelan and Bahaddad (2021) added the constructs of Lecturer's Influence, Personal Innovativeness, and Mobile Application Quality; Kharma et al. (2021) used the UTAUT2 and combined it with Quality of Life, Technological Experience, Perceived Usefulness, Previous Online Learning Experience, Perceived Community Building Assistance, Online Course Design, and User Interface Design; Bamoallem and Altarteer (2022) added the CoI Framework, Social Presence, Cognitive Presence, Teaching Presence, and Student Perception of Blended Learning; Zacharis and Nikolopoulou (2022) added the Learning Value and Empowerment in Learning variables constructs to the UTAUT2 model; and Kader et al. (2022) expanded it by adding the Teaching-Related Aspects, Price Value, and Technostress and Actual use of Online Learning constructs (network combination can be seen in the Appendix Figure 5).

Finally, several other studies have extended the basic UTAUT model in education, such as research done by Raza et al. (2021) which only added the construct of the Corona Fear; Ahmed et al. (2021) added the construct of Perceived Enjoyment Mobile Self-Efficacy and moderator (Social Isolation and Fear of COVID-19). Next, two empirical studies were presented in the Massive Online Open Courses (MOOCs) subchapter. Khalid et al. (2021) added the Perceived Autonomy Absorptive Capacity and Culture; Chaveesuk et al. (2022) added the constructs of Absorptive Capacity, Social Distancing, and Culture. Another combination in the research of Maphosa et al. (2020) only added the constructs of Attitude and User Behavior; Oluyinka et al. (2021) combined UTAUT with Innovation Diffusion Theory (IDT); Alvi (2021) added Intrinsic Value; while Nikou and Aavakare (2021) added the constructs of Information Literacy and Digital Literacy (see Appendix Figure 6).

e. Combination in the Government Sector

Only one study in this field was conducted by Alhadid et al. (2022). It measured predictors of adoption of e-Government applications (SANAD application services) by combining the UTAUT model with TAM and TPB using the Perceived Service Quality construct (see Appendix Figure 7).

f. Combination in the Economics and Social

The COVID-19 pandemic also has an impact on economic and social factors. Several studies examined this field, namely Eneizan et al. (2022) that specifically explained parental acceptance of the adoption of online shopping technology during the pandemic using a combination of UTAUT and the COVID Fear construct; Yan et al. (2021) measured the factors that influence the intention to adopt the use of mobile financial services (FinTech applications) by combining UTAUT and adding the constructs of Perceived Trust, Perceived Risk, and Perceived Value; while Shao and Lee (2020) added the construct of Perceived Enjoyment in testing the UTAUT model (Appendix Figure 8).

g. Combination in the Company Environment Sector

Two studies examine technology adoption for the corporate environment in the UTAUT review. Research conducted by Razif et al. (2020) investigated the role of environmental care in adopting WFH technology during COVID-19 by combining the UTAUT model with the Environmental Concern (EC) construct and research. Oktavia et al. (2022) explored the factors that influence the application of video conference during WFH by combining UTAUT with Trust and Perceived Risk variables (Appendix Figure 9)

h. Combination in the Mobile Technology Sector

The focus of research in the field of mobile technology is dominated by the theme of digital payments Wu et al. (2021) examined the determinants of cross-border mobile payment intentions among tourists by involving the Task Technology Fit (TTF) and Initial Trust (ITM) constructs (see Appendix Figure 10).

Meanwhile Zhao and Bacao (2021) added the constructs of Trust, Perceived Benefits, and Perceived Security; Santosa et al. (2021) combined the Inertia construct; Musyaffi et al. (2021) added the variable Perceived Security and Trust; Chaveesuk et al. (2021) combined the variables of Attitude, Social Distancing, and Perceived Risk; Khan et al. (2021) focused on the UTAUT2. Meanwhile Gumasing et al. (2022) in research related to the online basic food application, added The Health Belief Model (HBM); and Yuduang et al. (2022) measured the factors that affect the effectiveness of Morchana's COVID-19 risk assessment application through UTAUT measurement model.

DISCUSSION

The COVID-19 pandemic has affected a large part of the world's population for nearly three years. We can learn new things from this incident. The literature shows that COVID-19 has played a role as a catalyst for transformation from conventional interactions to technology-based interactions that affects all sectors, including the medical, educational, economic, social, corporate, entertainment, etc. Through this paper, the authors present a systematic result and a comprehensive review of the developments and trends of the UTAUT model, especially during the COVID-19 pandemic, during which there is an urgent transition to human interaction behavior when the new normal policy is universally applied to most of the world's population.

Based on a review of 70 articles that have gone through a systematic process using the ROSES guide, the data sources were identified through Scopus, ScienceDirect, and Google Scholar. This paper is presented in five primary aspects, namely the demographic characteristics of the researchers, the primary contexts and research methods used in the analyzed studies, the contribution of universities and institutions and productive researchers discussing the UTAUT model during the pandemic, the analysis of factors influencing ICT adoption during the pandemic, and the review of technology adoption research during the pandemic.

Our analysis of country contributions to UTAUT research during the pandemic, a total of 249 researchers from 44 countries analyzed and evaluated ICT acceptance during the pandemic, 15 of which involved five or more researchers, Indonesia was among the highest followed by several other Asian countries and Middle Eastern countries, namely Malaysia, Phillipines Jordan, Saudi Arabia and Thailand. This condition has improved from the previous study by Williams et

al. (2015), which involved 41 countries, and 17 countries sent three or more researchers. The same thing is also reflected in the involvement of countries from the perspective of primary data sources from 28 countries. Popular countries come from the Asian and Middle Eastern regions, namely Indonesia, Jordan, Saudi Arabia, Malaysia, Thailand and China. This shows the diversity in the number of countries involved. There is no dominance of a particular country as it has undergone wider development. The UTAUT model has penetrated into various countries. It can be seen from the review of Williams et al. (2015) that there are significant differences regarding country involvement when compared to this review.

The high involvement of the countries in assessing ICT acceptance during the pandemic shows the uniformity of the situation. People are on the same page under the pressure of lockdown policy, social distancing, and avoiding exposure to the virus. Apart from the interaction of ICT adoption that had occurred before the pandemic when the rate of the infected victim with the virus increased sharply, the intentions, attitudes, and behavior of people to adopt ICT were higher. Embracing ICT as the only solution then, there was an urgent and unexpected transformation and transition. This potential situation is interesting for further research.

When viewed from the main context of research on ICT adoption during the pandemic, it is dominated by studies on education (52.86%), health (17.14%), mobile technology (11.43%), business (8.57%), economics and social (4.29%), corporate environment (2.86%), and entertainment and government 1.43%. Other findings also explain that from all studies, distance learning (11.43%), e-learning (5.71%), and digital payment (4.29%) are the most analyzed. It shows that the fields of education, health, and mobile technology are at the centre of attention in most countries during the pandemic. The pandemic started in 2019 is not yet known when it will normally end, while educational activities involving many people must continue adequately. Likewise with health, even though it is within a certain distance, health services for patients with a certain level of attention must continue to run to minimize the death rate, both those that occur due to COVID-19 and diseases other than it. Another essential sector is cellular technology, which is relevant to people's daily needs. During restriction or lockdown, interaction through specific applications is safe.

The result of the review that needs to be further explained is the dominant factors that influence ICT adoption intentions during the pandemic. The findings of 70 studies illustrate that the Performance Expectancy (PE) factor affects Behavioral Intention (BI) in 48 studies (68.57%), Facilitating Conditions (FC) factor affects Behavioral Intention (BI) in 37 studies (52.86%), and the the Effort Expectancy (EE) and Social Influence (SI) factors affect Behavioral Intention (BI) which is found in 35 studies (50%).

Based on these findings, the result of research on which performance expectancy affects behavioral intention shows that the adoption of the use of a system or technology helps improve and motivate them in their work during the pandemic. This finding is supported by Venkatesh et al. (2003), which explains that performance expectancy is consistently a strong predictor of behavioral intention, even in crisis conditions. This condition is confirmed by several related research results during the pandemic, for example Maphosa et al. (2020) proves that WhatsApp increases student engagement which leads to better results; Prasetyo et al. (2021) supports that e-learning platforms provide usefulness, perceived achievement, and productivity on behavioral

intentions among medical students; and Zanetta et al. (2021) concludes that usability, convenience, and efficiency are needed for FDA users during a pandemic.

On the other hand, the result of the study proves that Performance Expectancy does not significantly affect Behavioral Intention. It indicates that adopting the system or technology does not help improve and motivate people's work. As a result, they find it difficult to understand the system or technology. The study of Asvial et al. (2021) finds that junior high school students participating in e-learning during COVID-19 due to parental encouragement and government regulations are not interested in using this system, which proves the current research finding. Therefore, they find it difficult to accept learning e-learning.

The next factor that, according to Venkatesh et al. (2003), is consistently a strong predictor of Behavioral Intention is Effort Expectancy. The level of ease in applying a particular system or technology affects the Behavioral Intention of its use, both in voluntary and mandatory contexts. From the findings of this review, only 50% of the studies were confirmed. Wu et al. (2021) identifies that if cross-border mobile payments require little effort to operate, users will be willing to use them. Oktavia et al. (2022) supports the condition in a study on video conferencing during WFH that video conferencing applications are considered easy to understand, use, learn, and master.

In contrast, Effort Expectancy does not affect Behavioral Intentions, meaning that the level of ease of application of a particular system or technology does not affect its acceptance and use. In this review, it is natural that only 50% of studies are confirmed because when faced with disaster conditions, people will continue to use particular systems or technologies, ignoring the convenience factor. A study by Walrave et al. (2021) proves that when using a contact tracing application, users do not perceive the convenience offered by the application as significant. Contact tracing only needs to be enabled, and users are notified of what action they should take when they encounter a user infected with COVID-19.

Similar results were found on the effect of Social Influence on Behavioral Intentions, which was only confirmed in 50% of studies. This influence refers to the extent to which an individual perceives that others believe they should use the new system (Venkatesh et al., 2003, p. 451). For example, a study by Asvial et al. (2021) proves that most students take distance e-learning because of government regulations during the COVID-19 situation and encouragement from their parents. In addition, school regulations force them to use the application. Thus, compulsion was their reason for participating.

In contrast, Social Influence does not affect Behavioral Intentions. This condition occurs when the Behavioral Intention of users adopts a system or technology without intervention from others considered important. A study from Alharbi (2021) proves this condition in research on digital healthcare platforms during the pandemic. Social Influence does not affect the intention to use the application because of the awareness of healthcare consumers in Saudi Arabia as users to manage their healthcare activities during paramedics. Thus, factors related to other people are ignored.

Furthermore, the FC factor influencing BI indicates that organizational infrastructure support affects people's acceptance and use of a particular system or technology during the pandemic. This condition is very relevant because people will expect a better infrastructure to support ICT adoption in a situation of restrictions and lockdowns. A study by Razif et al. (2020)

confirms that the availability of infrastructure, facilities, and technical support is crucial for employees before using WFH technology. Likewise, a study by Oluyinka et al. (2021) explains that facilities such as laptops, Ipads, smartphones, and good internet connections increase the adoption of the Canvas feature during the pandemic.

On the contrary, FC does not affect BI, indicating that infrastructure support does not affect the adoption of acceptance and use of specific systems or technologies. It was surprisingly demonstrated in a study by Cruz et al. (2022), which shows that infrastructure and technical support did not affect the adoption of the MSCS use, similar to the case in previous studies (Jones et al., 2021; Liu et al., 2017). It may be due to several factors, one of which is the technology used under ideal conditions. In this case, there is an intermediary who solves problems between healthcare assistants and technology providers so that health workers feel that the infrastructure is unimportant, because they do not have to interact with service providers.

Analysis of the progress of ICT adoption research in implementing the UTAUT model found that 57.14% of studies performed extensions, 21.43% of studies carried out integration, 18.57% carried out applications, and 2.86% of studies modified the basic UTAUT model. It explains that over 70 analyzed studies, more than half succeeded in extending the basic UTAUT model by adding new exogenous, endogenous, moderating, mediating, internal, or external constructs or variables to their research. Although several studies perform the modification process, the indicators and concepts still refer to the basic UTAUT model. It also demonstrates the robustness of the UTAUT baseline model for testing, measuring, and proving the associated factors with ICT adoption.

CONCLUSION

The urgent transition due to the COVID-19 pandemic forces people to adopt ICT in their daily needs. The new situation that causes people to switch to remote work is interesting to study. Most researchers examining ICT adoption have demonstrated the robustness of the UTAUT model. Through a systematic review method, this paper has succeeded in compiling the literature related to the implementation of the UTAUT model during the pandemic in a comprehensive manner and reviews several essential questions, including the demographic characteristics of researchers, the main context and research methods used in the research analyzed, the contribution of universities, institutions, and productive researchers who discuss on the UTAUT model during the pandemic, and the analysis of the factors influencing ICT adoption during the pandemic, and lastly reviewing the progress of technology adoption research during the pandemic.

The authors of this paper started with the search process through superior data sources such as Scopus, ScienceDirect, and Google Scholar. Seventy articles from 801 articles were selected through a process guided by the ROSES protocol, including the identification, screening, eligibility, and quality appraisal process. Furthermore, selected papers were analyzed further. The findings show that 249 researchers from 44 countries were involved in an empirical study of ICT adoption through the measurement of the UTAUT model during the pandemic. It explains that there is no dominance in this research, in terms of country of origin involved.

It is also interesting that the primary context in these findings is dominated by the fields of education, health, and mobile technology. This condition explains that during the pandemic, these three areas have attracted the attention of most researchers to evaluate without ignoring other fields. It is very reasonable because no one can say for sure when the pandemic will end, and these three activities must continue. Education is considered the most significant, because it involves all ages, ranging from children, youth, and adults. Moreover, this activity involves many people. Likewise, with health and mobile technology, patients need to stay connected to get good services, and most people use mobile technology to meet their daily needs during restrictions or lockdowns.

From the findings, it is also explained that Performance Expectancy is the dominant factor influencing the Behavioral Intentions of users of a particular system or technology during a pandemic. This phenomenon is considered natural because in times of crisis, people intend and use a system or technology to help, facilitate, and motivate their work. Therefore, several empirical research results that are reviewed provide significant recommendations, not only intended for end users of specific applications, but also governments, policymakers, system or technology managers and academics.

Finally, the findings show significant expansion of the basic model of UTAUT, primarily by extending the basic model of UTAUT through the mechanism of adding exogenous, endogenous, moderating, mediating, internal, or external constructs or variables to their research.

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APPENDIX

Table 1: The results of quality appraisal

Studies	Research design	Q1	Q2	Q3	Q4	Q5	No. criteria	Inclusion review
(Razif et al., 2020)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Asvial et al., 2021)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Rahi et al., 2021)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Wu et al., 2021)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Maphosa et al., 2020)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Cao et al., 2021)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Prasetyo et al., 2021)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Khan et al., 2021)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Oluyinka et al., 2021)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Alharbi, 2021)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Khalid et al., 2021)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Zanetta et al., 2021)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Sitar-Taut & Mican, 2021)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Sakka & Namaziandost, 2022)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Oktavia et al., 2022)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Acharjya & Das, 2022)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Al-Harazneh et al., 2022)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Shoheib & Abu-Shanab, 2022)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Jevsikova et al., 2021)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Muangmee et al., 2021)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Mussa & Sazalli, 2021)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Zulherman et al., 2021)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Azizan et al., 2022)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Latip et al., 2022)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Puriwat & Tripopsakul, 2021)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Ardiansyahmiraja et al., 2021)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Cruz et al., 2022)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Sora et al., 2021)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Tomczyk et al., 2021)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Dindar et al., 2021)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Park & Ahn, 2021)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Chaveesuk et al., 2021)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Yoelianto & Tjhin, 2022)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Eneizan et al., 2022)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Alhadid et al., 2022)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Alshami et al., 2022)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Lutfi et al., 2022)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes

(Gumasing et al., 2022)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Yuduang et al., 2022)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Habib & Hamadneh, 2021)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Shao & Lee, 2020)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Chotigo & Kadono, 2021)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Yunus et al., 2021)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Zhao & Bacao, 2021)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Walrave et al., 2021)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Santosa et al., 2021)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Butt et al., 2022)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Chaveesuk et al., 2022)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Shiferaw et al., 2021)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Cao & Nguyen, 2022)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Musyaffi et al., 2021)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Raza et al., 2021)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Nguyen & Nguyen, 2022)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Badwelan & Bahaddad, 2021)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Kharma et al., 2021)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Muthuraman & Abdullah, 2022)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Zacharis & Nikolopoulou, 2022)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Osei et al., 2022)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Nguyen, 2022)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Zhou et al., 2022)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Alghamdi et al., 2022)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Bamoallem & Altarteer, 2022)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Alvi, 2021)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Abbad, 2021)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Nikou & Aavakare, 2021)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Yan et al., 2021)	MM	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Pagaling et al., 2022)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(El-Sofany & El-Seoud, 2022)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Kader et al., 2022)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes
(Ahmed et al., 2021)	QT	Yes	Yes	Yes	Yes	Yes	5/5	Yes

Quantitative (QT), Mixed Methods (MM)

Table 2: Main contexts, sample size, and respondent population

Research Context	Sample Size	Respondent Population
Work From Home (WFH) technology	172	WFH workers who use WFH technology in various regions in Indonesia
Distance learning	50	Middle school students in Jakarta and Tangerang, Indonesia
Telemedicine	354	Patients taking medical care from various hospitals in Pakistan
Cross-Border Payments	786	Travelers using Mobile cross-border payments to Korea (Chinese citizens)
Study online on WA	82	Undergraduate and postgraduate students of the academic year 2019/2020 at Lupane State University, Zimbabwe
Online Tutoring Platforms	1133	Educators and students from universities all over mainland China
e-Learning Platforms	360	Volunteer of medical students in the Philippines
Mobile Finance Sevice	839	MFS app users from different locations in Bangladesh
Canva Online	789	Students using the Canvas App at Universities in the Philippines
Digital Health Care	249	Health consumers using digital health platforms in Saudi Arabia
Massive Open Online Courses	1003	Respondents from Thailand and Pakistan
Food Delivery Application	950	FDA users in four regions of Brazil
M-Learning	311	College students using M-Learning in Romania
Distance learning	178	College student in Amman, Jordan
Video Conference	212	WFH workers who use Video Conference in Jakarta, Indonesia
E-learning	411	Undergraduate students in Andhra Pradesh, India
E-Learning System	411	Undergraduate students in Jordan
Social Commerce (SC)	463	Qatari citizens who are actively using the internet and have at least one account on a social media website
Distance learning	550	Elementary School Teachers in Lithuania
E-Learning Tools	1493	Students across Thai higher education institutions
M-Learning	163	English Foreign Language (EFL) teachers in Iraq

Zoom Cloud Meeting	175	Lecturers, students, and teachers from universities in Indonesia
Distance learning	119	Students from three disciplines at the University of Singapore
E-Learning System	414	Undergraduate and postgraduate students in Malaysia
Food Delivery Application	223	FDA users in Thailand
Distance learning	156	High school students and university students who interact with distance learning in Indonesia,
App Mobile Smart Care System (mSCS)	60	Healthcare assistants using the mSCS in Canada
Telepsychology	514	-
Covid-19 Contact Tracking App	349	COVID-19 contact tracing app users in Germany
Learning Management Study (LMS)	196	K-12 teachers in Finland
Retail management strategy	200	High-speed rail consumers in South Korea
Digital Payment	467	Residents of Bangkok Province, Thailand who use digital payment applications
Subscription Video on Demand (SVOD)	140	SCOD application users (Netflix, Disney+ Hotstar, HBO GO, or Viu) in Indonesia
Online Shooping	274	Jordanians who use online shopping apps
SANAD service App	442	SANAD app users in Jordan
Covid-19 Contact Tracking (MySejahtera) App	150	Malaysians using the Mysejahtera app
Distance learning	384	King Faisal students, Saudi Arabia
Online Grocery App	373	Residents who use the online Sembako application in the Philippines
Risk Assessment App "Morchana"	907	Morchana app users in Thailand
Online Grocery App	443	Consumers of online grocery app users in India
Social Virtual Reality	114	Elderly in Taipei
Food Delivery App	470	Customers using the FDA app in Thailand
Study online	169	Postgraduate students at public universities in Malaysia
Mobile Payment	739	Smartphone users accessing M-Payment in China
Contact Tracing Technology	1500	Belgian Residents
Digital Payment	320	Digital payment users in Indonesia
Online Learning	404	Public and private college students in Punjab, Pakistan

Massive Open Online Course (MOOCs)	1458	MOOC app users from Poland, Thailand, and Pakistan
Telemedicine	319	Healthcare providers in Ethiopia
Mobile Learning Platform	831	Students from Vietnam University
Digital Payment	204	Digital payment users in Indonesia
Learning Management System (LMS)	516	Karachi state college students, Pakistan
Contact Tracing App	224	-
M-Learning App	539	Students using m-learning applications in Saudi Arabia
Online Learning	462	Students of Al-Ahliyya University Amman, Jordan
Distance learning	504	Undergraduate students in Penang
E-Learning	314	Students from various universities in Greece
E-Learning	1024	College students in Ghana
Digital Detox App	263	-
Study Virtual	301	Smartphone users accessing M-Payment in China
E-Training	397	Field training course students at Imam Abdulrahman Bin Faisal University Saudi Arabia
Distance learning	115	Undergraduate student majoring in design at Saudi University
Social Network Tools	305	Students at engineering institutes in the State of Rajasthan, India.
E-Learning	370	Students in Jordan
Digital technology for college information and literacy	249	University Staff and Students in Finland
Pintech App	227	MFS users in Bangladesh
Teleneurology	287	Adult and pediatric neurologists in the Philippines
Ubiquitous Learning Technology	600	Bachelor of Computer Science in Saudi Arabia
Study online	212	Diploma Students of MARA University Pahang Malaysia
Learning Management System (LMS)	1875	Students from Pakistan, India, South Korea, Malaysia, and Bangladesh.

Table 3: Influential constructs

Studies	Adoption	PE→ BI/other	EE→ BI/other	SI→ BI/other	FC→ BI/other
(Razif et al., 2020)	WFH technology	Yes	No	Yes	Yes
(Asvial et al., 2021)	Distance learning	No	No	Yes	No
(Rahi et al., 2021)	Telemedicine	Yes	No	No	No
(Wu et al., 2021)	Cross-Border Payments	Yes	Yes	No	Yes
(Maphosa et al., 2020)	Study online on WA	Yes	Yes	Yes	Yes
(Cao et al., 2021)	Online Tutoring Platforms	Yes	Yes	No	No
(Prasetyo et al., 2021)	e-Learning Platforms	Yes	No	No	No
(Khan et al., 2021)	Mobile Finance Sevice	Yes	Yes	Yes	Yes
(Oluyinka et al., 2021)	Canva Online	Yes	Yes	No	Yes
(Alharbi, 2021)	Digital Health Care	No	No	No	Yes
(Khalid et al., 2021)	Massive Open Online Courses	Yes	No	Yes	Yes
(Zanetta et al., 2021)	Food Delivery Application	Yes	No	Yes	No
(Sitar-Taut & Mican, 2021)	M-Learning	Yes	No	No	No
(Sakka & Namaziandost, 2022)	Distance learning	No	No	No	No
(Oktavia et al., 2022)	Video Conference	Yes	Yes	Yes	Yes
(Acharjya & Das, 2022)	E-learning	Yes	No	Yes	Yes
(Al-Harazneh et al., 2022)	E-Learning System	Yes	No	No	Yes
(Shoheib & Abu-Shanab, 2022)	Social Commerce (SC)	No	No	No	Yes
(Jevsikova et al., 2021)	Distance learning	Yes	Yes	Yes	No
(Muangmee et al., 2021)	E-Learning Tools	Yes	Yes	Yes	Yes
(Mussa & Sazalli, 2021)	M-Learning	Yes	Yes	Yes	Yes
(Zulherman et al., 2021)	Zoom Cloud Meeting	No	No	No	No
(Azizan et al., 2022)	Distance learning	No	No	No	No
(Latip et al., 2022)	E-Learning System	Yes	No	Yes	No
(Puriwat & Tripopsakul, 2021)	Food Delivery Application	Yes	Yes	Yes	No
(Ardiansyahmiraja et al., 2021)	Distance learning	No	Yes	No	No
(Cruz et al., 2022)	App Mobile Smart Care System	Yes	No	No	No
(Sora et al., 2021)	Telepsychology	No	No	No	No

(Tomczyk et al., 2021)	Covid-19 Contact Tracking App	No	No	No	No
(Dindar et al., 2021)	Learning Management Study (LMS)	Yes	Yes	No	No
(Park & Ahn, 2021)	Retail management strategy	Yes	No	Yes	No
(Chaveesuk et al., 2021)	Digital Payment	Yes	No	No	Yes
(Yoelianto & Tjhin, 2022)	Subscription Video on Demand (SVOD)	No	Yes	Yes	Yes
(Eneizan et al., 2022)	Online Shopping	Yes	Yes	Yes	Yes
(Alhadid et al., 2022)	SANAD service App	Yes	Yes	Yes	Yes
(Alshami et al., 2022)	Covid-19 Contact Tracking (MySejahtera) App	Yes	Yes	Yes	Yes
(Lutfi et al., 2022)	Distance learning	Yes	Yes	No	Yes
(Gumasing et al., 2022)	Online Grocery App	Yes	No	No	No
(Yuduang et al., 2022)	Risk Assessment App "Morchana"	Yes	Yes	Yes	Yes
(Habib & Hamadneh, 2021)	Online Grocery App	No	No	No	Yes
(Shao & Lee, 2020)	Social Virtual Reality	Yes	No	Yes	No
(Chotigo & Kadono, 2021)	Food Delivery App	No	No	Yes	No
(Yunus et al., 2021)	Study online	Yes	Yes	Yes	Yes
(Zhao & Bacao, 2021)	Mobil Payment	Yes	No	Yes	No
(Walrave et al., 2021)	Contact Tracing Technology	Yes	No	Yes	Yes
(Santosa et al., 2021)	Digital Payment	Yes	Yes	Yes	Yes
(Butt et al., 2022)	Online Learning	No	No	No	No
(Chaveesuk et al., 2022)	Massive Open Online Courses (MOOCs)	No	Yes	No	Yes
(Shiferaw et al., 2021)	Telemedicine	No	Yes	No	No
(Cao & Nguyen, 2022)	Mobile Learning Platform	No	Yes	No	No
(Musyaffi et al., 2021)	Digital Payment	Yes	No	No	No
(Raza et al., 2021)	Learning Management System (LMS)	Yes	Yes	Yes	No
(Nguyen & Nguyen, 2022)	Contact Tracing App	Yes	No	No	No
(Badwelan & Bahaddad, 2021)	M-Learning App	Yes	Yes	No	No
(Kharma et al., 2021)	Online Learning	No	No	Yes	No

(Muthuraman & Abdullah, 2022)	Distance learning	No	No	No	No
(Zacharis & Nikolopoulou, 2022)	E-Learning	Yes	No	Yes	No
(Osei et al., 2022)	E-Learning	Yes	Yes	No	Yes
(Nguyen, 2022)	Digital Detox App	Yes	Yes	Yes	No
(Zhou et al., 2022)	Study Virtual	Yes	Yes	Yes	No
(Alghamdi et al., 2022)	E-Training	Yes	Yes	Yes	Yes
(Bamoallem & Altarteer, 2022)	Distance learning	No	Yes	No	Yes
(Alvi, 2021)	Social Network Tools	Yes	Yes	Yes	No
(Abbad, 2021)	E-Learning	Yes	Yes	No	Yes
(Nikou & Aavakare, 2021)	Digital technology for college information and literacy	No	No	No	No
(Yan et al., 2021)	Pintech App	No	No	Yes	No
(Pagaling et al., 2022)	Teleneurology	Yes	Yes	Yes	Yes
(El-Sofany & El-Seoud, 2022)	Ubiquitous Learning Technology	Yes	Yes	No	Yes
(Kader et al., 2022)	Study online	No	No	No	Yes
(Ahmed et al., 2021)	Learning Management System (LMS)	Yes	Yes	Yes	Yes

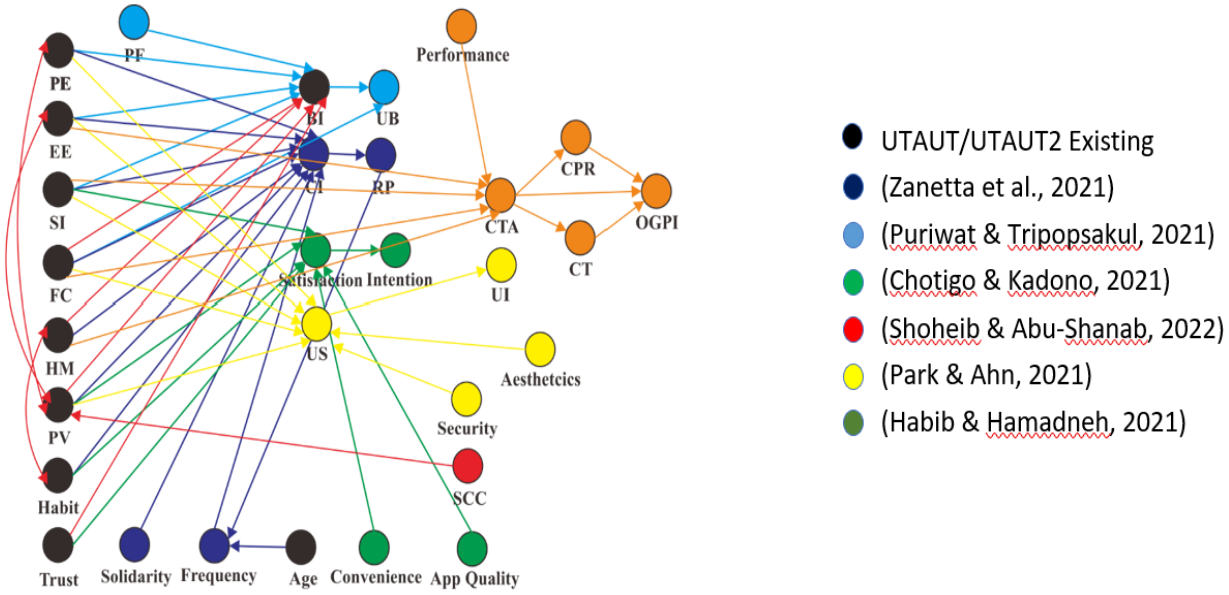

Figure 1: UTAUT combination of business fields

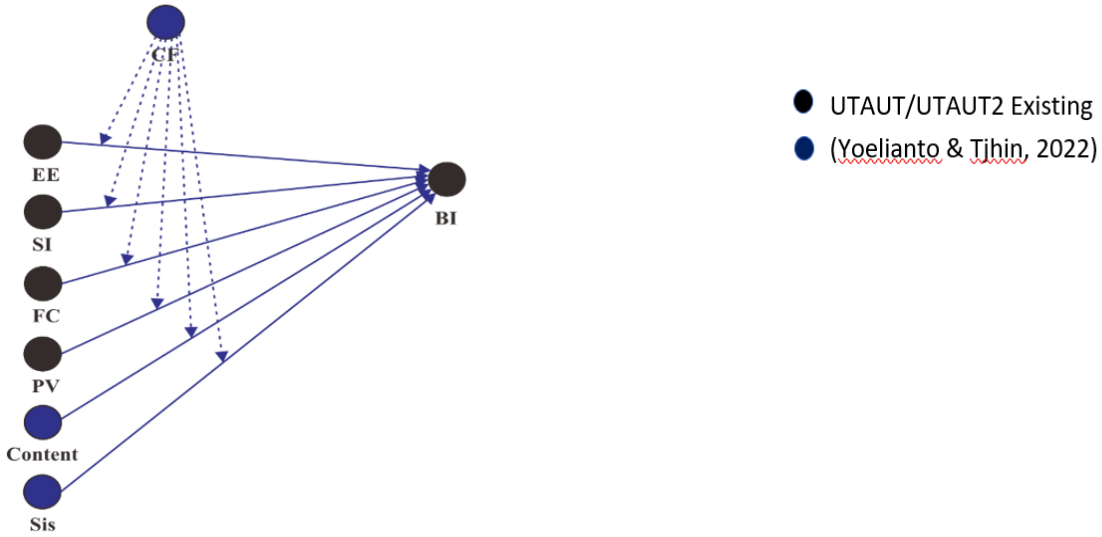

Figure 2: UTAUT combination of entertainment fields

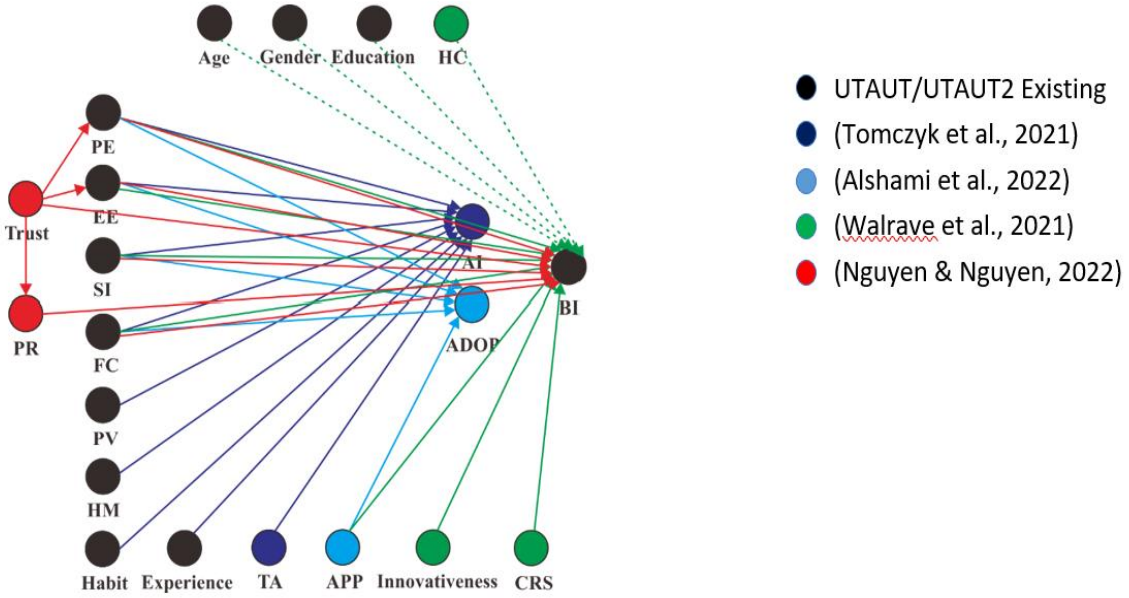

Figure 3: UTAUT combination of health fields

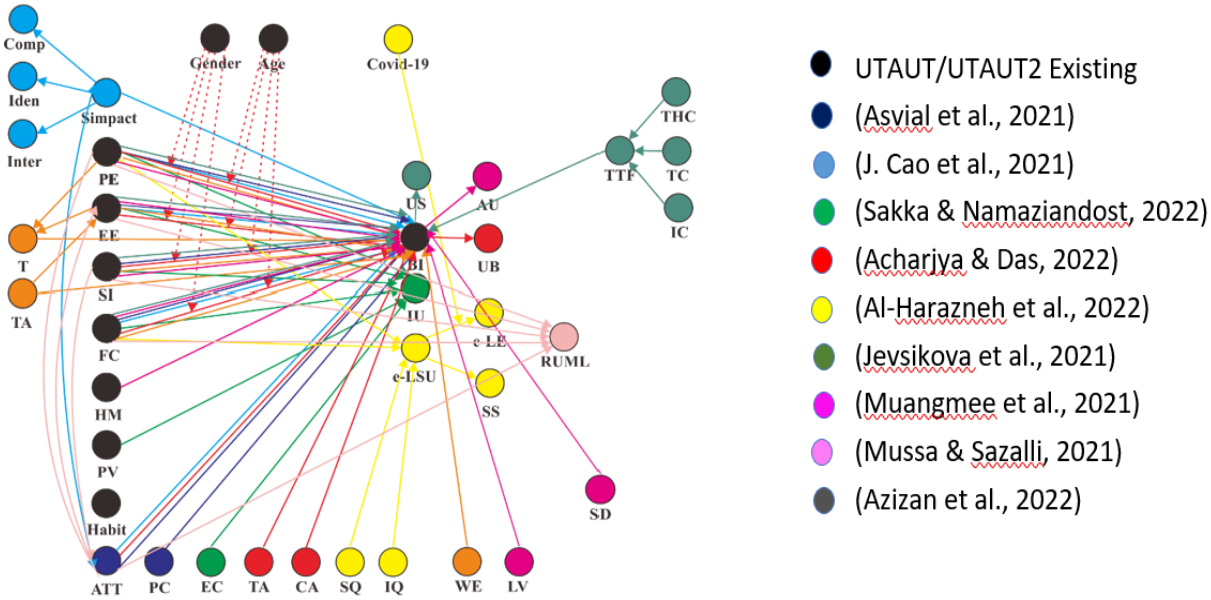

Figure 4: UTAUT combination of education fields (part 1)

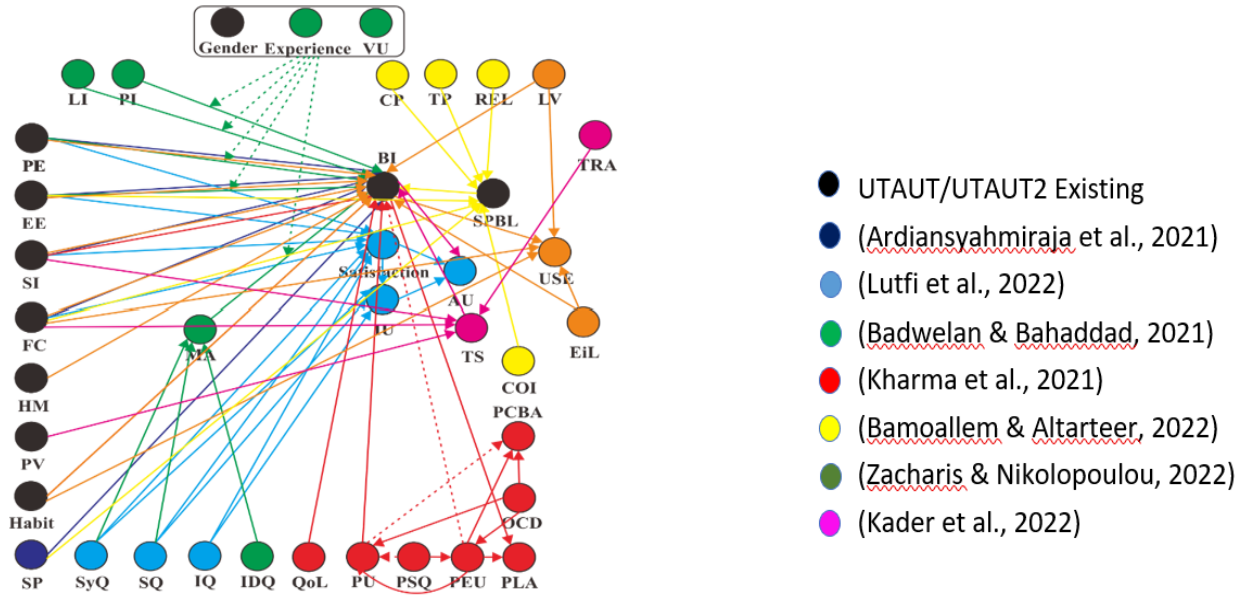

Figure 5: UTAUT combination of education fields (part 2)

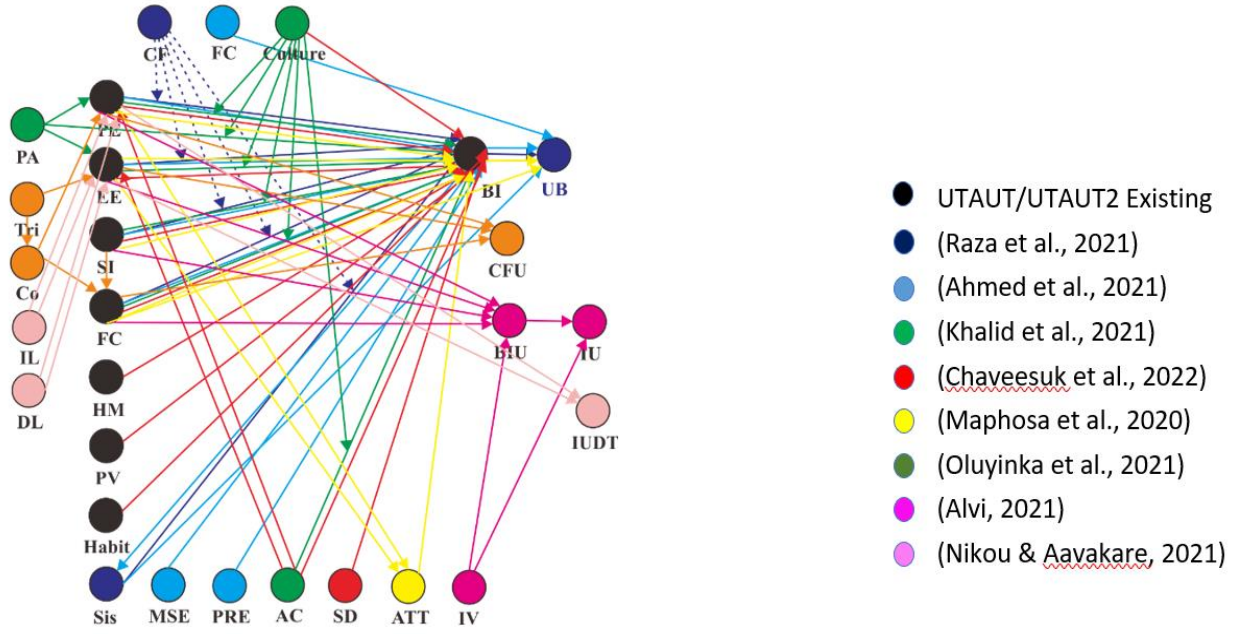

Figure 6: UTAUT combination of education fields (part 3)

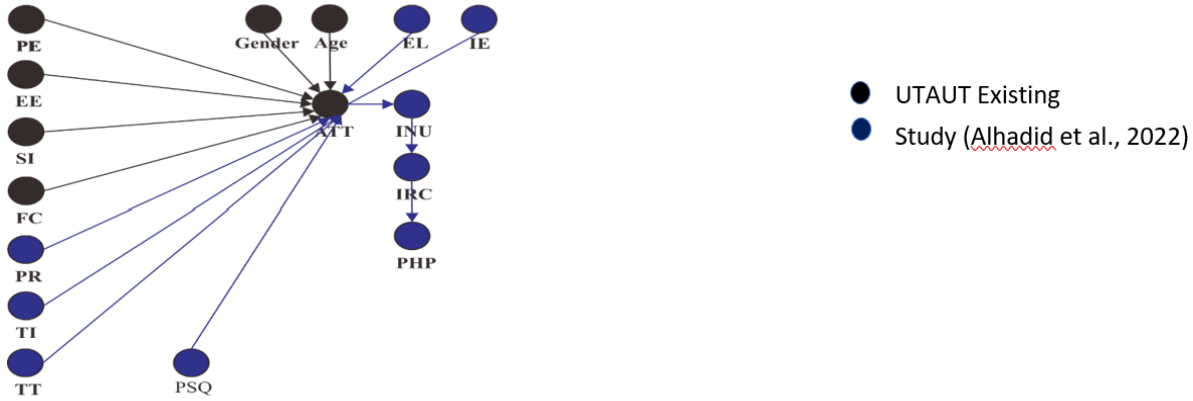

Figure 7: UTAUT combination in the government fields

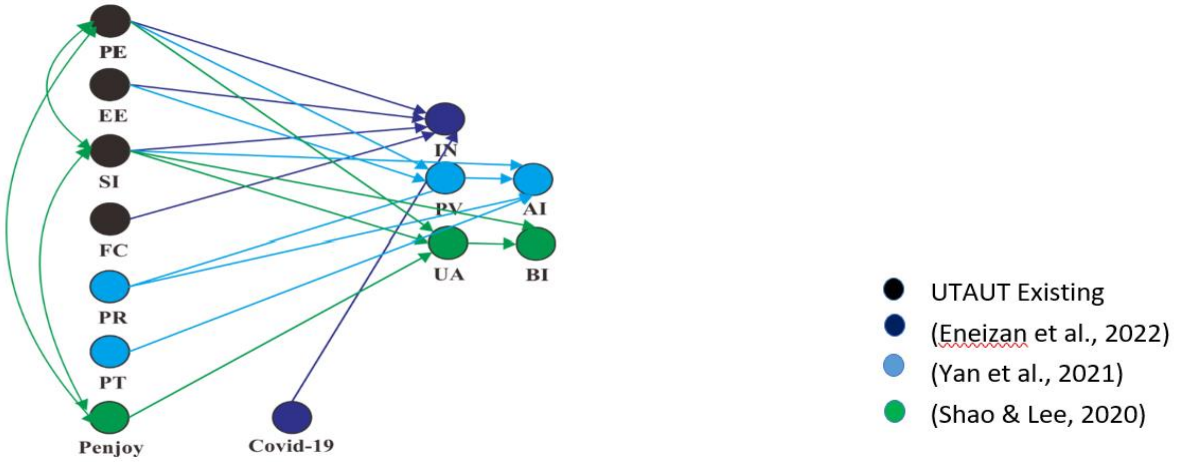

Figure 8: UTAUT combination in the economy and social fields

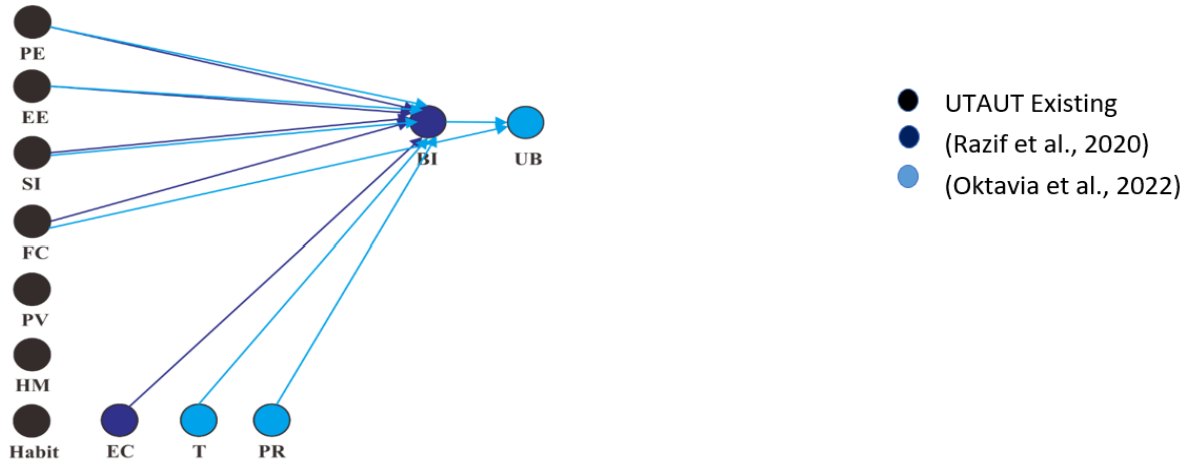

Figure 9: UTAUT combination in corporate environment fields