Review Article

THE USE OF THE TECHNOLOGY ACCEPTANCE MODEL TO ANALYSE THE CLOUD-BASED PAYMENT SYSTEMS: A COMPREHENSIVE REVIEW OF THE LITERATURE

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ABSTRACT

Over the past decades, organisations worldwide driven by the growth in e-commerce transactions have been investing in new payment methods in order to gradually align with the current trend of cashless transactions among individuals, businesses and governments. As a result, payments conducted over the internet or cloud-based payment systems (CBPS) have significantly increased. In this sense, the aim of this study is to provide a comprehensive review of studies that used the technology acceptance model (TAM) to analyse the CBPS. The findings of this study found 134 studies conducted between 2013 and 2020, which have applied the TAM. 118 new variables were tested alongside with the 5 basic constructs of TAM. Surveys are the preferred research method of data collection. Users have been the main focus of academics. China was the country with more studies conducted in CBPS using TAM as a research-based model, followed by India, Indonesia, Spain and Malaysia. Trust was the most used construct by academics to investigate the CBPS adoption, followed by perceived risk and perceived compatibility. SEM was the preferred research instrument for analysing the relationship among constructs followed by regression analysis and multi-group analysis.

Keywords: Cloud-based payment systems, CBPS, Technology Acceptance Model, TAM, Influencing factors.

INTRODUCTION

Over the past decades, the traditional payment systems have been impacted by the evolution of technology. The rise of new means of payments such as online banking, electronic wallets, mobile payments etc., have changed the way people buy and pay for goods and services received. As a result, several countries across the globe have become less dependent on cash payments, or in other words, cashless. Furthermore, the decline in cash usage to make payments could be also related to the emergence of the electronic commerce, or e-commerce, which has transformed the payment market. The adoption of e-commerce worldwide has changed the consumer's choice of payment as they have more options of electronic payments available (Mangiaracina & Perego 2009; Hampshire 2016; Yamaguti Mondego 2019).

Therefore, technology has been used as a mediator in commerce transactions and the development of new means of payment has been facilitating economic exchanges between businesses and consumers. Besides, the rise of the cloud computing has changed the way businesses are conducted.

Cloud computing, which refers to the method that allows individuals or organisations to store and access data over the Internet (Donoghue 2018), has been adopted as an effective basis for other technologies that work through networks to make improvements on their services and functions (Psannis, Batalla & Ishibashi 2020). The use of the cloud computing technology, for instance, is helping banks to have a competitive advantage in the market as it can provide reduction of costs, better profit margins, and simplify the maintenance and management of the application (Elhag 2015). Moreover, the widespread use of the Internet and mobile technology has been contributing to the evolution of the online banking and the digital payment systems (Alkhowaiter 2020).

Hence, payments conducted over the Internet, or cloud-based payment systems (CBPS), 'have been gaining momentum, enabling for the acceptance and processing of payments over the Internet rather than via physical devices' (Opus Consulting 2019).

LITERATURE REVIEW

Over the past years, researchers all over the world have been investigating the impact of new technologies on the adoption of new means of payment. These studies, which could be applied in several areas of knowledge, have investigated the reasons that could lead people to accept or reject a new payment system. In this context, several factors have been tested by academics, who have developed various research models, in order to provide 'a visual representation of theoretical constructs (and variables) of interest' (Creswell 2009 cited in Shuhaiber 2016, p.62).

Notwithstanding many research models have been created, and different factors have been tested in the information technology field, the technology acceptance model (TAM) is the most frequently used research model pointed out by various authors (Mondego & Gide 2018; Patil, Rana & Dwivedi 2018; Boteng & Sarpong 2019; Pal et al. 2019; Alkhowaiter 2020). The reason is due to the fact that TAM can predict the use of information technology and the determinants of acceptance (Kristensen 2016).

Proposed by Davis (1989), the TAM presents five constructs (external variables, perceived usefulness, perceived ease of use, attitude towards using and the actual system use) as it is depicted by Figure 1:
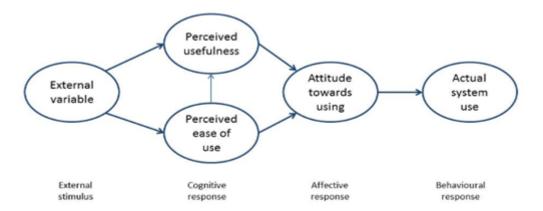
Figure 1. Technology Acceptance Model (Davis 1989 cited in Hampshire 2016, p.66)

According to Davis (1989), notwithstanding the behavioural intention to use a new technology is impacted by the external stimulus, the 'TAM is based upon two central constructs: perceived usefulness and perceived ease of use [which] reside within the cognitive response area of human psychology' (Hampshire 2016, p.11). Perceived usefulness (PU) is defined as 'the degree to which a person believes that using a particular system would enhance his or her job performance' (Davis 1989, p.320). In contrast, perceived ease of use (PEOU) refers to 'the degree to which a person believes that using a particular system would be free of effort. This follows the definition of "ease": freedom from difficulty or great effort' (Davis 1989, p.320).

It is noteworthy to point out that these external stimuli or external variables refer to the factors that could have impact on users' behaviour. Factors such as the features of the system, the development of processes and training could have an indirect impact on the adoption of a new technology as they have a direct impact on users' perceived usefulness and perceived ease of use (Duan 2012).

Thus, the 5 basic constructs of TAM (external variables, PU, PEOU, attitude and behavioural intention) can be used to explain the acceptance of new technologies. However, several academics have been adding new variables into TAM in order to test the influence of new constructs on the user's intention to adopt a new payment system. It is worth mentioning that the focus of these studies have presented a wide range of combinations and responses as it depends on the authors' approach to analyse different aspects of the users, merchants, banks and providers. Besides, the focus of the authors' studies has also been influenced by the evolution of the technology and the period in which the study was conducted.

In this context, this study has found 134 studies conducted between 2013 and 2020, which have applied the TAM. These studies are relating to all types of payments conducted over the Internet or CBPS (electronic payments, mobile payments, mobile banking, mobile wallet etc.). Table 1 shows the studies conducted in CBPS in the period analysed. It is important to mention that the analysis' acronyms are presented in Appendix 1.

Table 1. Studies conducted in CBPS between 2013 and 2017

Author (2020)	Country	Method	N	Focus	Analysis	Author (2020)	Country	Method	N	Focus	Analysis
Malaquias & Silva (2020)	Brazil	Survey	115	Users	CFA, SEM	Ardiansaha, Charirib, Rahardjab & Udin (2020)	Indonesia	Survey	96	Consumers	SEM, CR, CA
Lee et al. (2020)	China	Survey	307	Users	DS, CR, AVE, PLS-SEM, ANN (SEM-ANN)	Chawla & Joshi1 (2020)	India	Survey	744	Users	PLS-SEM
Lin, Yang & Chang (2020)	Taiwan	Survey	606	Consumers	DS, CA, CFI, NFI, NNFI, IFI, SEM	Widaya, Masudin & Satiti (2020)	Indonesia	Survey	101	Consumers	PLS-SEM
Liébana-Cabanillas, Molinillo & Japutra (2020)	Spain	Survey	701	Users	CA, CR, AVE, HTMT, PLS-SEM	Karim et al. (2020)	Malaysia	Survey	330	Users	PLS-SEM
Pal, Funilkul & Patra (2020)	Thailand	Interview	25	Users	NA*	Tiong (2020)	Malaysia	Survey	150	Users	CA, KST MLR
Hashim et al. (2020)	Malaysia	Survey	220	Consumers	MR	Pertiwi1, Suprapto1 & Pratama (2020)	Indonesia	Survey	184	Users	DS, CA, CR, PLS
Ariffin & Lim (2020)	Malaysia	Survey	211	Users	DS, CA, MR,	Baskoro & Amini (2020)	Indonesia	Survey	195	Consumers	DS, FL, AVE, CR, SEM
Agyei et al. (2020)	Ghana	Survey	482	Users	CA, CFA, SEM						
Author (2019)	**Country**	**Method**	**N**	**Focus**	**Analysis**	**Author (2019)**	**Country**	**Method**	**N**	**Focus**	**Analysis**
Sharma, Sharma, & Dwivedi (2019)	Oman	Survey	212	Consumers	CFA, CA, CR, AVE, X^2/df, NFI, TLI, IFI, RMSEA, SEM-NN, ANN	Siyal et al. (2019)	China	Survey	200	Consumers	AVE, CR, CA, HTMT, PLS-SEM
Kalinic et al. (2019)	Spain	Survey	701	Consumers	CFA, EFA, SEM, ANN	Siyal, Ding & Siyal (2019)	Pakistan	Survey	200	Consumers	AVE, CR, CA, CB-SEM
Wang et al. (2019)	Indonesia	Survey	100	Users	DS, CR, CA, SEM	Chawla & Joshi (2019)	India	Survey	283	Users	EFA, PCA, CA, CFA, SEM, Normed x^2, NGI, CFI, TLI, NFI, RMSEA
Tounekti, Ruiz-Martínez & Gomez (2019)	52 countries	Survey	272	Users	FA, CA, CR	Briliana, Deitiana &	Indonesia	Survey	310	Users	AVE, CA, CR, PLS
Nadler, Chen & Lin (2019)	China	Survey	315	Users	FA, CA,	Phoong (2019)	Malaysia	Survey	161	Users	DS, CA, PCA, ANOVA
Liu et al. (2019)	China	Survey	245	Users	CA, CFA, AVE, CR, PLS- SEM	Li et al. (2019)	China	Survey	491	Users	CA, CR AVE, SEM
Ndofirepi & Gavai (2019)	Zimbabwe	Survey	376	Consumers	AVE, EFA, HLRA	Sun & Havidz (2019)	Indonesia	Survey	201	Users	CA, AVE, CR, HTMT, SEM
Yap & Ng (2019)	Malaysia	Survey	384	Consumers	SEM, PCA and MR	Ziwei, Tham & Azam (2019)	China	Survey	380	Users	EFA, CFA, AVE, CR, GIF, CFI, CMINDF, RMSEA, SEM

Table 1. Cont.

Banu, Mohamed & Parayitam (2019)	India	Survey	500	Consumers	DS, CA, CR, HR	Ardiansah, Chariri & Januarti, (2019)	Indonesia	Survey	96	Users	DS, CR, SEM
Sharma (2019)	Oman	Survey	225	Users	CFA. CA, CR, AVE, MSV, MaxR GFI, AGFI, TLI, CFI, RMSEA, SEM, NN	Khoa (2019)	Vietnam	Survey	918	Consumers	CA, CR AVE, HTMT, PLS-SEM

Author (2018)	Country	Method	N	Focus	Analysis	Author (2018)	Country	Method	N	Focus	Analysis
Liébana-Cabanillas, Muñoz-Leiva & Sánchez-Fernández (2018)	Spain	Survey	2012	Users	CA, CR, AVE, RMSEA, TLI, CFI, GFI, AGFI, FCA, SEM	Nguyen & Huynh (2018)	Vietnam	Survey	200	Users	EFA, CFA, SEM
Liébana-Cabanillas et al. (2018)	Spain	Survey	191	Users	X²/df, RFI, NFI, CFI, TLI, IFI, RMSEA, SEM, NN	Bagla & Sancheti (2018)	India	Survey	313	Users	Inferential analysis
Ramos de Luna et al. (2018)	Spain	Survey	742	Consumers	CA, CFA, CR, AVE, RMSEA, GFI, AGFI, CFI, NFI, SEM	Singh, Kumar & Gupta (2018)	India	Survey	462	Consumers	CFA, SEM
Wong (2018)	Hong Kong	Survey	277	Users	CR, AVE, PLS-SEM	Tan, Purba &Widjaya (2018)	Indonesia	Survey	238	Consumers	CA, MR
Qu et al. (2018)	China	Survey	320	Users	EFA, CA, AVE, CR, BTS, KMO, CFA, SEM	Lai (2018a)	Southeast Asia (ASEAN)	Survey	380	Consumers	CFA, SEM
Ma et al. (2018)	China	Survey	295	Users	CA, CFA, KMO, BTS, X²/df, RMSEA, AGFI, NFI, IFI, CFI, RMR,	Lai (2018b)	Malaysia	Survey	560	Consumers	CA, CFA, SEM
Gumussoy, Kaya & Ozlu (2018)	Turkey	Survey	225	Users	CA, MR	Sumerta & Wardana, (2018)	Indonesia	Survey	108	Users	PLS-SEM
Chandra et al. (2018)	Indonesia	Survey	284	Users	CR, AVE, PLS-SEM	Nigam & Kumari (2018)	India	Survey	210	Users	CA, FA
Saji & Paul (2018)	India	Survey	214	Consumers	IA, DS, CFI, GFI, NFI, RMSEA, SEM	Bhardwa & Aggarwal (2018	India	Survey	302	Users	EFA, FA, CA
Öztüren (2018)	Cyprus	Survey	226	Consumers	CA, RA	Su, Wang & Yan, (2018)	China	Survey	922	Users	CA, FA AVE, CFA, AGF, RMSEA
Wiradinata (2018)	Indonesia	Survey	121	Merchants	CA, CR, PLS-SEM	Kongarchapatara & Rodjanatara (2018)	Thailand	Survey	275	Users	DS, IA, CA, MR
Mutahar et al. (2018)	Yemen	Survey	482	Users	DS, CR AVE, CFA, RMSEA, DFI, NFI, PGFI, PNFI, SEM	Chawla & Joshi (2018)	India	Survey	367	Users	EFA, CFA,RA, Fishers' Z-statistics
Shankar & Datta (2018)	India	Survey	381	Users	CA,CR, AVE, CLF, CFA, GFI, AGFI, NFI, CFI, RMSEA, CB-SEM	Eelu & Nakakawa (2018)	Uganda	Survey	384	Users	FA, Correlation analysis, RA, TA
Alaeddin et al. (2018)	Malaysia	Survey	98	Users	PLS-SEM						

Table 1. Cont.

Author (2017)	Country	Method	N	Focus	Analysis	Author (2017)	Country	Method	N	Focus	Analysis
Liébana-Cabanillas, Ramos de Luna & Montoro-Ríos (2017)	Spain	Survey	287	Users	CFA, FL, CA, CR, AVE, GFI. AGFI, CFI, NFI, RMSEA, SEM	Kumar, Lall & Mane (2017)	India	Survey	144	Users	DS, FA, CA, RA
Ramos de Luna et al.(2017)	Brazil	Survey	423	Users	CFA, CA, CR, AVE, SEM	Hebie (2017)	Burkina Faso	Survey	106	Users	DS, IA, CA, MLR
Bailey et al. (2017)	USA	Survey	240	Consumers	EFA, CFA, CFI, TLI, RMSEA, SRMR, CR, AVE, Ratio x²	Chawla & Joshi (2017)	India	Survey	367	Users	EPA, CFA, CA, LRA
Riskinanto, Kelana, Hilmawan, (2017)	Indonesia	Survey	532	Users	CFA, PLS-SEM	Barkhordari et al. (2017)	Iran	Survey	246	Consumers	CFA, SEM
Mun, Khalid & Nadarajah (2017)	Malaysia	Survey	300	Users	CA, PCA, MR	Mutahar et al. (2017)	Yemen	Survey	482	Non-users	DS, CA, CR, AVE, SEM
Chen & Wu (2017)	Taiwan	Survey	127	Users	DS, FA, CA, PCA, RA	Baganzi & Lau (2017)	Uganda	Survey	438	Users	AVE, CR, SPA, PLS-SEM
Sharma et al. (2017)	Oman	Survey	208	Users	CA, FA, Two-staged MLR, NN	Khalilzadeh, Ozturk & Bilgihan (2017)	USA	Survey	412	Merchants	DS, CFA, CA, AVE, CR, MSV, CMB, EFA, X², X²/df, AGFI, CFI, NFI, RMSEA, PCLOSE, HOELTER
Roy & Sinha (2017)	India	Survey	465	Consumers	EFA, CFA, SEM	Lwoga & Lwoga (2017)	Tanzania	Survey	292	Users	EFA, FL, KMO, CA, CFA, X²/df, RMSEA, CFI, AVE, MGA, SEM
Munoz-Leiva, Climent-Climent, Liébana-Cabanillas (2017)	Spain	Survey	103	Users	CA, CR, AVE, CFA, SEM	William et al. (2017)	Middle East and Africa	Survey	237	Consumers	CA, AVE, CR, CMB, PLS-SEM, MGA
Author (2016)	**Country**	**Method**	**N**	**Focus**	**Analysis**	**Author (2016)**	**Country**	**Method**	**N**	**Focus**	**Analysis**
Hankun et al. (2016)	China and USA	Survey	382	Users	SPSS, CA, CR, AVE, PLS-SEM	Liu &Tai (2016)	Vietnam	Survey	90	Consumers	DS, EFA, KMO, BTS, CFA, X², X²/df, CFI, TLI, RMSEA, SEM, ANOVA
Apanasevic, Markendahl, Arvidsson (2016)	Sweden	Interviews	5	Users	NA*	Cao, Dang & Nguyen (2016)	Vietnam	Survey	489	Consumers	CA, BC, MR
Lesa & Tembo (2016)	Zambia	Survey	152	Consumers	PCA, MLR	Dastan & Gürler (2016)	Turkey	Survey	225	Consumers	CFA, X², CMIN/df, GFI, NFI, RMASEA, AVE, CA, CR, FL
Aydin & Burnaz (2016)	Turkey	Survey	1395	Users	PLS-SEM	Kristensen (2016)	Denmark	Survey	217	Consumers	SPSS, PLS-SEM, PLS-MGA
Arif , Afshan & Sharif (2016)	Pakistan	Survey	389	Consumers	EFA, CMB, CFA, CR, CA, AVE, SEM	Ooi & Tan (2016)	Malaysia	Survey	459	Users	AVE, CR, CA, PLS-SEM-ANN, MGA

Table 1. Cont.

Mehrad & Mohammadi, (2016)	Iran	Survey	384	Users	CR, AVE, FA, SEM, PA	Phonthanukitithaworn, Sellitto, & Fong (2016)	Thailand	Survey	529	Consumers	CFA, GFI, SRMR, RMSEA, AGFI, X²/df, FL, AVE, CR, SMC, SPA
Hossain & Mahmud (2016)	Bangladesh	Survey	75	Users	DS, CR, AVE, PLS-SEM	Suwunniponth (2016)	Thailand	Survey	300	Consumers	CA, MR
Alalwan et al. (2016)	Jordan	Survey	343	Consumers	CA, SEM	Lai (2016)	Malaysia	Survey	450	Consumers	CFA, SEM
Ramos de Luna, Montoro-Rıos & *Liébana-Cabanillas (2016)*	Spain	Survey	190	Users	CR, AVE,CA FCA, PLS-SEM	Yuan et al. (2016)	China	Survey	434	Users	CA, EFA, SEM
Upadhyay & Jahanyan (2016)	Iran	Survey	196	Users	CFA, X², RMSEA, CFI, GFI, NFI, AVE, CA, PCA, LR						

Author (2015)	Country	Method	N	Focus	Analysis	Author (2015)	Country	Method	N	Focus	Analysis
Liébana-Cabanillas, Ramos de Luna & Montoro-Ríos (2015)	Spain	Survey	168	Users	EFA, CFA, CR, AVE, CA, X², RMSEA, TLI, CFI, GFI, IFI, SEM	Phonthanukitithaworn, Sellitto, & Fong (2015)	Thailand	Survey	256	Consumers	CFA, X²/df, GFI, AGFI, CFI, NFI, SRMR, RMSEA, PA, SEM
Sidek (2015)	Malaysia	Survey and Interviews	167(M)** 682(C)** 7(D)**	Users	PLS-SEM, CFA, CA, CR, AVE	Yan & Yang (2015)	China	Survey	193	Users	SIL, AVE, CR, CA, CMV, PCA, PLS
Pham and Ho (2015)	Taiwan	Survey	402	Consumers	EFA, KMO, BTS, CFA, CFI, CMIN/DF, RMSEA, SRMR, CR, AVE, CA, PCA	Chin & Ahmad (2015)	Malaysia	Survey	389	Consumers	CFA, SEM
Tai & Liu (2015)	Vietnam	Survey	604	Consumers	DS, CA, EFA, KMO, BTS, CFA, X², X²/df, CFI, TLI, RMSEA, SEM, ANOVA	Dutot (2015)	France	Survey	320	Users	DS, PCA, CFA, CR, AVE, CA, PLS-SEM
Gao & Waechter (2015)	Australia	Survey	851	Users	CFA, CA, AVE, CR, PLS-SEM,CMV,	Mha (2015)	Jordan	Survey	404	Users	PLS, CR, AVE, CA
de Reuver et al. (2015)	Netherlands	Interviews	15	Merchants	NA*	Mohammadi (2015)	Iran	Survey	128	Consumers	CFA, EFA, AVE, CR, CA, SEM
Yang et al. (2015)	China	Survey	870	Consumers	DS, ITA, PCA, CFA, AVE, CA, CR, X²/, X²/df, NFI, CFI, IFI, RFI, GFI, AGFI, RMSEA, SEM,						

Author (2014)	Country	Method	N	Focus	Analysis	Author (2014)	Country	Method	N	Focus	Analysis
Yan & Pan (2014)	China	Survey	220	Users	CFA, AVE, CR, CA, X²/df, GFI, AGFI, CFI, NFI, RMSEA	Mingxing, Jing &Yafang, (2014)	China	Survey	196	Consumers	CR, AVE, CA, PLS-SEM
Arvidsson (2014)	Sweden	Survey	169	Consumers	MR, ANOVA	Roy & Sinha (2014)	India	Survey	167	Consumers	CA, FA

Table 1. Cont.

Morosan (2014)	USA	Survey	556	Consumers	DS,CFA, X², X²/df, RMSEA, TLI, CFI, CR, SMC, AVE, SEM	Govender & Sihlali (2014)	South Africa	Survey	71	Users	CA, MR
Anthony & Mutalemwa (2014)	Tanzania	Survey and Interviews	120(CS)*** 10(CI)*** 1(MI)***	Consumers Merchants	DS	Ahmed et al (2014)	Saudi Arabia	Interview	14	Users	NA*
Liébana-Cabanillas, Sánchez-Fernández & Muñoz-Leiva (2014a)	Spain	Survey	2012	Consumers	CA, RC, AVE, SEM, MGA	Engwanda (2014)	USA	Survey	385	Users	CA, DS, EFA, MR, FA, CM, DRM, PM, CFI, AGFI, RMR, GFI, RMSEA, PA SEM
Liébana-Cabanillas, Sánchez-Fernández & Muñoz-Leiva (2014b)	Spain	Survey	2012	Users	CFA, CA, CR, AVE, X², RMSEA, TLI, CFI, GFI, AGFI, SEM, MGA	Shin & Lee (2014)	Korea	Survey	585	Users	EFA, CFA, CA, CR, AVE, GFI, CFI, SRMR, RMSEA, SEM
Liébana-Cabanillas, Sánchez-Fernández & Muñoz-Leiva (2014c)	Spain	Survey	2012	Users	EFA, KMO, BTS, X², RMSEA, TLI, CFI, GFI, AGFI CFA, CA, CR, AVE, MGA	Li, Liu & Heikkilä (2014)	China	Survey	377	Users	FL, CR, AVE, CA, PLS-SEM
Shaw (2014)	Canada	Survey	284	Consumers	DS, CA, AVE, CR, PLS	Li, Liu & Ji, (2014)	China	Survey	623	Users	CA, CFA, GFI, AGFI, NFI, IFI, CFI, RMSEA

Author (2013)	**Country**	**Method**	**N**	**Focus**	**Analysis**	**Author (2013)**	**Country**	**Method**	**N**	**Focus**	**Analysis**
Aboelmaged & Gebba (2013)	UAE	Survey	119	Users	CFA, CA	Liébana-Cabanillas, Muñoz-Leiva & Sánchez-Fernández (2013)	Spain	Survey	684	Users	CFA, Ratio x², RMSEA, TLI, NFI, CFI, GFI, AGFI, FA, SEM
Ho et al. (2013)	Switzerland	Interviews	12	Users	NA*	Fonchamnyo (2013)	Cameroon	Survey	210	Consumers	CA CR, AVE, SEM
Guhr, Wiegard & Breitner (2013)	Finland, Germany, USA and Japan	Survey	270	Consumers	CR, CA, AVE, SEM						

*NA= Not Applicable

**(M) = Merchant; (C) = Consumer; (D) =Directors of Service providers

***CS= Consumers Survey; CI= Consumers Interview; MI= Merchant Interview

Research Instrument and Focus

In the previous section, this paper has investigated previous studies conducted in the CBPS area, in which the TAM was applied. As a result, 134 studies conducted between 2013 and 2020 were found revealing that the preferred method of collecting data used by academics is questionnaire surveys. Interviews were conducted in 7 studies. Only two studies conducted in the period aforementioned had focus on both, surveys and interviews (Anthony & Mutalemwa 2014; Sidek 2015). Table 2 illustrates the focus of the studies:

Table 2. Focus of the studies conducted between 2013 and 2020

Research methods		Focus		
Surveys	Interviews	Consumers	Merchants	Users
130	7	50	4	81

It is important to mention that in this literature review, this study divided the focus of 134 studies in three categories: Consumers, Merchant and Users. The main reason is that in many studies the authors have classified their subjects of study with different nomenclatures such as travelers, students, tourists and so forth. In this context, in order to organise, classify and provide a better understand of these distinct groups, this study has classified Consumers as people who pay the services provided, Merchants as organisations who supply the service to consumers and Users as people in general (all stakeholders: consumers, merchants, service providers etc).

Thus, according to the literature review, the majority of studies have focus on Users (81), followed by Consumers (50). It is worth mentioning that 1 study has focus on 'non-users'. Merchants were the focus of only 4 studies.

Countries analysed

In regards to the number of countries analysed by academics, this study found 37 different countries, which were analysed between 2013 and 2020. China was the country with more studies conducted in CBPS using TAM as a research-based model. 17 out of 134 studies were conducted in China. It was followed by India (14), Indonesia (13), Spain (13) and Malaysia (13). Table 3 shows the complete list of countries analysed during the aforementioned period:

Table 3. Countries analysed

Countries analysed: 37						
China 17	India 14	Indonesia 13	Spain 13	Malaysia 13	Thailand 5	Vietnam 5
USA 4	Iran 4	Turkey 3	Oman 3	Taiwan 3	Tanzania 2	Brazil 2
Pakistan 2	Yemen 2	Uganda 2	Sweden 2	Jordan 2	Australia 1	Ghana 1
Zimbabwe 1	Hong Kong 1	Cyprus 1	Burkina Faso 1	Zambia 1	Bangladesh 1	Denmark 1
Netherlands 1	France 1	Canada 1	Saudi Arabia 1	South Africa 1	Cameroon 1	Korea 1
UAE 1	Switzerland 1					
Comparative studies that take into account more than 1 country: 5						
52 Countries 1	Southeast Asia (ASEAN) 1	Middle East and Africa 1		Finland, Germany, USA and Japan 1	China and the USA 1	

The majority of the studies on CBPS were conducted in one country. Only 5 cross-cultural studies, comparing different countries, were found. Tounekti, Ruiz-Martínez & Gomez (2019) conducted an online survey in 52 countries with 272 respondents. Lai (2018a) investigated the Association of Southeast Asian Nations (ASEAN) which is composed of eleven countries: Brunei, Cambodia, Timor-Leste, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam (Maizland & Albert 2020). William et al. (2017) surveyed 237 people from the Middle East and Africa. Guhr, Wiegard & Breitner (2013) conducted a survey with 270 consumers in 4 different countries (Finland, Germany, the USA and Japan). Finally, Hankun et al. (2016) investigated the differences and similarities between users in China and the USA.

Influencing factors

As pointed out in the previous sections, this study have analysed 134 studies that have applied the technology acceptance model (TAM) during the period 2013-2020. Several authors have added or tested different factors with TAM in order to point out which factors have positive and negative impact on payments conducted over the Internet or CBPS (online banking, mobile banking, electronic payments, mobile payments, NFC payments, mobile wallet and so forth). It was found 118 new variables which were tested alongside with the 5 TAM constructs. Table 3 shows the different factors tested with TAM constructs:

By far trust, which can be described as the perception that individuals need to rely on another person's intentions and motives (Shuhaiber 2016; Mondego, Gide & Chaudhry 2018), was the most used construct by academics to investigate the CBPS adoption. Trust appears in 71 studies conducted between 2013 and 2020. It was followed by perceived risk (44 studies), which is the sentiment of uncertainty among users in relation to the possibility of negative consequences of adopting a new technology (Phonthanukitithaworn, Sellitto & Fong 2016; Mondego & Gide 2018). Perceived compatibility, which refers to the degree to which a new technology is perceived as compatible with the experiences, needs and lifestyle of potential users (Liébana-Cabanillas et al. 2018; Gumussoy, Kaya & Ozlu 2018; Sun & Havidz 2019) was the focus of 31 studies. Perceived security levels, which is related to the protection of the users' data against accidental or intentional disclosure to an unauthorized people (Liu, Yang & Chang 2020), was tested 28 times. Subjective norms, which can be defined as the need that individuals have to receive an approval by other members of society while making a particular decision (Gumussoy, Kaya & Ozlu 2018: Liébana-Cabanillas, Molinillo & Japutra 2020), appears 27 times. Finally, innovativeness, which is the willingness of individuals or organisations of being pioneers in adopting new ideas, products and systems (Kalinic et al. 2019; Lee et al.2020), was subject of 22 studies.

It is worth mentioning that all the other factors presented in the papers analysed, despite having appearing less than the other factors listed above, by no means are less important. It only reflects academics' viewpoint and has to be taken into consideration as it sheds some light into the factors that have a positive and negative impact on CBPS adoption.

Techniques employed to analyse data

In relation to the research instruments used by academics to analyse data from stakeholders, this study found a wide variety of techniques employed by researchers as shown in Table 5. The complete list of acronyms is presented in Appendix 1.

Table 4. Additional factors alongside TAM constructs

Factors	Articles	Factors	Articles	Factors	Articles	Factors	Articles
Trust	71	Perceived Risk/ Risk Perception	44	Perceived Compatibility	31	Perceived Security Levels	28
Subjective Norms	27	Innovativeness/ Personal innovativeness/ Personal innovation	22	Perceived Mobility/ Mobility Access/ Individual Mobility	17	Perceived Cost / Switching Costs/ Fees/ Lower Service Cost	16
Social Influence/ Social Factors	16	Age	15	Experience / Habit/ Knowledge/ Skilfulness	15	Gender	14
Perceived Convenience	13	Self-Efficacy	12	Mobility Users' Awareness / Informal Learning	10	Perceived Enjoyment	7
Perceived Behavioural Control	7	Perceived Benefit / Relative Advantage	7	Privacy Concern/ Privacy and Opportunism/ Privacy and Security	7	User Satisfaction / Perceived Satisfaction	6
Income	6	Perceived Lifestyle/ Consumers' Lifestyle/ Lifestyle Compatibility	6	Perceived Credibility	5	Education	5
Discomfort	5	Perceived Financial Risk	4	Optimism	4	Insecurity	4
Hedonic Motivation/ Controlled motivation/ Autonomous motivation	4	Perceived Service Quality	4	Marital Status	4	Social Image	4
Perceived Reputation	4	Structural Assurance	4	Price Value/ Value for Money/ Monetary Value	4	Privacy Risk	3
Facilitating Conditions	3	Perceived Usage	3	Perceived Efficiency	3	Performance Expectancy	2
Perceived System Quality	3	Environmental Risk	2	Perceived Safety/ Safe to use	2	Perceived Information Quality	2
Effort Expectancy	2	Perceived Value / Emotional Value	2	Openness to Third Parties	2	Governance Issues/ Regulatory risk	2
Occupation	2	Trialability	2	Design	2	Word of Mouth	2
Social Risk	2	Time Risk	2	Reachability	2	Perceived Accessibility	2
Size of Business/ Business Scope	2	Qualifications	2	Demographics factors/ Personal factors	2	Absorptive Capacity	2
Perceived Task-Technology	2	Lack of Dependencies	1	Perceived Financial Resources/Availability of Resources	1	Service Availability	1
Attractiveness	1	Ubiquity	1	Transparency	1	Enticing Promises	1
Additional Values Of NFC Mobile Payment	1	Strategic Objectives and Interests	1	Perceived Expressiveness	1	Location	1
Perceived Functional Benefits	1	Trusted Service Manager (TSM)	1	Find Policies/ Government as Policy	1	Clearing System	1
Observability	1	Conflicts	1	Communication	1	Confidentiality	1
Actual System Use	1	Openness to New Experience	1	Flexibility	1	Perceived Reliability	1
Confirmation	1	Simplicity	1	Transaction Time	1	Perceived Performance Risk	1
Conscientiousness	1	Risk of Product Use	1	Quality of Internet Connection	1	Security Risk	1
Rewards	1	Neuroticisms	1	Resistance to Change	1	Agreeableness	1
Perceived Information Risk	1	Business Number	1	Extraversion	1	Brand	1
Perceived Complementarity	1	Cognitive Style	1	Use Situation	1	Economic Benefits	1
Social Interaction	1	Added Value of a Service	1	Technological Feasibility	1	New Technology Anxiety	1
Perceived aesthetics	1	Customization	1	Network Externalities and Critical Mass	1	User's Willingness	1
Technology Availability	1	Use Context	1	Perceived Interest	1	Smartness	1
Technological Uncertainty	1	Responsiveness	1	Technology readiness	1	Time Savings	1
Perceived Technological Risk	1	Perceived Asset	1	Computer Playfulness	1		

Table 5. Techniques employed to analyse data

Techniques employed to analyse data									
DS 26	CMB 5	IA 4	EFA 22	KMO 7	BTS 6	CFA 55	CA 79	AVE 56	CR 60
RA 5	HR 1	MR 9	MLR 7	HLRA 1	HTMT 3	TA 1	SIL 1	MSV 2	CM 2
X^2 12	X^2/df 13	CFI 27	GFI 20	AGFI 17	PGFI 1	IFI 7	NFI 18	PNFI 1	RMSEA 33
SRMSR 4	TLI 13	CMIN/DF 3	BC 1	FISHER'S Z STATISTICS 1	ANOVA 4	PLS 5	SEM 50	PLS-SEM 24	CB-SEM 2
NN 3	SEM-NN 1	ANN 2	SEM-ANN 1	PLS-SEM-ANN 1	MGA 6	PLS-MGA 1	SPSS 2	PM 1	CLF 1
PA 3	PC 5	PCA 6	MaxR 1	SMC 2	DRM 1	FA 13	FL 6	ITA 1	KST 1
SPA 2	PCLOSE 1	HOELTER 1	MC 1	CRA 1	EPA 1	RFI 2	NGI 1	DFI 1	NNFI 1

Cronbach's alpha (CA) test, which measures the reliability of construct models (Liu et al. 2019; Agyei et al. 2020) or internal consistency (Ramos de Luna et. al 2017), was used in 79 studies. Confirmatory Factor Analysis (CFA), which measures the convergent and divergent validity of the scales (Ramos de Luna et. 2017; Liu et al. 2019), appears in 55 studies. It is important to highlight that although CFA was used in several studies, various researchers preferred to assess the reliability of constructs using the composite reliability (CR) and the validity of the scale using the average variance extraction (AVE) separately. CR was used in 60 studies, while AVE appeared in 56 papers.

The structural equation model (SEM) was the preferred research instrument for analysing the relationship among constructs. It appears in 50 studies, and its other methods, partial least square structural equation model (PLS-SEM), covariance based structural equation model (CB-SEM), neural network structural equation method (NN-SEM) and artificial neural network-structural equation model (ANN-SEM) were used in 24, 2, 1 and 1 studies respectively. It is noteworthy to highlight that the regression analysis (RA) appears in 33 studies with different approaches: multiple linear regressions (MLR), multiple regressions (MR), hierarchical regressions (HR), hierarchical linear regression analysis (HLRA), logit regression analysis (LRA), and linear regression (LR). Multi-group analysis appears in 6 studies.

Finally, the fit indices (Appendix 1), which represents the measurement of the fitness of the model (Ziwei, Tham & Azam 2019; Sharma 2019; Ardiansah et al. 2020), were used by academics in 33 studies.

SUMMARY AND CONCLUSION

This paper has provided a scoping review of the literature of studies that have applied the TAM to investigate the factors that have a positive or negative influence on CBPS adoption during the period 2013-2020.

The findings of 134 papers, published during the aforementioned period, suggest that the majority of the studies conducted questionnaire surveys as the main instrument of collecting data from participants and users were the main focus of academics. Few studies have gathering information from participants through interviews, as well as few papers take into account the point of view of merchants.

China was the country with more studies conducted in CBPS using TAM as a research-based model. It was followed by India, Indonesia, Spain and Malaysia. Notwithstanding the number of studies have increased in some countries (e.g India and Indonesia) during the period analysed, it is noticeable that the number of studies conducted in some countries seems under-represented and in others there is no data available. Besides, only 5 studies were found, which have investigated cross-cultural similarities and differences.

Trust was the most used construct by academics to investigate the CBPS adoption, followed by perceived risk, perceived compatibility, perceived security levels and subjective norms.

Finally, many studies used the fit index to evaluate the fitness of the model and SEM was the preferred research instrument for analysing the relationship among constructs, followed by regression analysis and multi-group analysis.

Limitations and Future research opportunities

This paper has summarised studies conducted and published between 2013 and 2020. The reason to focus on the aforementioned period was that the consumers' choices of payment methods have significantly increased over the past years, due to the emergence of e-commerce and the rapid advancement of technology. Besides, the main focus of this study was to analyse recent studies conducted in the CBPS area, which has used TAM as a research-based model, and point out future research opportunities.

Future research needs to investigate the factors that have impact on CBPS adoption from the merchants' viewpoint as the majority of the studies had focus on consumers and users in general. Also, interviews with stakeholders should be encouraged, as questionnaire surveys was the main research instrument of gathering data. Furthermore, there is a need to conduct cross-cultural studies in order to analyse similarities and differences among different countries.

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Appendix 1 – Acronyms

ANN – Artificial Neural Network

AVE – Average Variance Extracted

BC - Bivariate Correlations

BTS – Bartlett's Test of Sphericity

CA – Cronbach's alpha

CFA – Confirmatory Factor Analysis

CLF – Common Latent Factor

CM – Correlation Matrix

CMB/ CMV – Common Method Bias/ Common Method Variance

CR – Composite Reliability

CRA - Correlation Analysis

DRM – Data Reduction Method

DS – Descriptive Statistics (Mean and Standard Deviation)

EFA – Explanatory Factor Analysis

FA – Factor Analysis

FL- Factor Loadings

FCA – Factorial Correspondence Analysis

FI – Fit index (CFI= Comparative Fit Index; GFI= Goodness of Fit Index; AGFI= Adjusted Goodness of Fit Index; PGFI= Parsimony Goodness of Fit Index; IFI= Incremental Fit Index; NFI= Normed Fit Index; PNFI= Parsimony Normed Fit Index; RMSEA= Root Mean Squared Error of Approximation; SRMSR= Standardized Root Mean Square Residual; TLI= Tucker-Lewis Index; X^2= Chi-Square; X^2/df= Normed x^2 or Chi-Square/ df; CMIN/df= Minimum Discrepancy)

HR – Hierarchical Regression

HLRA - Hierarchical Linear Regression Analysis

HTMT – Heterotrait-monotrait Ratio of Correlations

IA – Inferential Analysis

ITA – Item Analysis

KMO – Kaiser-Meyer-Olkin

LR – Linear Regression

LRA – Logit Regression Analysis

MGA – Multi-Group Analysis

MaxR– Maximal Reliability

MLR – Multiple Linear Regressions

MR – Multiple Regressions

MSV – Maximum Shared Values

NN – Neural Network

PA – Path Analysis

PC – Pearson's Correlation Analysis

PCA – Principal Component Analysis

PLS-SEM – Partial Least Square Structural Equation Modeling

PM- Pattern Matrix

SEM – Structural Equation Modeling

SIL – Standardized Item Loading

SMC – Square Multiple Correlations

SPA – Structural Path Analysis

RA – Regression Analysis

TA – Thematic Analysis