Digital Banking : A Meta-Analysis Approach

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Abstract

This research paper attempted to study the behavioral intention adoption of prominent digital banking channels, such as mobile banking and wallets and online and telephone banking, in an international scenario. The behavioral intention adoption of mobile banking was studied through seven bivariate relationships: perceived usefulness, perceived ease of use, facilitating conditions, perceived security, cost, self-efficacy, and innovativeness in a global context, which have had a profound impact on the desire of people to adopt digital banking channels. The seven bivariate relationships were analyzed through a meta-analysis approach in a universal framework. The main findings were that location is a major contributor to heterogeneity in a comprehensive global framework. The main managerial implications of the paper are that the universal adoption of digital banking adoption is being significantly affected by location, and global strategists should, therefore, keep this constraint in mind while framing international policies and launching new digital products. Such products must appeal to the location to be successful. An important social link that the current research highlighted was that location has vital linkages with other social factors such as religion, caste, race, color, income, gender, education, family size, buying habits, and wealth, which need to be explored in detail for a better examination of the successful adoption of digital banking channels.

Keywords : **perceived use, perceived ease of use, innovativeness, facilitating conditions, perceived security, cost, self-efficacy**

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Digital banking is a vast concept that is changing the landscape of banking in an accelerated manner. The two prominent digital channels for banking are mobile and online banking; these are coupled with other sub-channels such as telephone banking, debit and credit cards, and video banking. Digital banking is gaining importance globally, especially during the COVID-19 pandemic. Customers can use digital platforms throughout the day according to their banking aspirations. The two main research objectives are to identify the most important seven bivariate relationships affecting digital banking adoption universally and whether significant differences exist across continents; secondly, the study attempts to identify the most important factors contributing to this heterogeneity by applying the fundamentals of meta-analysis. There have been studies that

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have been published on the meta-analysis of mobile banking & TAM, but this is for the first time that an effort has been made to understand the most compelling bivariate relationships affecting digital banking adoption in a global arena and the prominent factors contributing towards heterogeneity. This is one of the niche papers symbolically representing the most important bivariate relationships influencing digital banking adoption by applying the fundamentals of meta-analysis. The research is in demand as most banks and financial institutions worldwide are undergoing a digital transformation to increase customer engagement and profitability.

Digital banking has been categorized as mobile payments (payments made through mobile phones using mobile banking, digital assistants, near field communication, digital wallets); electronic banking refers to the use of the internet as a remote delivery channel for banking services; internet banking is a medium which enables customers to access their bank accounts and other information through a bank's website; online banking also refers to the automatic delivery of products and services through electronic communication (Alkhowaiter, 2020).

The demonetization decision of the Indian government in 2016, along with emerging technologies like 4G, paved the way for the growth of digital wallets in India (Reddy & Rao, 2019). The growth in mobile commerce has led to the growth in mobile wallets (Reddy & Rao, 2019). The digital banking experience has to be coupled with delightful customer engagement through omni channels for success in today's world (Reddy & Rao, 2021). Digital banking costs are only one-eighth of the traditional banking costs (Nagdev & Rajesh, 2018).

An interesting phenomenon is that for every 10% increase in mobile phone subscribers, the GDP of a country grows by 0.8%. Mobile phones have entered the lifestyle of populations in a significant manner and are used for location tracking, paying utility bills, connecting on social media, and M-banking transactions. In another significant example, Westpac took less than 30 months to migrate one million customers to a digital banking platform; whereas, it took 80 months to migrate one million customers to their online channel in 1996 (Kelly, 2014).

Digital Banking and Technology

As explained above, the two main channels of digital banking are mobile and online banking. Digital banks represent the future of banking, and today's brick-and-mortar model is set to slowly give way to the click and portal system. The term “digital banking” can be defined as the online modes of payment through net banking, mobile banking, and paperless banking across all processes. Artificial intelligence and machine learning are paving the way toward identifying banking customers' pre and post-buying behavior.

Digital banking is well defined under three stages of evolution (Melnychenko et al., 2020):

- The first stage refers to the beginning of ATMs and call centers for bank customers.
- The second stage embarks on the beginning of the personalization of banking services through analytics, the social media network, cloud technologies, and social networks.
- The third stage in digital banking introduces the influx of new technologies like artificial intelligence, robotics in process improvement, application programming interface, & blockchain.

Electronic word of mouth is referred to as a phenomenon that leads to gradual and subsequent development of trust and perceived security and positively influences intention to adopt digital banking. Thus, perceived security is an integral part of electronic word of mouth (Prasad & Sen, 2018). In information search, the search essence is the one that can be gauged before purchase, and experience features can be gauged after the purchase. It is hard for the customers to gauge the credence attribute even after the purchase (Malik & Dangi, 2021). Technology has made it possible for banks to provide services anywhere and at any time. This has resulted in the banks rethinking their distribution channels (Chandel & Vij, 2019). Digital banking payment systems can be categorized into two

variants, electronic payment systems (EFT, NACH, RTGS) and second is prepaid payment instruments, mobile payment systems, POS terminals, and online banking (Madhava Priya et al., 2019).

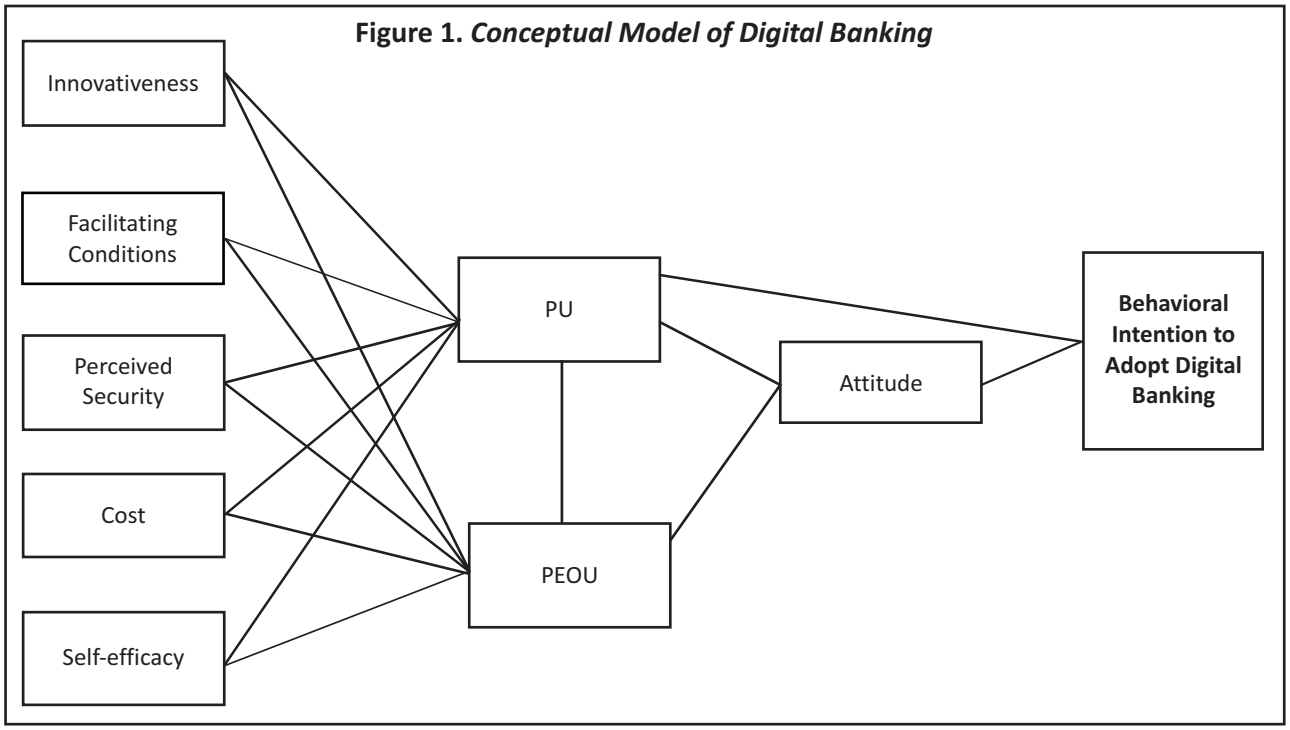
Review of Literature

Customer Engagement and Technology Adoption

Customer engagement and technology adoptions are two terms that must be analyzed together to formulate a complete success strategy for an organization. Among the technology models, the technology acceptance model (TAM) has emerged as one of the most successful and widely accepted (Davis, 1989). The TAM outlines two factors, namely, perceived use (PU) and perceived ease of use (PEOU), which are important determinants of the behavioral intention (BI) to adopt technology. These two variables have received considerable attention in information systems and mobile banking studies (Malaquias & Hwang, 2019).

Although TAM is a powerhouse model of technology adoption, it only employs two predominant variables (PU & PEOU) to explain technology adoption. To explain and analyze the complete set of factors for technology adoption, TAM has to be coupled with other factors. Even if the user has a strong inclination to perform and progress, they will not be able to do so without security, facilitating conditions (FC), and other parameters. TAM 2 was therefore built along the lines of TAM, with the inclusion of experimental and intellective processes. The immense potential of mobile commerce has generated enormous attention from researchers both locally and internationally in terms of investigating the factors and conditions affecting mobile banking adoption among consumers. Local studies of mobile banking adoption by Mohd Daud et al. (2011) found that TAM and its extension are the best methodologies for studying M-banking behavior. The meta-analysis of 43 papers enabled us to identify the critical factors influencing the BI to adopt new technology, that is, PU, PEOU, FCs, perceived security, cost, self-efficacy, and innovativeness (Figure 1).

Figure 1. ***Conceptual Model of Digital Banking***



Perceived use refers to the extent to which particular technology will improve an individual's job performance and productivity. In TAM, the PU is the preliminary variable in the adoption of new technology by individuals. It is associated with the expectancy that the system will help the user perform in a productive way (Malaquias & Hwang, 2019).

The greater the PU of the system, the greater the proportion of technology adoption (Guo et al., 2018). PU is a very important forecaster of digital banking (mobile banking, online banking) across geographies and families globally. It reflects the usage derived from digital banking in both the long haul and short-haul (Malaquias & Hwang, 2019). Reddy and Rao (2019) proposed that the confederation of perceived usefulness and mobile technology has a positive association. PU is a prominent factor and is positively related to digital banking adoption (Reddy & Rao, 2021).

PU plays a prominent role in the diffusion of technology. It represents a very important dimension regarding the user's belief that the new innovative technology provides a discrete advantage compared to existing technology (Davis, 1989). In other words, PU reflects the user's subjectivity and how the new technology enhances productivity (Chong et al., 2010). Davis (1989) pointed out that PU is positively related to consumers' attitudes towards certain technologies. Malaquias and Hwang (2019) said that PU has larger effects on the use of a given system. PU leads to the positive adoption of digital banking (Nagdev & Rajesh, 2018). Based on the above literature review, we propose the following hypothesis:

- **H1 :** PU is positively related to the BI to adopt digital banking.

Perceived Ease of Use (PEOU)

PEOU and PU are the two main variables that impact and explain innovation adoption (Davis, 1989). PEOU represents a set of beliefs ascertaining how a system can be used without effort (Davis, 1989). PEOU is one of the most powerful predictors of the intention to use new technology (Venkatesh & Davis, 2000). PEOU reflects the user's view that using a particular technology is effortless. Accordingly, the user will boycott the use of mobile banking if it is difficult to learn and use (Hanafizadeh et al., 2014). Information about features and guidelines of mobile banking make it comfortable for the users to continue using it (Alalwan et al., 2017). Self-sustaining technologies (SSTs) also imply that technologies which are easy to adopt and user-friendly are compatible with users (Chemingui & Ben Lallouna, 2013). PEOU is an important forecaster of the BI to adopt mobile banking. PEOU is an important parameter that leads to technology diffusion in both organizational and individual factors (Malaquias & Hwang, 2019). Reddy and Rao (2019) proposed that customers found it very easy to use mobile applications, and PEOU significantly influenced post-adoption behavior in mobile commerce. PEOU is positively related to the adoption of digital banking services in India (Reddy & Rao, 2021). PEOU is a direct influencer of behavioral intention to adopt digital banking (Nagdev & Rajesh, 2018).

Based on the above review, we present the following hypothesis:

- **H2 :** PEOU is positively related to the BI to adopt digital banking.

Facilitating Conditions

This refers to a set of elements that exert pressure on a person to complete a task or a phenomenon. FCs comprise of the overall complete infrastructure (technical, organizational, environmental), which manages the use of the system. Yang (2009) established a positive relationship between BI and FCs. FCs refer to the user's interface, which decreases the complexity and increases interactivity and navigation. Service quality is also an important ingredient of FCs (Sarkar et al., 2020). In the case of mobile banking, the end-users have faith in venture holders

(bank, telecom companies, and service providers) to provide efficient services based on the comprehensive principles of integrity of data and transactions, which prompt and compel the user to adopt mobile banking (Hsu et al., 2011). FCs can also be defined as the amount of technical and organizational structure which exists to support the use of a system (Alkhowaiter, 2020). FCs are also described as the support available from a digital bank that helps customers perform a particular task. It is also a reflection of operational infrastructure in a digital environment, enabling customers to perform their banking activities (Patil et al., 2020). Facilitating conditions play a prominent role in motivating people to use mobile applications (Reddy & Rao, 2021). Website quality is an important ingredient in facilitating conditions, and it positively impacts service delivery and users' adoption of digital banking (Nagdev & Rajesh, 2018). Service quality is of paramount importance in establishing facilitating conditions for the customers (Malik & Dangi, 2021).

Several international studies, such as Mugambe (2017), also maintained that FCs positively affect the BI to adopt mobile banking. The operational and IT infrastructure existence for mobile banking and mobile wallets facilitates the adoption of digital transactions. Hence, we formulate the following hypothesis:

↳ **H3 :** FCs are positively related to the BI to adopt mobile banking.

Perceived Security

Perceived security refers to one party's likelihood that the other party will perform the desired actions as per commitment (Wu et al., 2011). In the context of digital banking, consumers expect that their transactions are free from malware and viruses and their financial details are not shared with any third party (Sarkar et al., 2020). Perceived security is formerly governed by the subjective evaluation of a service by a customer. It increases users' confidence in sharing personal details while using mobile and online banking. Trust and perceived security increase the adoption of digital banking (Malaquias & Hwang, 2019). Perceived security is a very important variable having a profound impact on both PU and PEOU. The existence of legal and technological structures increases perceived security (Sarkar et al., 2020). Perceived security has been defined as an important variable that explains 72% of the differences in the adoption of mobile wallets (Reddy & Rao, 2019). It is a harbinger of trust and has a positive relationship with digital banking (Reddy & Rao, 2019). Based on the above arguments, we formulate the following hypothesis :

↳ **H4 :** Perceived security is positively related to the BI to adopt digital banking.

Perceived Cost

The economy of scale of the internet connection is an important factor in controlling internet usage. Perceived cost is the extent to which a user thinks that using a particular technology will cost him/her heavily; the price is related to the cost of mobile devices, subscription fees, and other application prices (Al-Saedi et al., 2020). It is perceived to be a major antecedent to the adoption of digital technologies and is negatively related to the adoption of digital technologies (Jiang et al., 2016). Perceived cost negatively influences mobile banking behavioral adoption intention (Wessels & Drennan, 2010). Costs have presented a major barrier to the adoption of M-banking (Alalwan et al., 2017). They can be broken down into the following categories: initial purchase of the phone, subscription to internet charges, and transaction cost.

Therefore, as per the above arguments, we present the following hypothesis:

↳ **H5 :** Perceived cost is negatively related to the BI to adopt digital banking.

Self-Efficacy

The term self-efficacy illustrates the certainty that individuals have in using new technology (Koksal, 2016). It can also be described as the grit and determination of a particular individual to use new technology. Self-efficacy is also referred to as the user's ability to conduct online transactions through their mobile devices anywhere and at any time (Sarkar et al., 2020). It is defined as the extent to which a particular technology measures the magnitude of innovation in attaining a particular job. In recent studies, self-efficacy has been found to significantly impact the behavioral intention to adopt digital banking (Al-Saedi et al., 2020). The more the mobile payment system can achieve a task effectively, the better the self-efficacy (Al-Saedi et al., 2020). It is also defined as a user's ability to understand multimedia teaching material. Perceived knowledge or self-efficacy has a positive relationship with digital adoption (Jiang et al., 2016). The higher the self-efficacy of an individual, the greater the outcomes (Nagdev & Rajesh, 2018). Important technology adoption theories, namely, the unified theory of acceptance and use of technology (UTAUT) and the theory of planned behavior (TPB), explain that self-efficacy is an important construct in technology use and adoption. Therefore, we propose the following hypothesis:

↳ **H6 :** Self-efficacy is positively related to the BI to adopt digital banking.

Innovativeness

Innovativeness is the strongest indicator of M-banking sources. Baabdullah et al. (2019) found that innovativeness is strongly related to mobile banking adoption. Innovativeness can also be described as a state of mind in which an individual seeks something unique and different. Innovativeness is also defined as personal innovativeness and can be related to trying something new in information technology (Patil et al., 2020). It has been described as a major force in the adoption of innovative digital banking technologies (Patil et al., 2020).

Thus, we propose the following hypothesis:

↳ **H7 :** Innovativeness is positively related to the BI to adopt digital banking.

Research Methodology (Meta-Analysis)

The technique of meta-analysis has been used as it is of paramount importance in social sciences, and it binds together the results of multiple scientific studies. It combines the results of several techniques to give an overall estimate of the effect on the population (Suurmond et al., 2017). Meta essentials software is used for analyzing the results of a meta-analysis. The data sets used in the analysis are secondary data. A meta-analysis is a technique for combining the results of many studies. Only quantitative studies have been considered for the analysis depicting correlation values and several participants between the seven most important bivariate relationships (PU to BI, PEOU to BI, facilitating conditions to BI, self-efficacy to BI, perceived security to BI, the cost to BI, and innovativeness to BI) in digital banking.

Digital banking behavioral intention to adopt varies across the world, and the main problem is identifying the factors responsible for this heterogeneity. To identify the variation, we assembled 9,641 research papers from popular databases by applying appropriate keywords. After removing duplicates, we were left with 6,836 papers. On screening the records through titles, 5,975 records were excluded. The remaining 861 articles were screened through the full text. Out of these, 648 articles were further excluded after full-text analysis, and we were left with 213 articles being analyzed for qualitative synthesis. Post qualitative synthesis, we were only left with 43 papers for quantitative meta-analysis and analyzing the research problem (Figure 2). After the literature review, we framed seven hypotheses of the seven bivariate relationships. To identify the variable factor, we have applied the

fundamentals of meta-analysis, in which we study publication bias, effect size, heterogeneity, and sub-group analysis. Based on the statistical results, we test the seven hypotheses. The software used for the study is meta essentials. The reliability value of the constructs in the selected research papers has been more than 0.7; hence, it is assured. The details of the study period, geographical details, and author details are mentioned in Table 2.

The hypothesis statements are mentioned in Table 1. Meta-analysis is a prominent technique being used in social sciences for metabolizing the results of various scientific studies. Meta-analysis of the present research has been compiled by applying the fundamentals of TAM, and future research can focus on other information system models like UTAUT 2. The research for future generation projects should focus on moderating and mediating factors affecting TAM and customer engagement. The present study was conducted in the financial year 2021.

Table 1. *Hypothesis Statements*

H1	*PU* is positively related to the *BI* to adopt digital banking.
H2	*PEOU* is positively related to the *BI* to adopt digital banking.
H3	*FCs* are positively related to the *BI* to adopt mobile banking.
H4	Perceived security is positively related to the *BI* to adopt digital banking.
H5	Perceived cost is negatively related to the *BI* to adopt digital banking.
H6	Self-efficacy is positively related to the *BI* to adopt digital banking.
H7	Innovativeness is positively related to the *BI* to adopt digital banking.

Table 2. *Meta-Analysis of Research Papers*

S. No.	Authors	Geography	Year of Publication
1	Pipitwanichakarn & Wongtada	Thailand	2021
2	Gao & Bai	Australia	2014
3	Zhou	China	2011
4	Siyal et al.	Pakistan	2019
5	Leong et al.	Malaysia	2021
6	Chawla & Joshi	India	2020
7	Flavián et al.	Portugal	2020
8	Tran & Corner	New Zealand	2016
9	Alalwan, Dwivedi, Rana, & Simintiras	Jordan	2016
10	Mortimer et al.	Thailand & Australia	2015
11	Baabdullah et al.	Saudi Arabia	2019
12	Mohammadi	Iran	2015
13	Giovanis et al.	Greece	2019
14	Glavee-Geo et al.	Pakistan	2017
15	Oertzen & Odekerken-Schröder	Germany	2019
16	Chawla & Joshi	India	2019
17	Chaouali et al.	Tunisia	2019
18	Bakhsh et al.	Pakistan	2017
19	Rahi et al.	Pakistan	2021

20	Wu et al.	China	2017
21	Karjaluoto et al.	Finland	2014
22	Thakur & Srivastava	India	2014
23	Yadav et al.	India	2016
24	Alalwan, Dwivedi, Rana, & Williams	Jordan	2016
25	Foroughi et al.	Malaysia	2019
26	McGovern et al.	Ireland	2019
27	Akhtar et al.	Pakistan & China	2019
28	Roy & Moorthi	India	2017
29	Lee	Taiwan	2009
30	Kumar & Shenbagaraman	India	2017
31	Aboelmaged & Gebba	UAE	2013
32	Ruangkanjanases & Wongprasopchai	Thailand	2018
33	Salimon et al.	Malaysia	2020
34	Agyei et al.	Ghana	2020
35	Al Khasawneh	Jordan	2015
36	Krishanan et al.	Malaysia	2016
37	Gbongli et al.	Togo	2019
38	Sreelakshmi & Prathap	India	2020
39	Singh & Srivastava	India	2018
40	Chiu et al.	Philippines	2017
41	Makanyeza & Mutambayashata	Zimbabwe	2018
42	Moorthy et al.	Malaysia	2020
43	Makanyeza	Zimbabwe	2017

Data Collection

We conducted a comprehensive search of research papers across databases, and after applying the exclusion criteria, we shortlisted 43 papers. We performed a comprehensive search of prominent databases and journals, such as Scopus database, Emerald, EBSCO, Wiley, and JSTOR by using the following combination of words: "customer engagement and digital banking," "consumer behaviour & digital banking," "customer engagement and telephone banking," "customer engagement and mobile banking," "customer engagement & mobile wallet adoption," "mobile banking," "mobile wallet," "augmented reality and mobile banking," "augmented reality and mobile wallets," "augmented reality and digital banking," "customer engagement and online banking," "customer engagement and online shopping," "customer engagement and internet banking," "customer engagement and banking," "consumer behaviour and banking," "TAM and mobile banking adoption," "TAM and mobile wallets," "UTAUT and mobile banking adoption," "UTAUT and mobile wallets," "consumer attitude and mobile banking," "behavioral intention and mobile banking," and "behavioral intention and digital banking."

Figure 2. ***The PRISMA Figure***

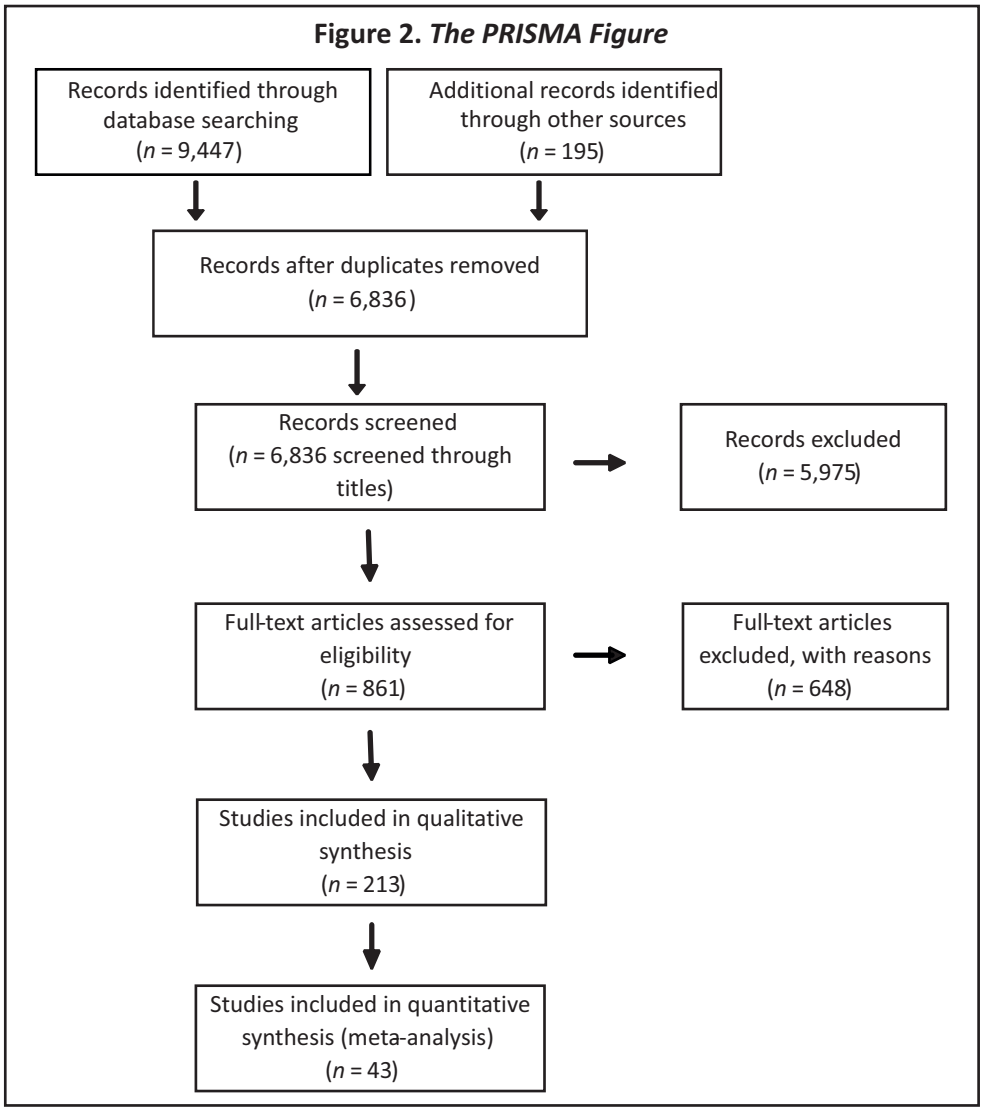


Table 3. ***Inverse Standard Error (ISE) and Z - values of PU, PEOU, FC (Facilitating Conditions), PSec (Perceived Security), Cost, Self Eff (Self Efficacy), and Innov (Innovation)***

		PU		*PEOU*		*FC*		*P Sec*		*Cost*		*Self Eff*		*Innov*	
SNO	**Authors**	**ISE**	***Z***	**ISE**	***Z***	**ISE**	***Z***	**ISE**	***Z***	**ISE**	***Z***	**ISE**	***Z***	**ISE**	***Z***
1	Pipitwanichakarn & Wongtada	3.74	1.95	4.71	3.36										
2	Gao & Bai	3.73	2.32	4.70	3.24										
3	Zhou	3.68	2.24												
4	Siyal et al.	3.67	3.67	4.58	5.79										
5	Leong et al.	3.67	2.26	4.57	2.85			2.15	0.91					0.76	0.07
6	Chawla & Joshi	3.77	2.84	4.77	2.82	3.34	1.99	2.17	1.57						
7	Flavián et al.	3.77	2.83	4.78	3.77										
8	Tran & Corner	3.66	2.51												
9	Alalwan, Dwivedi,	3.72	3.89									4.06	3.08		

	Rana, & Simintiras														
10	Mortimer et al.	3.65	2.85	4.55	2.12										
11	Mortimer et al.	3.65	1.59	4.54	2.12										
12	Baabdullah et al.	3.72	3.23	4.68	1.79			2.16	1.04						
13	Mohammadi	3.60	3.46	4.45	3.58							3.90	0.39		
14	Giovanis et al.	3.77	2.56	4.79	2.64	3.34	1.29					4.13	1.77		
15	Glavee-Geo et al.	3.66	2.27	4.57	3.31							3.98	2.19		
16	Oertzen & Odekerken-Schröder	3.77	3.50												
17	Chawla & Joshi	3.77	2.84	4.77	2.82	3.34	1.99	2.17	1.57						
18	Chaouali et al.	3.68	4.49			3.28	3.20								
19	Bakhsh et al.	3.76	0.15	4.76	0.57							4.11	0.88		
20	Rahi et al.	3.73	1.62	4.69	1.56										
21	Wu et al.	3.66	3.77												
22	Karjaluoto et al.	3.56	3.07	4.37	2.27									0.48	0.10
23	Thakur & Srivastava	3.55	2.63	4.35	3.45	3.18	3.33	2.13	0.37					0.74	0.10
24	Yadav et al.	3.68	2.40	4.60	1.90					2.17	–0.38				
25	Alalwan, Dwivedi, Rana, & Williams	3.72	3.02	4.69	3.11							4.06	1.39		
26	Foroughi et al.	3.73	3.98	4.70	1.04							4.07	4.65		
27	McGovern et al.	3.69	2.75	4.63	2.93							4.02	2.36		
28	Akhtar et al.	3.70	1.13	4.65	1.61										
29	Akhtar et al.	3.71	2.35	4.67	2.32										
30	Roy & Moorthi	3.73	0.64	4.70	1.00									0.73	0.05
31	Lee	3.73	3.16	4.70	2.90			2.17	–1.57						
32	Kumar & Shenbagaraman	3.60	1.96	4.45	2.14							3.91	1.58	0.42	0.09
33	Aboelmaged & Gebba	3.59	1.66	4.42	1.48										
34	Ruangkanjanases & Wongprasopchai	3.74	2.00	4.71	2.11					2.18	–0.24	4.08	2.08		
35	Salimon et al.	3.70	2.46	4.64	2.76			2.16	0.40						
36	Agyei et al.	3.75	3.59	4.73	3.72									0.55	0.05
37	Al Khasawneh	3.70	1.61	4.64	2.40										
38	Krishanan et al.	3.73	2.37	4.71	3.08					2.18	–0.84				
39	Gbongli et al.	3.75	0.71	4.74	1.50							4.10	0.91	0.25	0.04
40	Makanyeza & Mutambayashata					3.33	0.11			2.19	0.06	4.02	1.25		
41	Makanyeza					3.28	0.27								
42	Moorthy et al.					3.28	2.66	2.16	1.14						
43	Chiu et al.							2.16	2.06	2.18	1.26				
44	Singh & Srivastava							2.17	0.53	2.19	–1.55	4.12	2.16		
45	Sreelakshmi & Prathap											4.11	1.20		

Statistical Analysis and Results

As a part of the statistical analysis, we first performed the publication bias test for the shortlisted 43 papers followed by the homogeneity/ heterogeneity test followed by subgroup analysis.

Publication Bias Analysis of the Bivariate Relationships

To test the seven bivariate relationships for publication bias, we use the Galbraith plots to test for publication bias in the shortlisted set of studies. The central concept of the Galbraith plot is to run an unweighted regression of *z* - scores on the inverse of the standard error, with the intercept constrained to zero. The plot can be used for aberration in the effect sizes. The basic assumption is that 95% of the studies are within the area defined by the two confidence interval lines. We used meta essential software, which presents a table with studies, a graph, and a table with regression estimates. "Effect size" is a simple way of quantifying the relationships between two groups and is extensively used for meta-analysis in management research and social sciences. As is evident from the Galbraith plots of the seven bivariate relationships, 95% of the studies are within the two confidence interval lines PU to BI (Figure 3), PEOU to BI (Figure 4), facilitating conditions to BI (Figure 5), perceived security to BI (Figure 6), the cost to BI (Figure 7), self-efficacy to BI (Figure 8), and innovativeness to BI (Figure 9). The intercept and slope of the seven bivariate relationships are as follows: PU to BI (Table 4), PEOU to BI (Table 5), facilitating conditions to BI (Table 6), perceived security to BI (Table 7), the cost to BI (Table 8), self-efficacy to BI (Table 9), and innovativeness to BI (Table 10).

A *z* - score indicates how many standard deviations are away from the mean; a positive *z* - score depicts that the raw score is higher than the mean average. In the inverse variance method, the weight given to each study is the inverse of the variance of the effect estimate (means one over the square of its standard error); thus, larger studies are assigned more weights than smaller studies that have large standard errors (Borenstein et al., 2007). Table 3 summarizes the inverse standard error and *z* - values of the seven bivariate relationships to behavioral intention.

Figure 3. ***Bivariate Relationship of Perceived Use to Behavioral Intention***

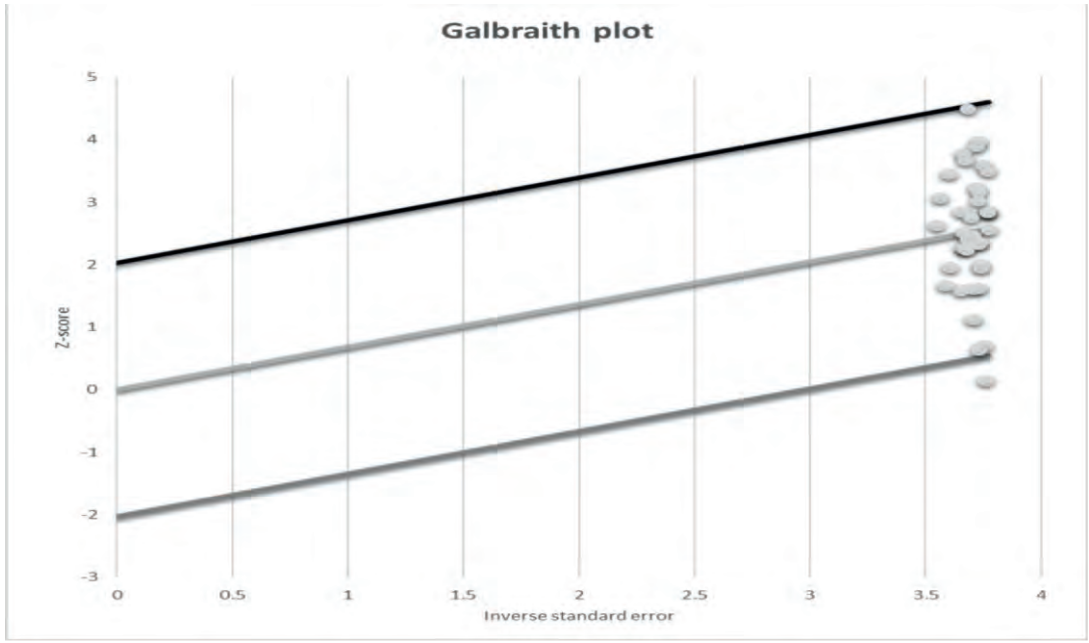


Table 4. ***Intercept and Slope of the Bivariate Relationship Between PU & BI***

Regression Estimate				
	Estimate	**SE**	**CI LL**	**CI UL**
Intercept	0			E
Slope	0.68	0.04	0.60	0.77

Figure 4. ***Bivariate Relationship of Perceived Ease of Use to Behavioral Intention***

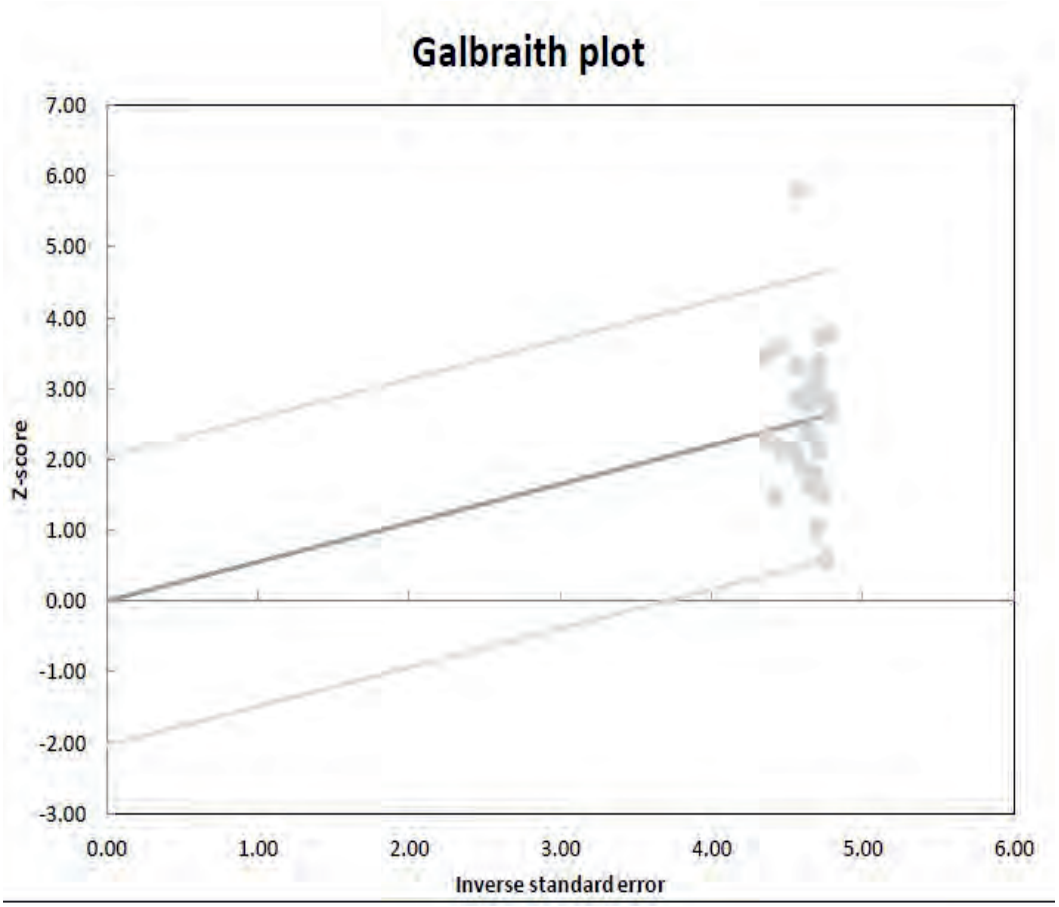


Table 5. ***Intercept and Slope of the Bivariate Relationship Between PEOU & BI***

Regression Estimate				
	Estimate	**SE**	**CI LL**	**CI UL**
Intercept	0			
Slope	0.55	0.04	0.47	0.63

Figure 5. ***Bivariate Relationship of Facilitating Conditions to Behavioral Intention***

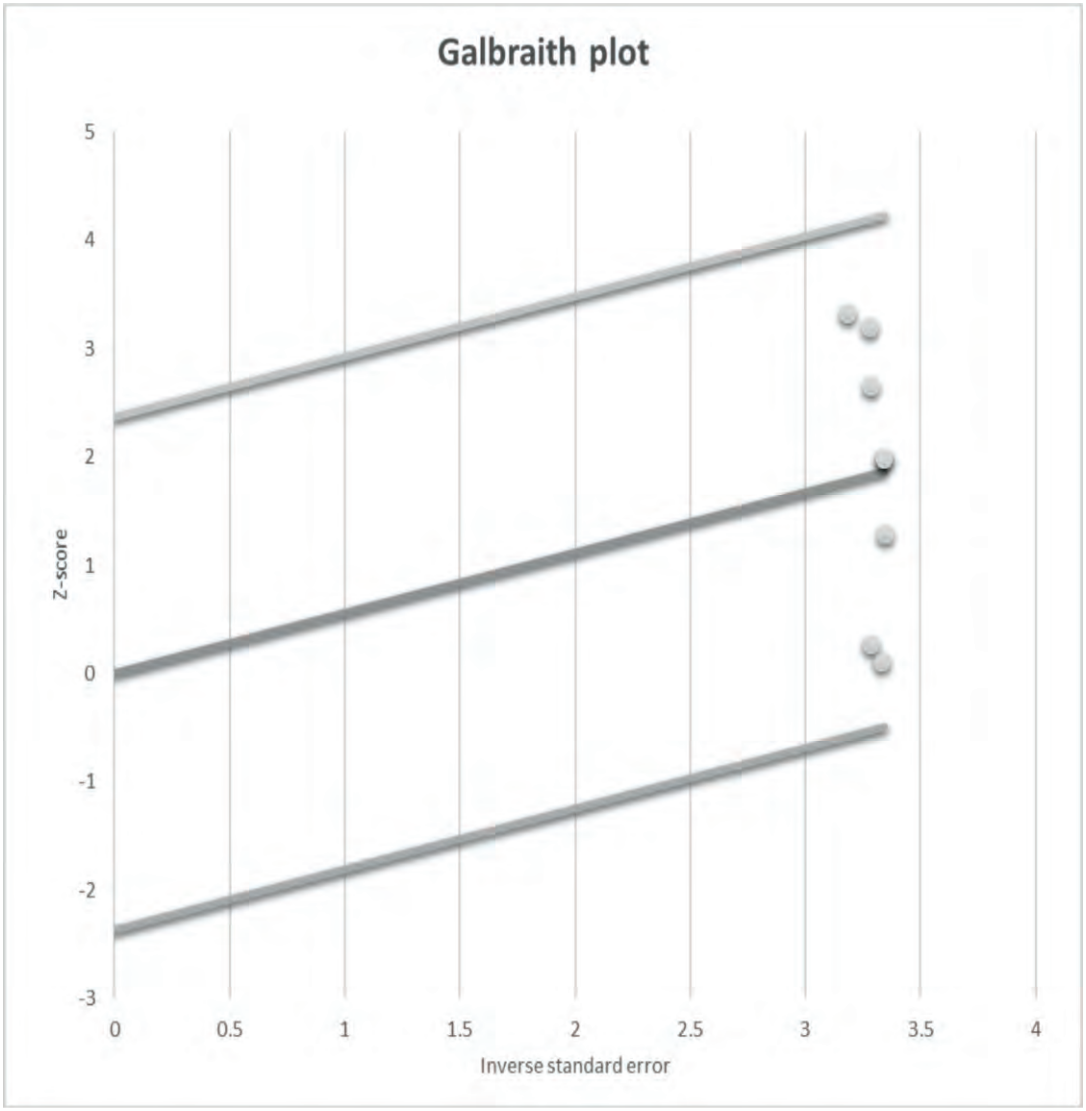


Table 6. ***Intercept and Slope of the Bivariate Relationship Between FC & BI***

Regression Estimate				
	Estimate	**SE**	**CI LL**	**CI UL**
Intercept	0			
Slope	0.56	0.13	0.24	0.87

Figure 6. ***Bivariate Relationship of Perceived Security (PSec) to Behavioral Intention (BI)***

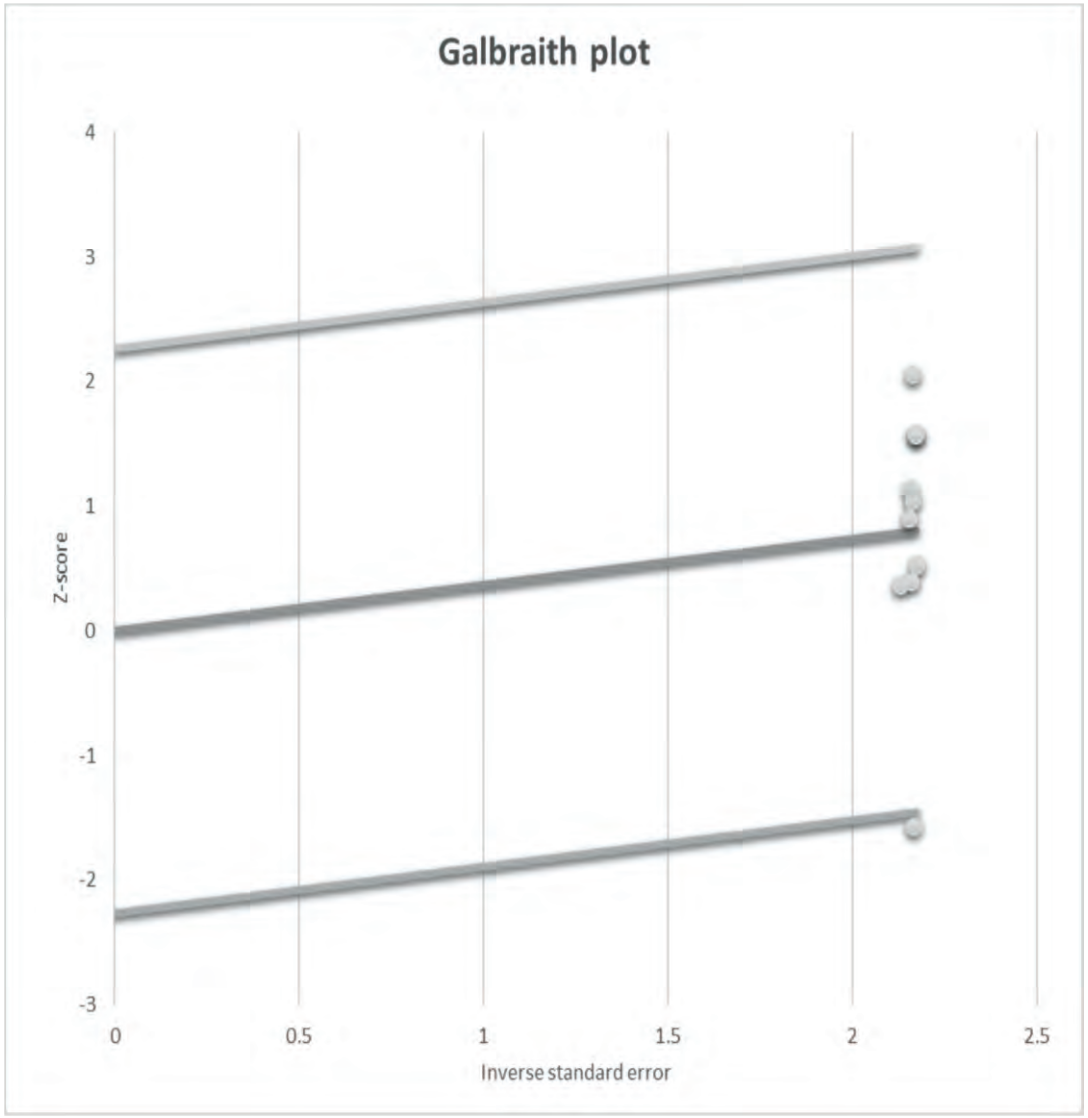


Table 7. ***Intercept and Slope of the Bivariate Relationship Between (PSec) & BI***

Regression Estimate				
	Estimate	**SE**	**CI LL**	**CI UL**
Intercept	0			
Slope	0.37	0.15	0.04	0.70

Figure 7. ***Bivariate Relationship of Cost to Behavioral Intention (BI)***

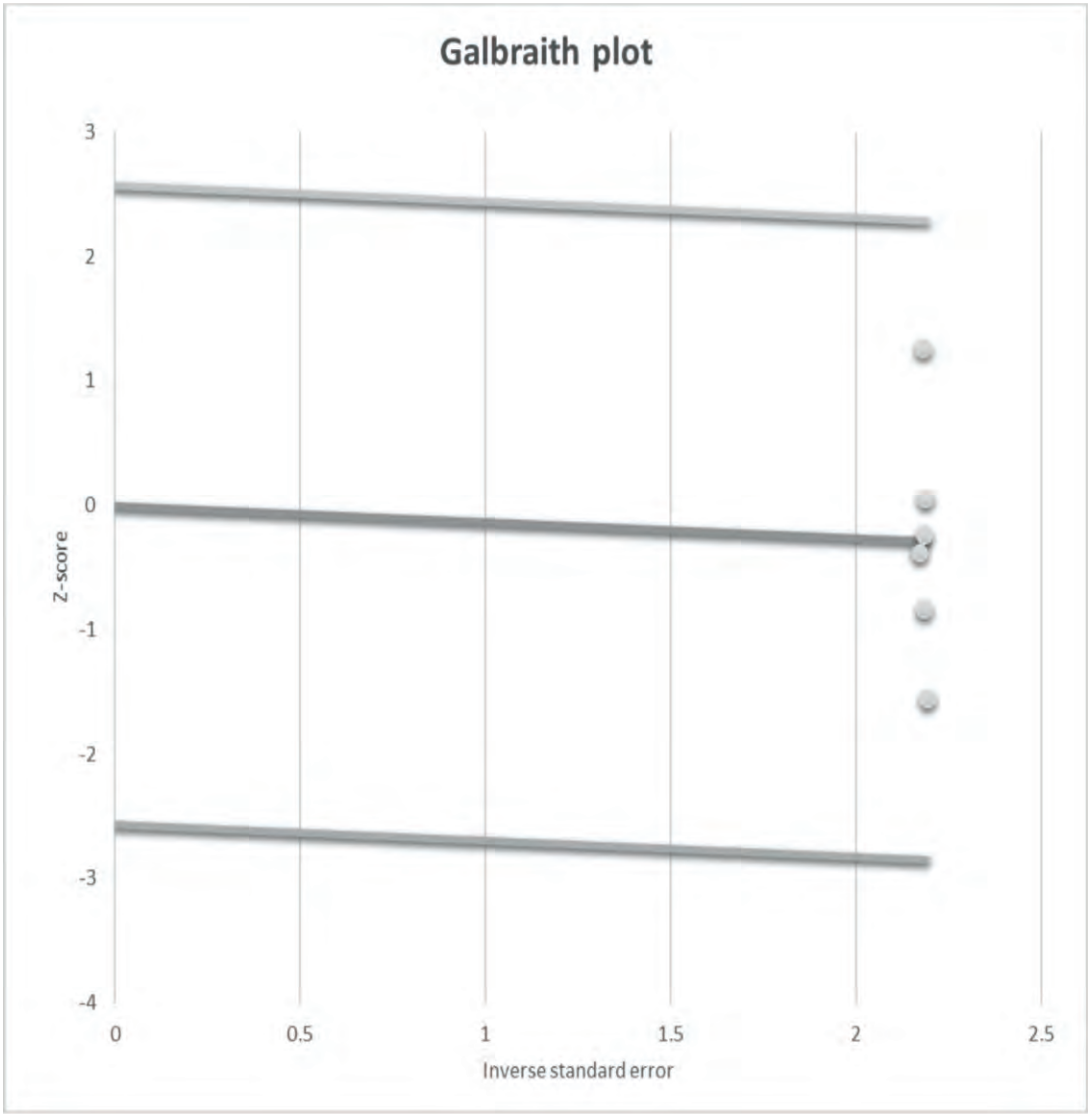


Table 8. ***Intercept and Slope of the Bivariate Relationship Between Cost & BI***

Regression Estimate				
	Estimate	**SE**	**CI LL**	**CI UL**
Intercept	0			
Slope	–0.13	0.18	–0.58	0.32

Figure 8. ***Bivariate Relationship of Self-Efficacy (SE) to Behavioral Intention (BI)***

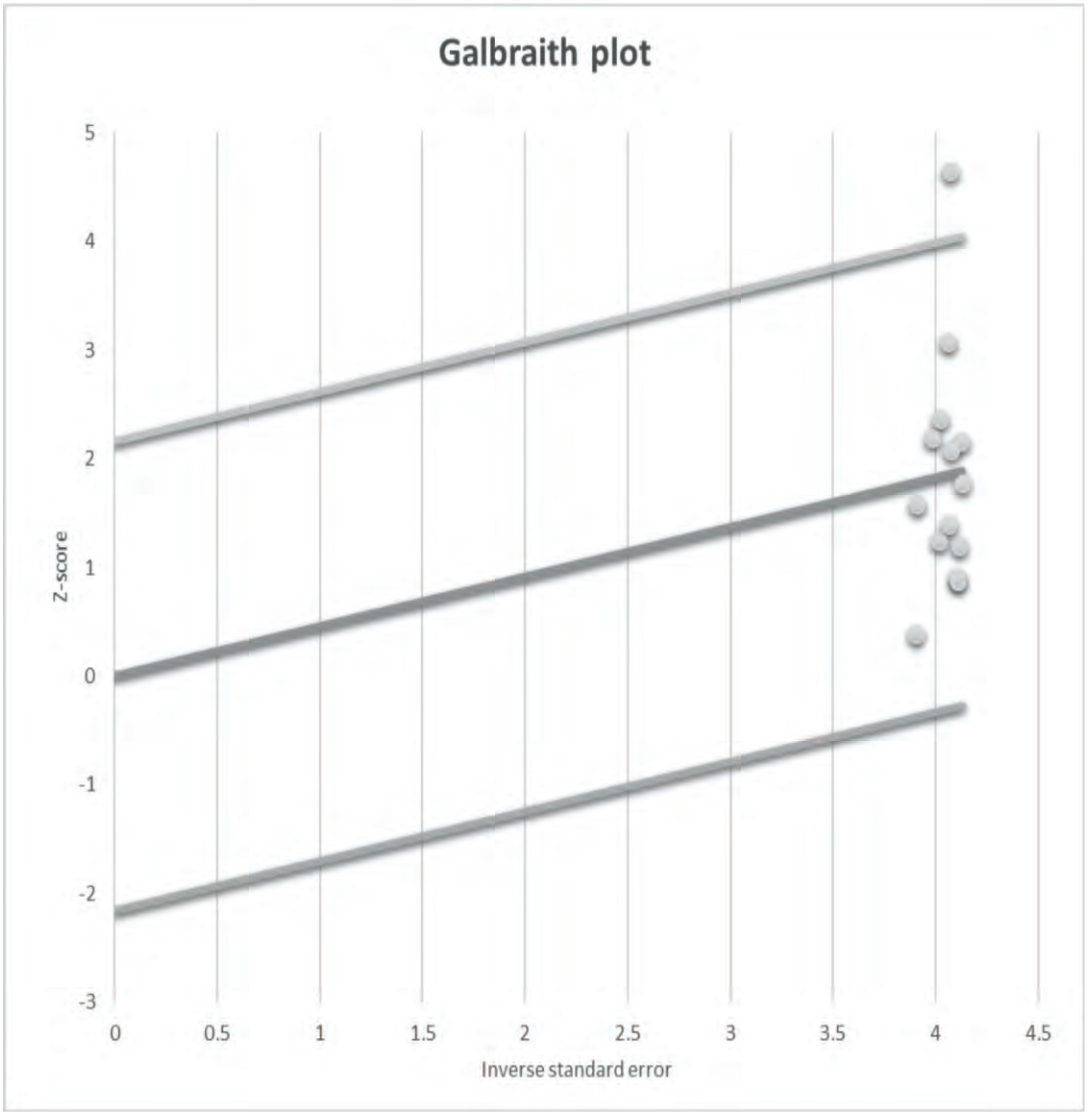


Table 9. ***Intercept and Slope of the Bivariate Relationship Between SE & BI***

Regression Estimate				
	Estimate	**SE**	**CI LL**	**CI UL**
Intercept	0			
Slope	0.46	0.07	0.31	0.61

Figure 9. ***Bivariate Relationship of Innovativeness (Innov) to Behavioral Intention (BI)***

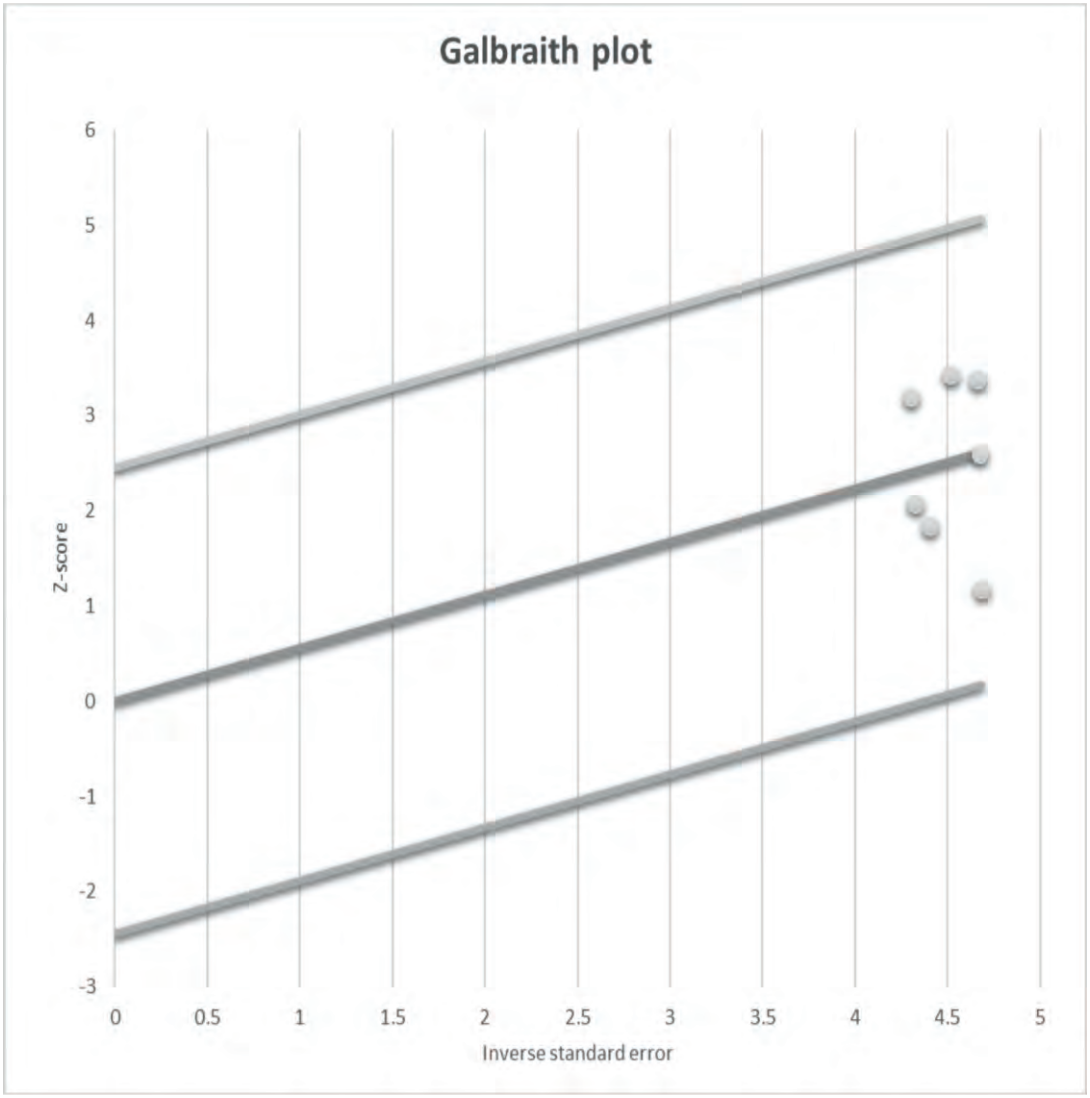


Table 10. ***Intercept and Slope of the Bivariate Relationship Between Innovativeness & BI***

Regression Estimate				
	Estimate	**SE**	**CI LL**	**CI UL**
Intercept	0			
Slope	0.56	0.07	0.38	0.74

The Effect Size

The effect size measures the magnitude of the relationship between two variables (Borenstein et al., 2007). Two types of effect sizes exist; namely, the fixed effect and random effect size. The fixed effect assumes that only a single effect exists across populations from which samples are drawn; whereas, the random effects signify varying effects across populations through which samples are drawn. The forest plot is an important way of analyzing the effect sizes of a particular bivariate relationship being studied. The effect size can be categorized into strong (0.5), moderate (0.3), or weak (0.1) based on its magnitude (Dodhia, 2005). In the case of a 95% confidence interval, if the *p*-value is less than 0.05, it clearly illustrates that the bivariate relationship being studied is statistically significant and strong.

For the bivariate relationship PU to BI, the *p*-value is less than 0.05, which signifies that PU positively influences BI. For the second relationship PEOU to BI, the *p*-value is again less than 0.05, signaling the positive impact of PEOU on BI. For the third relationship FC to BI, the *p*-value is again less than 0.05, indicating that FC positively influences BI. For the fourth relationship of perceived security to BI, the *p*-value is less than 0.05, implying that perceived security positively impacts BI. For the sixth relationship SE to BI, the *p*-value is less than 0.05, indicating that self-efficacy positively impacts BI. For the seventh relationship, innovation to BI, the *p*-value is less than 0.05, representing a positive impact of innovation on BI (Table 11). For the fifth relationship of cost to BI, the *p*-value is more than 0.05, implying that cost negatively impacts BI (Table 11).

From the above, the following inferences regarding our hypotheses can be drawn:

- **H1 :** PU is positively related to BI to adopt digital banking (True).
- **H2 :** PEOU is positively related to BI to adopt digital banking (True).
- **H3 :** FCs are positively related to BI to adopt mobile banking (True).
- **H4 :** Perceived security is positively related to BI to adopt digital banking (True).
- **H5 :** Perceived cost is negatively related to BI to adopt digital banking (True).

Table 11. *The Effect Size*

Covariates	Combined Effect Size										Heterogeneity				
	Corr	CILL	CIUL	PILL	PIUL	*Z*-value	One-tailed *p*-value	Two-tailed *p*-value	Number of Incl. Subjects	Number of Incl. Studies	*Q*	*pQ*	I^2	T2 (z)	T *(z)*
PU to BI	0.59	0.54	0.64	0.14	0.84	16.43	0.000	0.000	13490	39	930.25	0.000	95.92%	0.07	0.26
PEOU to BI	0.50	0.44	0.56	0.12	0.75	14.35	0.000	0.000	11624	33	502.49	0.000	93.63%	0.04	0.21
FC to BI	0.51	0.24	0.70	–0.21	0.87	4.19	0.000	0.000	3717	8	276.13	0.000	97.46%	0.09	0.30
Psec to BI	0.36	0.04	0.61	–0.62	0.90	2.54	0.006	0.011	4130	10	753.12	0.000	98.80%	0.21	0.46
Cost to BI	–0.13	–0.52	0.31	–0.88	0.81	–0.73	0.232	0.463	2699	6	448.46	0.000	98.89%	0.21	0.46
SE to BI	0.43	0.30	0.54	–0.08	0.76	6.50	0.000	0.000	5949	14	320.59	0.000	95.94%	0.06	0.24
Inn to BI	0.51	0.36	0.63	0.02	0.80	7.61	0.000	0.000	1981	7	74.48	0.000	91.94%	0.04	0.21

Note. *PU* : Perceived use ; *PEOU* : Perceived ease of use ; *FC* : Facilitating conditions ; *Psec* : Perceived security ; *SE* : Self-efficacy ; *Inn* : Innovation ; *Corr* : Correlation ; *CILL* : Confidence interval lower limit ; *CIUL* : Confidence interval upper limit ; *PILL* : Prediction interval lower limit ; *PIUL* : Prediction interval upper limit.

- **H6 :** Self-efficacy is positively related to BI to adopt digital banking (True).
- **H7 :** Innovativeness is positively related to BI to adopt digital banking (True).

A population is said to be homogeneous if it has a similar and uniform structure throughout all aspects of nature, caste, color, race, religion, beliefs, religious sentiments, height, location, temperature, disease, and immunity. Heterogeneity refers to a sample that is non-uniform in the above aspects. If the I^2 value of a sample is more than 75%, it reflects the heterogeneity in the same. In all the seven bivariate relationships, the value of I^2 is more than 75%, which depicts that heterogeneity is present across the samples. To identify the reasons for heterogeneity, we performed a subgroup analysis to identify the factors related to heterogeneity.

Subgroup Analysis

After a detailed study of all the shortlisted studies, we identified the location as the main factor contributing to heterogeneity. The studies have been divided into two major subgroups: Asia and Australia (AA) and Europe and Africa (EA). Borenstein et al. (2007) clearly stated that in the subgroup analysis, the measure of heterogeneity has to be I^2 (Table 12).

Table 12. ***The Sub-Group Analysis***

Bivariate Relationship	Sub Groups	I^2 (Heterogeneity)	Weights of Subgroups as Per Analysis	Number of Studies
PU to *BI*	AA	0.95	0.75	39
	EA	0.97	0.25	
	CES	0.96		
PEOU to *BI*	AA	0.93	0.74	33
	EA	0.94	0.26	
	CES	0.94		
Facilitating Conditions to *BI*	AA	0.88	0.63	8
	EA	0.98	0.37	
	CES	0.97		
Perceived Security to *BI*	AA	0.99		10
	EA			
	CES	0.99		
Cost to *BI*	AA	0.99		6
	EA			
	CES	0.99		
Self-efficacy to *BI*	AA	0.97	0.41	14
	EA	0.89	0.59	
	CES	0.96		
Innovativeness to *BI*	AA	0.73	0.52	7
	EA	0.92	0.48	
	CES	0.92		

Note. AA – Asia & Australia, EA – Europe & Africa, CES – Combined Effect Size

In the bivariate relationship PU to BI, the I^2 value of CES is 0.96, and the two subgroups are (AA: 0.95, EA: 0.97), strongly indicating that heterogeneity can be attributed to location as a subgroup. In the second relationship, PEOU to BI, the I^2 value of CES is 0.94, and the two subgroups are (AA: 0.93, EA: 0.94), indicating that peculiarity is because of location as a subgroup. In the third bivariate relationship, FC to BI, the I^2 value of CES is 0.97 and that of the subgroups (AA: 0.88, EA: 0.98), signaling that heterogeneity is because of location as a subgroup, and there is more heterogeneity in EA than AA. In the fourth bivariate relationship, perceived security to BI, the I^2 value of CES is 0.99, and the subgroup is (AA: 0.99), strongly indicating that location is an important characteristic of heterogeneity. In the fifth bivariate relationship, cost to BI, the I^2 value of CES is 0.99, and the subgroup is (AA: 0.99), signaling that location is an important facet of heterogeneity. In the sixth relationship, self-efficacy to BI, the I^2 value of CES is 0.96, and the subgroups are (AA: 0.97, EA: 0.89), clearly indicating that location symbolizes heterogeneity; moreover, there is more heterogeneity in AA compared to EA. In the seventh bivariate relationship, innovativeness to BI, the I^2 value of CES is 0.92, and the subgroups are (AA: 0.73, EA: 0.92), clearly indicating the presence of heterogeneity because of location (Table 12).

The subgroup analysis highlights that, universally, location is a crucial parameter to be considered in digital banking adoption and one that clearly explains the heterogeneity in the sample studies.

Discussion

The present study of the shortlisted 43 papers raises some interesting points and valuable insights. The first hypothesis that PU positively influences the BI to adopt digital banking is supported as is reflected by previous studies (Chawla & Joshi, 2019). PU reflects how the statement that usefulness will increase by adopting new technology is true in the case of digital banking, as new digital channels are governed by their usefulness to end-users. The second hypothesis that PEOU positively influences the BI to adopt digital banking also holds universally, as is indicated by previous studies (Thakur & Srivastava, 2014).

PEOU, in the case of digital banking, reflects that the less the effort required for customers to adopt new digital channels, the higher the adoption rate. The findings further indicate that the third hypothesis, that FCs positively influence the BI to adopt digital banking, also holds in a global context, as has also been established by previous studies (Makanyeza, 2017). In the case of digital banking, FCs play a pivotal role for new digital channels to be successful; for example, in mobile banking, internet connectivity plays a prominent role, and in telephone banking, the courtesy level of the employees is crucial in customers adopting the channel. The fourth hypothesis, that perceived security positively influences the BI to adopt digital banking, also universally holds according to our findings, as has also been indicated by previous studies (Singh & Srivastava, 2018). In the case of digital banking channels such as online banking, mobile banking, and telephone banking, the security aspect is vital: the higher the perceived security, the higher the adoption. The fifth hypothesis, that cost is negatively related to the BI to adopt digital banking, is also globally true, as has been found by previous researchers such as Cooke et al. (2016). Cost plays an important role in digital banking channel adoption: the lower the perceived cost, the higher the adoption rate. The contention that the sixth bivariate relationship, self-efficacy to BI, positively influences digital banking adoption is a universal truth, as reflected in sample studies (Glavee-Geo et al., 2017). The high rate of self-efficacy of an individual is directly related to digital banking adoption. The seventh hypothesis, that innovativeness positively affects the behavioral intention to adopt digital banking, also holds in the international arena and is also reflected in shortlisted studies (Gbongli et al., 2019). Innovativeness is a strong predictor of digital banking adoption, as the higher the innovation in terms of mobile, online, and telephone banking, the greater the adoption rate.

Managerial and Theoretical Implications

The present study presents some strong managerial implications as it brings together the factors affecting digital banking adoption in a global context. It also reflects the important point that location is a very effective explanation of heterogeneity across geographies, indicating that in terms of international financial services, strategists must consider location while framing global policies. In certain European countries, such as Spain and Italy, digital banking penetration has been significantly low ; whereas, the adoption rate of digital banking has been considerably high in Asian countries such as India and China. Banking in the coming decade has to change, and the brick-and-mortar model is quickly giving way to the click and portal model.

The present research is very beneficial in present-day digital & payments banking, as it helps management leaders in making informed decisions about the adoption and usage of their online journey. The existing customers should be approached based on the customer engagement factors, as is explained in the above research, and new customers should be approached based on location and other geographical factors. The location has raised a critical point for future-ready fin-tech companies to "think local and act global" to succeed in today's arena. The meta-analysis technique is very vital for today's managers as it brings about local insights contributing to heterogeneity which can be coupled with other global factors for being successful in today's universe. The meta-analysis technique followed in the research paper is a big value addition theoretically as researchers can ascertain the cumulative results of the most prominent bivariate relationships affecting digital banking adoption globally and the reasons for heterogeneity. It is one of the foremost research papers extending the literature on digital banking by applying the fundamentals of meta-analysis in a universal scenario. The shortlisted research papers have primarily used the TAM model, and the scale used in the papers for the most important constructs of PU, PEOU, and behavioral intention to use are from Davis (1989). Although meta-analysis uses secondary data from the shortlisted research papers, the research papers have used the Likert scale for their primary research. The existing researchers can further work on exploring other factors contributing to diverseness, such as race, caste, religion, education, and other moderating variables. The existing research papers focus only on questionnaire-led research papers for a particular geography, and the meta-analysis technique helps them to synthesize results in a global arena.

Conclusion

The present study focused on seven variables affecting digital banking adoption in an international context. The findings indicate that the variables PU, PEOU, FCs, perceived security, self-efficacy, and innovation positively affect the BI to adopt digital banking; the only cost is negatively associated with the BI to adopt digital banking. In a global scenario, costs must be kept low for digital channels to facilitate their mass adoption. Another sub-variable affecting mobile banking adoption is location; this is the main reason for the heterogeneity in studies in the global context. From a strategic perspective, this reflects an important point for companies to consider before launching their digital products and channels.

Limitations of the Study and Scope for Future Research

The present research has focused upon variables such as PU, PEOU, FCs, perceived security, cost, self-efficacy, and innovation in studying the factors impacting the BI to adopt digital banking, with location effectively explaining the reason for heterogeneity across studies. Future studies should focus on more discrete variables such as religion, caste, race, color, and gender for a more comprehensive understanding of the specific factors in digital banking adoption, both locally and globally. In the present study, we downloaded papers from the most popular

databases such as Scopus, EBSCO, Emerald, and Wiley, and there is a possibility that we might have missed some papers on behavioral intention to adopt digital banking channels from other prominent databases. Another important limitation of the present study is that we focused on only quantitative studies; qualitative studies have not been accounted for as the focus of the work has been on meta-analysis. Future research projects should focus upon additional sub-factors of location such as age, educational qualification, income, religion, profession, and other variables. Future research projects should also focus on moderating variables with millennials' focus affecting the intention to adopt digital banking.

Authors' Contribution

Suneet Sharma is the primary author and is responsible for writing the research paper. Dr. Ritu Sharma helped in the shortlisting of the research papers. Dr. Ghadeer Kayal helped in the editing of the research paper. Dr. Kaur contributed immensely in developing the concept of meta-analysis.

Conflict of Interest

The authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

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