ORIGINAL RESEARCH PAPER

Vol. XIII, No. II; September 2020 - February, 2021 Print ISSN: 0975-024X; Online ISSN: 2456-1371

Consumer Adoption in Technological Context: Conceptualization, Scale Development& Validation

Palima Pandey[1], Alok Kumar Rai[2]
[1]Research Scholar, Institute of Management Studies, Banaras Hindu University, Varanasi
[2]Professor, Institute of Management Studies, Banaras Hindu University, Varanasi

Abstract

Consumer adoption' is a rich concept, which is far beyond merely purchase of a product. Literature presents different psychological as well as behavioural components of adoption however, there have been found a lack of integration between them and consensus is yet to emerge regarding the concrete blend of its constituents. The study dealt with the conceptualisation of the term 'consumer adoption' in technological context. The construct was operationalized and consequently, an empirically tested comprehensive scale of 'technology adoption' was developed. The initial phase of the scale development process comprised of item generation, refinement, pre-testing and exploratory factor analysis while the advanced stage incorporated confirmatory factor analysis. The scale was validated on the basis of systematic authentication of measurement and structural model. The study resulted into construction of a nine-item scale of 'technology adoption' comprising three factors namely 'acceptance', full-scale usage' and embracement'. Further, the resultant factors served the basis for development of an 'operational definition' of adoption.

Keywords: Consumer Adoption; Technology Adoption Scale; Conceptualization, Operationalization

Introduction

The concept of 'consumer adoption' became popular as E. Rogers reviewed it for new products in the background of a social system (Rogers, 1962).In 'diffusion of innovation' literature, 'Consumer Adoption' is one of the oldest and important concepts (Eveland 1979). Recent years have witnessed an upsurge in the level and intensity of competition in the major industries. In response to excessive competition, companies are coming up with different innovations. But mere launching of innovations does not guarantee its adoption by consumers. Major firms such as Saas and Cloud Companies, Santarosa Consulting, Totango Spark, Walk Meetc. confirmed that 'Consumer Adoption' is crucial in maintaining the growth phase of business. World Bank (2018) and McKinsey Global Institute (2019) have generated reports on adoption with an objective to assess the success rate of digitalisation in India.

Corresponding Author: Palima Pandey, Research Scholar, Institute of Management Studies, Banaras Hindu University, Varanasi,
E-mail : palimapandey@gmail.com
How to cite this article: Pandey, P., & Rai, A.K. (2020). Consumer Adoption in Technological Context:Conceptualization, Scale Development & Validation. Purushartha, 13(2) 30-43
Source of support: Nil
Conflict of interest: None

'Consumer Adoption' in the technological context has been expressed by different researchers in the purview of different perceptual background. Different studies have been found in the literature related to 'factors affecting technology adoption' with respect to different technologies such as RFID, Internet Banking, Mobile Banking, Broadband etc., however, lack of concreteness with respect to the constituents of 'adoption' has led to the emergence of conceptual dilemma proving hindrance in the formation of operational definition of the term which is essential for scale development. Several elements have been reflected in the literature forming the essential constituents of the construct

but at the same time, these elements are lacking relational integrity and it is difficult to fit them in a single frame. In the light of conceptualization and operationalization of the concept, the present study focussed on developing scale of consumer adoption in technological context.

Review of Literature

Miller (2018) stated that, the process of 'Scale Development' begins with thematic analysis of literature and conceptualization of the construct in the form of its conceptual labels, definitions and generation of dimensions. The concept of 'adoption' in technological context evolved with Rogers' (1962) 'innovation adoption model' comprising five steps- "awareness-interest-evaluation-trial-adoption". The major question existed about the constituents of 'adoption'.

Conceptualization of 'consumer adoption' in technological context

Rogers (1962) then defined 'adoption' as the decision towards continuous full-scale use of an innovation. As clarified by Mohamed I. Nabih et al (1997), Rogers' (1962) definition specifies the 'intention' towards continuous and full-scale use of an innovation.'Intention' is an important indicator which confirms that a'decision' has been taken. Z. Deng et al (2010)defined adoption as "An individual consumer's propensity to accept new technologies and use them in a way that they will find useful".

However, Bhattacharjee (2001) introduces IS Continuance Model of Post-Adoption on the pillars of 'expectation-confirmation' theory. As depicted in the 'IS continuance model', 'continuance Intention for use' takes place after adoption. K. Jamalet. al (2014) stated that, an individual's decision to comply with the 'change' is the most complex behaviour and its implementation involves two phases of decision making; 'adoption decision' and 'continuity of innovation', thus segregating the two concepts. Bhattacharjee and Lin (2015) distinguished between 'adoption intention' and 'continuous usage intention' and signified the later as an important constituent of retention in the post-adoption period.

Warkentin et al. (2002) described technology adoption as,"the intention of consumers to get engaged with particular innovation". Gilbert & Balestrini (2004) Considered 'Willingness to use' as one of the constituent of adoption. Carter & Belangar (2005) confirmed 'intention to use' as an essential constituent of adoption.

Klongan and Coward (1970) defined technology adoption as 'incorporation of the innovation into the behaviour pattern'. Here, the definition of adoption gained some conative perspective. If an individual adopts an innovation, it becomes visible from his/her behaviour. Then, Robertson (1991) defined adoption as 'the acceptance and the continued use'. He further stated that, mere purchase can't be treated as adoption'. Wilkening (1953) primarily used the concept of 'acceptance'. However, his definition of acceptance was comprised of both 'approval' as well as'adoption'. Bohlen (1964) segregated the two concepts on the basis of time lag which takes place between acceptance (which is psychological in nature) and adoption (which is a blend of psychological and behavioural confirmation)

Renaud and Biljon (2008) confirmed 'Technology adoption' as a process consisting of 'awareness', 'full use' and 'embracement' of a technology by its user. He explained that, any user who embraces a technology will replace it if it breaks, will always try to use it in innovative ways, and will not able to carry his routine work without it. Renaud and Biljon (2008) further concluded that, 'adoption' can't occur without 'acceptance'. Mere purchasing of a product doesn't mean 'acceptance' and thus, it can't be treated as 'adoption'. 'Acceptance' occurs when the

user of a technology holds a favourable attitude towards it considering its usefulness. Thus, 'acceptance' is psychological in nature and it is a decision on account of which adoption takes place. Chidzambwa L (2018) of Taflaw Consulting Inc concluded that, 'acceptance' is the primary stage of using a technology. At this stage, the user acknowledges that,'the technology has some importance or it has certain role to play'. This is not the confirmation from the side of user that he/she is going to use that device. Adoption is the second stage where technology is actually applied by the user. Waqas Ahmad (2019) of University of Kuala Lumpur stated that, 'Acceptance' in a way is 'partial embracement' of the new technology. In the next phase, when 'retention' of using the technology (already accepted), occurs, it is called 'adoption'.

According to Vannoy, S. A., & Palvia, P. (2010) Technology Adoption incorporated two essential elements: 'Embracement' and 'Embedment'. 'Embracement' is assessed by evaluating the value assigned to a particular technology by an individual, the empowerment experienced and the degree of positive expectations associated by him with the technology. 'Embedment' is assessed by evaluating the extent(at par or at a greater level) of utilization of technology by others in the society, the strength of communication between technology provider's promise and recipients' understanding and the degree to which the user assume or accept the technology as an important requisite.

Richard et al (2007) conducted their study on 'CRM Technology Adoption' and concluded that, the construct – 'adoption' consists of 'user acceptance', 'functionality' and 'integration' within the firm. Acceptance deals with the regular use of the technology as part of the habit emerged through job requirements in order to achieve desired results (Kim et al., 2004).

Hall and Khan (2002) defined 'Adoption' as, 'the decision or choice to acquire and utilize an innovation'. Talukder M (2012) conducted his study on 'internet banking adoption in Hongkong' and considered 'usage' as an essential constituent of adoption. Schiffman and Kanuk (2007) stated that, 'adoption means using the product on a full scale, rather than on a limited or trial basis. The 'usage' should be incorporated on a complete basis. Here, the length (continued use) and breadth (full-feature use) of usage started gaining importance with respect to adoption constituents. Susan A. Brown et al (2014) confirmed 'use' as necessary element of adoption.

Kartiwi et al (2013) stated that, when 'intention to adopt' gets combined with 'Purchase and usage', it is termed as adoption. Hassan S and Awan A G (2017) indicated 'Usage' as an essential constituent of consumer adoption Antil J (1998) stated that, 'direct product experience' and 'product evaluation' takes place between trial and adoption. Gao et al (2008) stated that, customers' behaviour may change not immediately after the start of usage or initial usage. The effect of adoption evolves during several months after start of its usage. Few researchers explained 'technology adoption' by investigating the 'acceptance of technology' by its users (Venkatesh and Bala 2012; Zhu and Kraemer 2005; Zhu et al. 2003).

Original UTAUT 1 Theory is one of the well-known models of 'consumer adoption' in the existing literature. It contains 'factors' affecting adoption and the ultimate outcome is 'adoption intention' and 'usage' thus confirming them as constituents of adoption.

Even though 'Technology Acceptance Model' as well as 'Diffusion of Innovation Model' indicated that, 'Usage' was the major outcome of adoption process, while, the later focussed on different types of usage such as 'initial usage' and 'continuous usage' (Rogers 1983).

Research Methodology

Research Design

Research design is exploratory cum descriptive in nature. With the advancement in Information and Communication technologies, Indian banking sector is proceeding towards digitalization; however, the goal may not be achieved if consumer adoption of e- banking services does not take place with the same pace. In the present study, internet-banking customers were selected for the construction and validation of technology adoption scale. Those banks were selected which have been forerunners in harnessing information and communication technology as evidenced by 'Institute for Development and Research in Banking Technology' (IDRBT) and 'Indian Banks Association' (IBA). Accordingly 2 public sector banks ('State Bank of India' and 'Bank of Baroda') and 3 private sector banks('ICICI bank', 'HDFC bank' and 'Axis bank') were selected.

Research Sample

Judgemental Sampling was used in selection of the respondents. Respondents consisted of banks customers of the select banks who use internet banking for at least 6 months. Geographical area covered were selected cities of NCR region such as New Delhi, Gurgaon, Noida and Ghaziabad. Altogether 250 questionnaires were distributed, out of which 230 were returned. Out of those 230 questionnaires, 206 were found to be completely filled and hence were used as sample. About 59.70% of the respondents were male. 38.83 % respondents belong to age group of 21 to 30 years, 24.27 % were in the age group of 31 to 40 years, 21.35 % belong to age group of 40 to 50 years and 15.53 % fall in the age group of 50 to 60 years. A '5-Point Likert Scale' was used. Data analysis was performed using 'statistical package for social sciences' (SPSS) version 20 and 'Analysis of Moment Structures' (AMOS) version 21.

Scale Development and Validation

In this study, the process of 'scale development and validation' has been carried in two-steps:

1. Item Generation', 'Pre-Testing'and 'Refinement'

2. Development' and 'Validation' of Scale (Scale purification through EFA and confirmation through CFA, Reliability and Validity)

Item Generation and Refinement

The systematic review of literature in the form of conceptualization of 'consumer adoption' in technological context helped in the generation of the constituents of the construct as presented in Table 1:

Table 1: Conceptualization of 'Consumer Adoption' in Technological Context

Adoption	Authors
Intention for Full-Scale Usage	Rogers (1962): Mohamed I. Nabih et al (1997)
Intention to get engaged	Warkentin ct al. (2002)
Willingness to Use	Gilbert & Balestrini (2004)
Intention to use	Carter & Belangar (2005)
Behavioural Intention	Kiran J. Patel. Hu'en J. Patel (2018)
Acceptance	Venkatesh and Bala (2012): Zhu and Kraemer (2005): Zhu et al. (2003)
Usage	Klongan and Coward (1970): Tan Margarat et al (2000): Talukder M (2012): Hassan S and Awan A G (2017): Susan A. Brown ct al (2014)
Acceptance, Usage, Significance	Z. Deng. V. Lu. and Z. Chen (2010)
Acceptance & Continued Use	Robertson (1991)
Awareness, Full Usage & Embracement	Karen Renaud et al (2008)
Application	Lawrence Chidzambwa (2018)
Continuous Usage	Waqas Ahmad (2019)
Functionality, Acceptance & Integration	Richard et al (2007)
Acquisition & Usage	Hall and Khan (2002)
Full Scale Usage	Schiffinan and Kanuk (2007): LorinHitt. Mci Xuc. and Pci-vu Chen (2011)
Intention, purchase and use	Kartiwi et al (2013)
Intention & Use	Jiang. P. (2009)
Usage & Experience of Value & ROI	Mia Jacobs (2019)
Confirmation (Experience vs Expectation)	Michael Htunbani (2018)
'Duration of use'. 'Extent of use' and 'Significance of use'	Mohanunad Quaddus (2012)
Awareness, Interest, Evaluation and Usage	Musiime and Malinga Ramadhan (2011)
Usage. Familiarity & Significance	Boshkoska Meri and Satiroski (2018)
Implementation & Utilization	Khairina Rosli et al (2013)
Embedment & Embracement	Vannoy. S. A.. & Palvia. P. (2010)

The constituents generated through review of literature were discussed with subject experts and bank executives. After a long discussion with respect to relevance and repetition of constituents, 8 of them were finalized namely 'Intention to use', 'Awareness', 'Acceptance', Acquisition', 'Full-Scale Usage', 'Confirmation', 'Familiarity' and Embracement) which were operationalized to form 26 items. However, as per David and Beardon (2004), 'the overall measure cannot be a valid operationalization of the construct of interest until face validity is evaluated'. Accordingly, Face Validity was evaluated for initial pool of items with the help of subject experts. Total 50 respondents were approached for pre-testing. Taking into consideration, the opinions of the respondents, the questionnaire witnessed some changes with respect to its sections and languages. Content validity was evaluated jointly by a bank practitioner and two subject experts. Based on the suggestion of faculty of 'consumer behaviour' and experts in the field of 'banking' and 'information & communication

technology', twelve items were removed on account of repetition. Further, as a result of pre-testing, three items were dropped due to their loading values lesser than the threshold value (Hair et al 2009). EFA was run again for the remaining 11 items which resulted in a drop of two more items. Finally, the resultant 9 items were used in 'principal component analysis' with 'varimax rotation method'.

Development and Validation of Scale

Exploratory Factor Analysis

'Exploratory Factor Analysis' (EFA) is appropriate at the initial stage of scale (Hurley et al., 1997). This study applied 'principal component analysis' using 'varimax rotation' for conducting EFA on 9 finalized 'technology adoption' items in order to extract desirable constituents or factors. A 'three-factor model' was obtained through EFA. The obtained factors were to serve as constituents of 'technology' adoption'. The factors combinely accounted for 88.098% of variance. 'Kaiser Meyer Oklin' (KMO) measure of sampling adequacy was used for verifying the appropriateness of the data for factor analysis. For authentic results of factor analysis, 'KMO' value should be greater than 0.600 (Tabachnick and Linda, 2012). Here, the 'KMO' value of 0.916 is above the threshold value, which indicated that the sample of the study is statistically significant. Further, 'Bartlett's test of sphericity' was also significant ($p<0.001$) (Field A 2013), which confirmed that the 'inter-correlation matrix' produced was an identity matrix.

'Rotated Component Matrix' provides the correlation value of the variables with each of the factors extracted by 'principal component analysis' method. In the present study, three constituents have been obtained.The operationalization of the constituents into measured variables as shown in Table 2 confirmed that each factor or constituent possesses three variables.

Table 2: Factor Extraction and Rotation: Principal Component Analysis with Varimax

	Component		
	1	**2**	**3**
I have the essentials (physical & informational] to execute Internet banking transactions.			.826
Internet banking play important role in carrying banking activities			.780
Using internet banking has become crucial to conduct banking activities smoothly.			.789
I use Internet banking most frequently than any other channel to conduct my banking transactions.	.805		
I use almost all the features of Internet banking services.	.821		
Using Internet banking for carrying out my banking activities is a routine matter for me	.777		
I find Internet banking is useful for carrying my banking activities		.809	
I believe Internet banking is an easy way to conduct my banking activities		.805	
My reference group prefer and value the use of internet banking		.792	

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 6 iterations.

The factor loadings of all the variables are above 0.5, establishing strong representation of each variable towards their specific factor (Truong & McColl, 2011). Consequently, the constituents have been named as: 'Acceptance', 'Full-Scale Usage' and 'Embracement'.

Nunnally (1994) reported that,'the threshold value of Cronbach's α must be at least 0.60 and is considered highly reliable beyond 0.70'. The present study used this technique for 'internal consistency' in determining the reliability of each factor associated to technology adoption. Here, a strong evidence for reliability was found as the chronbach's α value for all the three constructs were above 0.70 as shown in Table 3:

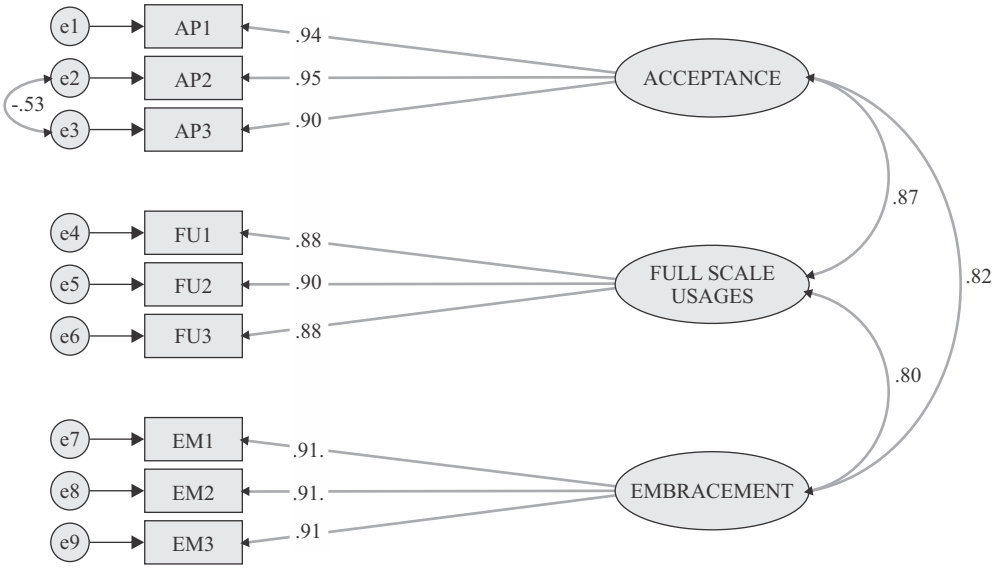
Table 3: Reliability Analysis: Cronbach's α

Construct	Chronbach's α
Acceptance	0.84
Full Scale Usage	0.85
Embracement	0.86

Confirmatory Factor Analysis

For the purpose of scale validation, 'Confirmatory Factor Analysis' was run using AMOS 21.0.0. 'Maximum likelihood' method of estimation was performed for the entire set of items obtained during EFA. The factor loadings of CFA for each construct have been shown in Figure 1. Both 'measurement' as well as 'structural' model was assessed during the process.

Figure 1: Confirmatory Factor Analysis: Factor loadings and Inter Construct Correlation



Measurement Model

The measurement model was assessed by evaluating 'Composite Reliability', 'Average Variance Extracted' and 'Construct Validity' of the constructs.

a) Composite Reliability and Average Variance Extracted

Composite Reliability is a more suitable indicator of reliability than Cronbach coefficient alpha (Lin & Lee, 2005; Raza et al 2016). Taking into

consideration the standard regression weights and Error variance values of the items, 'composite reliability' as well as 'average variance extracted' values were calculated for each construct as shown in Table 4:

Table 4: Composite Reliability; Average Variance Extracted

1	2	3	4	5	6	7	8	9	10	11	12
Items	Construct	SL	EV							CR	AVE
API	Acceptance	0.939	0.055 (el)	2.795	7.812	0.203	8.015	0.881	2.605	0.97	0.86
AP2		0.954	0.043 (e2)					0.910			
AP3		0.902	0.105 (e3)					0.813			
FU1	Full Scale Usage	0.882	0.139(e4)	2.667	7.112	0.423	7.535	0.777	2.371	0.94	0.79
FU2		0.902	0.127(e5)					0.813			
FU3		0.883	0.157(e6)					0.779			
EM1	Embracement	0.907	0.161(e7)	2.723	7.414	0.486	7.900	0.822	2.471	0.93	0.82
EM2		0.908	0.169(e8)					0.824			
EM3		0.908	0.156 (e9)					0.824			

*SL is Standardized Loadings; *EV is Error Variance; *CR is Composite Reliability; *AVE is Average Variance Extracted

As represented in Table 4, the 'standardized loadings' and 'error variance' of each item is displayed in column 3 and 4 respectively. To assess 'composite reliability' of the constructs, the standardized loadings of items of each factor were summed up (as represented in column 5) and then the square of the sum of standardized loadings of items of each factor were obtained (as presented in Column 6). Further, the error variances of items of each factor was summed up (as represented in column 7). Column 8 is the summation of column 6 and column 7. Column 9 is the square of standardized loadings of each item while Column 10 represents the sum of square of standardized loadings of items of each factor. By dividing the respective constructs' values of Column 6 by values of Column 8, we get Column 11 that indicates 'Composite Reliability' value of each construct.

Finally, by dividing the respective constructs' values of Column 10 by no. of items in that construct, we get Column 12 which indicates 'Average Variance Extracted' value of each construct.

'Composite reliability' and 'average variance extracted' of all the constructs pertaining to technology adoption have been found as greater than or equal to the standard limit of 0.7 of CR (Carmines & Zeller, 1988) and 0.5 of AVE (Fornell & Larcker, 1981). This proves the reliability of the constructs.

b) Construct Validity – It included 'Convergent' as well as 'Discriminant Validity'

i) Convergent Validity - For establishing convergent validity, the obtained value of composite reliability and average variance extracted (AVE) must be greater than 0.700 and 0.500 respectively in such a manner that CR values remain greater than AVE (Hancock and Mueller, 2001; Hair et al., 2010).

ii) Discriminant Validity - For establishing discriminant validity, both 'maximum shared variance' (MSV) and 'average shared variance' (ASV) must be lesser than that of obtained AVE values for each construct (Bagozzi et al., 1991; Hair et al., 2010). As shown in Table 5, based on inter-construct correlation formed by each factor, the

variance value for each of them were calculated as the figures represented under bracket. Accordingly, MSV for each factor were selected which is the 'greatest variance value' among the pairs made by that factor. Further, ASV value for each factor was calculated which is the sum of 'variance of each pair' made by that factor divided by 'no. of pairs' made by that factor.

Table 5: Maximum shared Variance; Average Shared Variance

	Acceptance	Full Scale Usages	Embracement	MSV	ASV
Acceptance		0.81(0.6561)	0.82 (0.6724)	0.67	0.66
Full Scale Usage	0.81(0.6561)		0,80(0,64)	0.65	0.64
Embracemen	0.82(0.6724)	0.80(0.64)		0.67	0.65

It is evident from Table 5 that, both MSV and ASV values are smaller than AVE values (as represented in Table 4) for all the three constructs, thus, strong evidence of discriminant validity has been found in the present case.

The next criterion for assessing discriminant validity is 'Fornell-Lacker' Criterion. The discriminant validity as per this criterion can be established if the 'Square root of AVE' of each factor will be found greater than the inter-construct correlations formed by that factor. Table 6 represents the square root of AVE for each construct.

Table 6: Square root of AVE or Discriminant Value

1	2	3	4
Items	**Construct**	**AVE**	**Sq. root of AVE**
AP1	Acceptance	0.86	0.93
AP2			
AP3			
FU1	Full Scale Usages	0.79	0.89
FU2			
FU3			
EM1	Embracement	0.82	0.91
EM2			
EM3			

As per the 'Fornell-Lacker' Criterion', the inter-construct correlation values formed by each construct were compared with the square root AVE value of that construct and consequently it was found greater in each case, thus, satisfying the condition for discriminant validity as represented in Table 7:

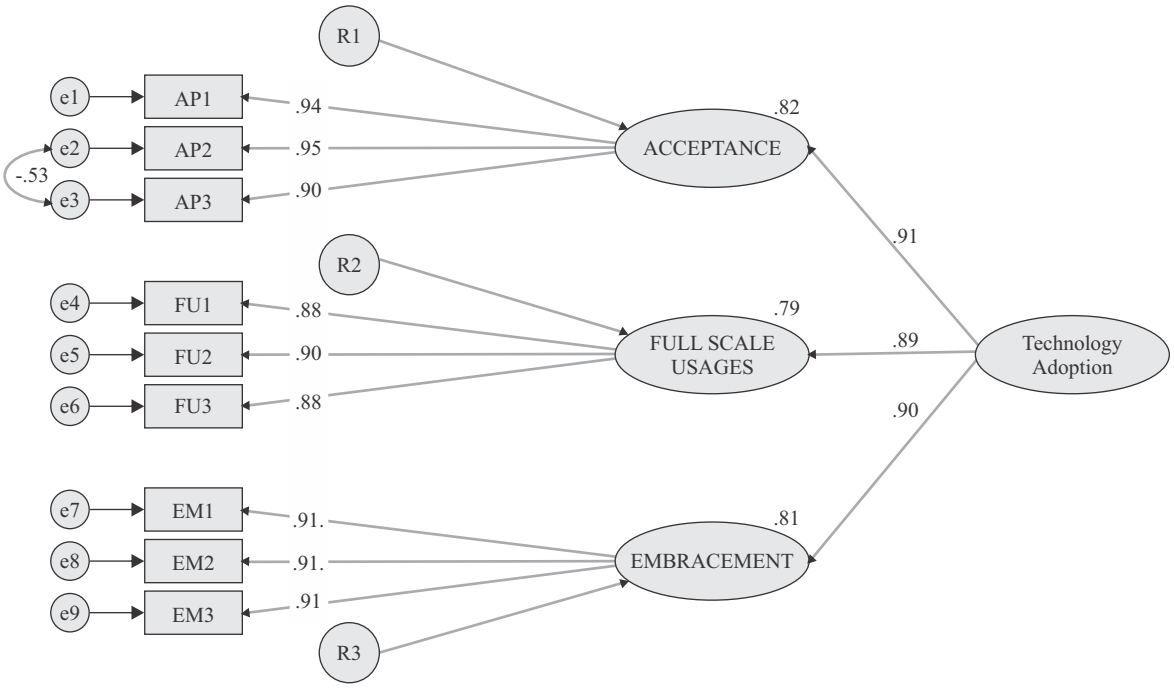
Table 7: Discriminant Validity Analysis

Constructs	Acceptance	Full Scale Usage	Embracement
Acceptance	0.93		
Full Scale Usage	0.81	0.89	
EmbRacement	0.82	0.80	0.91

Structural Model

The 'structural model' was evaluated by examining the fit-indices of the model.The output yielded a Chi-square value (χ^2) of 38.016 with 23 degrees of freedom. Chi-squared assesses the overall fit and discrepancy between the sample and fitted-covariance-matrices. The CMIN/DF ratio was 1.653, which is within the threshold limit value of less than 5, thus indicating an acceptable-fit between the hypothetized model and the sample data (Hair et al., 2009). Small values of CMIN/DF (which are lesser than 1.000) may result into an over-fitted model while extremely higher values(which are greater than 3.000)may produce an under-parameterized model. Model fit-indices (CFI, IFI,TLI, RFI and NFI) usually range from '0' resembling 'no-fit at all' to '1.0' indicating 'perfect-fit'. According to Hair et al (2010), 'an acceptable decision rule is to accept the fit as moderate for values above 0.80 and good for values above 0.90'. The incremental fit indices of the measurement model appeared as "Comparative Fit Index (CFI)= 0.992; Tucker–Lewis Index (TLI)= 0.988, Incremental Fit Index (IFI) = 0.992, Relative Fit Index (RFI)= 0.970 and Normed Fit Index (NFI)= 0.981", which indicates that the 'hypothesized model' represented an adequate-fit to the data. The value of 'root mean square error of approximation' (RMSEA) is 0.065, which represents a good model fit (Hair et al. 2010; Prakash et al. 2011).

Figure 2: Second-Order Confirmatory Factor Analysis



Second-order Confirmatory Factor Analysis

It was confirmed that, the construct 'consumer adoption' in technological context is represented by three constituents namely 'Acceptance', 'Full Scale Usage' and 'Embracement'. Consequently, 'second-order confimatory factor analysis' was applied. Figure 2 represented the construct of adoption with its measurable constituents.
The model was found good representing the same values for model fit indices as represented during confirmatory factor analysis (CMIN/DF = 1.653, CFI = 0.992, TLI = 0.988 ,IFI = 0.992, RFI = 0.970, NFI = 0.981 and RMSEA = 0.056).

Further, 'Composite Reliability' and 'Average Variance Extracted' values of 'Technology Adoption' (as a second-order construct) was calculated as shown in Table 8:

Table 8: Composite Reliability; Average Variance Extracted (Second-order Factor)

Technology Adoption (Second Order Factor Model)						
		SL	EV	Sq of SL	CR	AVE
AC	Acceptance	0.908	0.072 (R1)	0.824		
FSU	Full Scale Usage	0.891	0.101 (R2)	0.793	0.95	0.81
EMB	Embracement	0.902 Sum of SL=2.701 Sq of Sum of SL= 7.295	0.139 (R3) Sum of EV=0.312 Sum of EV+Sq of Sum of SL =7.295+0.312=7.607	0..813 Sum of Sq of SL= 2.43	CR= (7.295/7.607)	AVE= (2.43/3)

*SL is Standardized Loadings; *EV is Error Variance; *CR is Composite Reliability; *AVE is Average Variance Extracted

Composite Reliability of 'Technology Adoption' was found to be 0.95 which is greater than 0.70, thus satisfying the reliability condition. On the other hand, AVE value of the construct is greater than 0.50 and it is lesser than Composite Reliability, thus satisfying the condition of convergent validity (Hancock and Mueller, 2001; Hair et al., 2010).

Discussion

'Consumer adoption' is one of the essential concepts in consumer behaviour literature. It has been mentioned in the previous studies that, 'adoption' takes place subsequently after 'trial' and 'purchase'. As suggested by Robertson (1991), 'adoption can't be treated as merely 'purchase'. Likewise, several researchers presented different views and it was found that the concept was rich in nature and comprised a blend of constituents. A thorough analysis of literature suggested different combinations of constituents expressing the concept of adoption but the observed combinations were insufficient to derive the complete meaning of the term. The lack of concreteness in the conceptualization of the concept became evident when the combinations were compared with one another and no integration was found between them. Various indicators of consumer adoption reflected in the literature were: "intention to use/willing to use, purchase & use, usage, continued use, full scale use, product acquisition, acceptance, application, implementation, embedment, embracement, integration, familiarity, experience of value & ROI" etc. Some researchers indicated 'adoption' as something beyond 'intention to use' whereas others concluded that mere 'usage' does not comprise adoption. Subsequently, it was observed that, the literature lacked consensus regarding the concrete blend of its constituents and there was a need for the conceptualization of the term followed by the operationalization of its

constituents and development of a measurement scale.

Conclusion and Managerial Implication

The present study conceptualized 'consumer adoption' in technological context with the help of thematic review of literature. Based on in-depth conceptual and empirical evidence, a comprehensive scale of 'technology adoption' was developed with special reference to ICT technology in banking sector. The sample was collected from NCR region of India which serves as the heart of country in terms of economic growth and development. The measurement model confirmed the reliability and validity of the scale while the structural model assured the robustness of the scale. It was found that, nine variables under three derived constituents were representing different parts of 'technology adoption' thus, confirming their existence in the formation of the overall concept. The resultant constituents of adoption helped in the formation of the operational definition of the construct. As, an operational definition consists of complete specification regarding the selective inclusion of observables (variables) and their measurement process, it can be stated that, "Adoption comprises of acceptance, full-scale usage and embracement of a technology". It was found from the observed variables that, 'acceptance' signified psychological readiness to use the product or intention to use the product after acknowledging its role, 'full scale usage' comprised the length (continued use) and breadth (full-feature use) of usage while 'embracement' dealt with the value assigned, empowerment experienced and the expectations developed by the user from a particular technology. The 'adoption' scale developed in this study can be used by marketers in the field of ICT to access 'consumer adoption' for their particular technology. Further, they can use constituents of adoption as marketing stimuli by adjusting their service value in favour of consumers. This will help marketers in initializing as well as accelerating the pace of technology adoption among consumers.

References

Antil, J. (1998). New Product or Service Adoption: When does it happen?".*Journal of Consumer Marketing*, 5(2), 5-16.

Bagozzi, R.P., Yi, Y. and Phillips, L.W. (1991).Assessing construct validity in organizational research. *Administrative Science Quarterly*, 36(3), 421-458.

Bhattacharjee and Lin (2015).A unified model of IT continuance: three complementary perspectives and crossover effects. *European Journal of Information Systems*, 24 (4), 364-373.

Bhattacharjee, A. (2001). Understanding Information Systems Continuance: An Expectation-Confirmation Model. *MIS Quarterly*, 25, 351-370.

Bohlen, Joe M. (1964). The adoption and diffusion of ideas in agriculture. In James H. Copp (Ed.),*Our changing Rural Society: Perspectives and Trends*. Ames: Iowa State University Press.

BoshkoskaMeri and Satiroski (2018).An empirical study of customer usage and satisfaction with e-banking services in the Republic of Macedonia.*Croatian Review of Economic, Business and Social Statistics (*CREBSS), 4(1), 1-13.

Carmines, E. G., & Zeller, R. A. (1979).*Reliability and validity assessment (Vol. 17)*.SAGE Publications.

Carter, L. and Bélanger, F. (2005).The Utilization of E-Government Services: Citizen Trust, Innovation and Acceptance Factor. *Information Systems Journal*, 15, 5-25.

David M. Hardesty and William O. Bearden (2004).The use of expert judges in scale development: Implications for improving face validity of measures of unobservable constructs.*Journal of Business Research*, 57(2), 98-107.

Deng, Z., Lu, Y., Wei, K, K. & Zhang, J. (2010).Understanding Customers Satisfaction and Loyalty: An empirical study of mobile Instant messages in China.*International Journal of Information Management*, 30, 289-300.

Eveland, J. D. (1979). Issues in Using the Concept of Adoption of Innovations.*The Journal of Technology Transfer*, 4(1), 1-13.

Field, A. (2013). *Discovering statistics using IBM SPSS Statistics*.London: Sage Publications Ltd

Fornell, C., &Larcker, D. F. (1981).Evaluating structural equation models with unobservable variables and measurement error.*Journal of Marketing Research*, 18 (1), 39–50.

Gao, Shang &Krogstie, John &ther, Gransæ (2008). Mobile Services Acceptance Model.*Proceedings - 2008 International Conference on*

Convergence and Hybrid Information Technology (ICHIT), 446-453.

Gatignon, Huberg and Thomas S. Robertson (1991).Innovative Decision Processes.In *Handbook of Consumer Behavior*, eds. T.S. Robertson and H.H. Kassarjian.New Jersey: Prentice-Hall, 316-348.

Gilbert &Balestrini (2004).Barriers and Benefits in the Adoption of E-Government.*International Journal of Public Sector Management*, 17(4), 286-301

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., &Tatham, R. L. (2009).*Multivariate data analysis*.Pearson Education, Dorling Kindersley (India).

Hair, J., Black, W., Babin, B.Y.A., Anderson, R. and Tatham, R. (2010).*Multivariate Data Analysis: A Global Perspective*. Pearson Prentice Hall, New Jersey, NJ.

Hall B. H. And Khan B. (2002).Adoption of New Technology.*NBER Working Papers 9730*. National Bureau of Economic Research, Inc.

Hancock, G.R. and Mueller, R.O. (2001).Rethinking construct reliability within latent variable systems.In Cudeck, R., du Toit, S. and Sörbom, D. (Eds), *Structural Equation Modelling: Present and Future – A Festschrift in Honor of Karl Jöreskog*.SSI Scientific Software International Inc., Lincolnwood, IL, pp. 195-216.

Hassan, S., &Awan, A. G. (2017). Factors affecting internet banking usage: a case study of professional graduates of Pakistan. *Global Journal of Management, Social Sciences and Humanities*, 3(2), 126-153.

Hossain, Mohammad Alamgir and Quaddus, Mohammed (2012).Antecedents of Continuance Intention of RFID Technology in Western Australian Farms. In Janczewski, L. and Nguyen, T. D. (ed), *The 16th Pacific Asia Conference on Information Systems*, Vietnam: PACIS

Humbani, Michael (2018). Consumers' Adoption and Continuance Intention to Use Mobile Payment Services.*Ph.D. Thesis*, University of Pretoria

Hurley A. E., Scandura, T. A., Schriesheim, C. A., Brannick, M. T., Seers, A., Vanderberg, R. J., & Williams L. J. (1997). Exploratory and confirmatory factor analysis: Guidelines, issues, and alternatives. *Journal of Organizational Behavior*, 18, 667-683.

Jiang Pingjun (2009). Consumer Adoption of Mobile Internet Services: An Exploratory Study. *Journal of Promotion Management*, 15 (3), 418-454

K. Jamal, N.H. Kamarulzaman, A.M. Abdullah, M.M. Ismail, & M. Hashim (2014). Adoption of Fragrant Rice Farming: The Case of Paddy Farmers in the East Coast Malaysia. *UMK Procedia*, 1, 8-17.

Kartiwi, M., Rfieda, A., &. Gunawan, T.S.(2013). A Conceptual Framework for Assessing Electronic Banking Continued Use. *8th International Conference on Information Technology in Asia* (CITA), 1-7.

Kim, J. W., Choi, J., Qualls, W., & Park, J. (2004).The impact of CRM on firm – and relationship – level performance in distribution networks. *Communications of the Association for Information Systems*, 14, 632-652.

Klonglan, G. E., and Coward, E. W. (1970).The concept of symbolic adoption: A suggested interpretation. *Rural Sociology*, 35, 77-83.

Lin, H.-F., & Lee, G.-G.(2005). Impact of organizational learning and knowledge management factors on e-business adoption. *Management Decision*, 43 (2), 171–188.

McKinsey Global Institute (2019).*Digital India Report*. March.

Mei Xue, Lorin M. Hitt and Pei-yu Chen (2011).The Determinants and Outcomes of Internet Banking Adoption. *Management Science*, 57 (2), 291-307.

Miller - Carpenter, Serena. (2018). Ten Steps in Scale Development and Reporting: A Guide for Researchers. *Communication Methods and Measures*, 12, 25-44.

Mohamed I. Nabih, jaakG. Bloem, and Theo B.C. Poiesz (1997) . Conceptual Issues in the Study of Innovation Adoption Behavior. In Merrie Brucks and Deborah J. MacInnis (Eds.), *NA - Advances in Consumer Research Volume 24*. Association for Consumer Research.

Musiime Andrew and Malinga Ramadhan Badru (2011).Internet banking, consumer adoption and customer satisfaction. *African Journal of Marketing Management*, 3(10), 261-269.

Nunnally, J. C. (1994). *Psychometric theory 3E*.Tata McGraw-Hill Education.

Patel, K.J., & Patel, H.J. (2018).Adoption of internet banking services in Gujarat: An extension of TAM with perceived security and social influence. *International Journal of Bank Marketing*, 36(1), 147-169.

Raza, S. A., Qazi, W., & Umer, A. (2016).Facebook is a source of social capital building among university students evidence from a developing country. *Journal of Educational Computing Research*, 55(3), 295-322.

Renaud, K.and Biljon, J.V. (2008). Predicting Technology Acceptance and Adoption by the Elderly: A Qualitative study.*2008 annual research conference of the South African Institute of Computer Scientists and Information Technologists*.

Richard, J.E., Thirkell, P.C., & Huff, S.L. (2007).An Examination of Customer Relationship Management (CRM) Technology Adoption and its Impact on Business-to-Business Customer Relationships. *Total Quality Management and Business Excellence*, 18(8), 927-945.

Rogers, Everett M. (1962).*Diffusion of Innovations*. New York: The Free Press.

Schiffman, L.G., and Kanuk, L.L. (2007). *Consumer Behavior*. New Delhi: Prentice Hall of India Pvt. Ltd.

Susan A. Brown, Viswanath Venkatesh and Hartmut Hoehle (2014).Technology Adoption Decisions in the Household: A Seven-Model Comparison. *Journal of the Association for Information Science and Technology*, 66(9), 1933-1949.

Tabachnick, B.G. and Linda, S.F. (2012).*Using Multivariate Statistics*. London: Pearson Education Limited.

Talukder, M. (2012). Factors affecting the adoption of technological innovation by individual employees: An Australian Study. *Procedia - Social and Behavioral Sciences*,40, 52-57.

Tan, M., and Teo, T. S. H. (2000). Factors influencing the adoption of internet banking. *Journal of the Association for Information Systems*, 1(1), 1–42.

Truong, Yann & Mccoll, Rod.(2011). Intrinsic motivations, self-esteem, and luxury goods consumption. *Journal of Retailing and Consumer Services*, 18, 555-561.

Vannoy, S. A. and Palvia, P. (2010).The Social Influence Model of Technology Adoption. *Communications of the ACM*, 53(6), 149-153.

Venkatesh, V., & Bala, H. (2012). Adoption and Impacts of Inter-organizational Business Process Standards: Role of Partnering Synergy. *Information Systems Research*, 23(4), 1131-1157.

Warkentin M., Gefen, D., Pavlou, P., & Rose, G.M. (2002). Encouraging Citizen Adoption of e-Government by Building Trust. *Electronic Markets*, 12(3), 157-162.

Wilkening, Eugene A. (1953), Adoption of Improved Farm practices as Related to Family Factors. *Research Bulletin 183*, Wisconsin Agricultural Experiment Station.

World Bank (2018).*Report on Digital Adoption Index*.

Zeithaml, V.A., Berry, L.L., &Parasuraman, A. (1996).The Behavioral Consequences of Service Quality.*Journal of Marketing* 60(2)

Zhu, K., & Kraemer, K. (2005). Post-adoption variations in usage and value of e-business by organizations: Cross-country evidence from the retail industry. *European Journal of Information Systems*, 12, 61–84.

Zhu, K., Kraemer, K., &Xu, S. (2003). Electronic business adoption by European firms: A cross-country assessment of the facilitators and inhibitors. *European Journal of Information Systems*, 12, 251–268

Web references

https://www.researchgate.net/post/What_is_the_difference_and_relatioship_between_technology_adoption_and_technology_acceptance

https://www.business2community.com/customer-experience/what-to-do-about-low-user-adoption-02213468

https://blog.totango.com/2019/08/how-to-measure-user-adoption-and-increase-your-rates-fc/