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ORIGINAL PAPER

THE POWER OF ADKAR CHANGE MODEL IN INNOVATIVE TECHNOLOGY ACCEPTANCE UNDER THE MODERATING EFFECT OF CULTURE AND OPEN INNOVATION

Muhammad Ahmad Ali[1], Asif Mahmood[2], Usman Zafar[1], Muhammad Nazim[3]

1) University of Engineering and Technology, Lahore, **Pakistan**, 2) Namal Institute, Mianwali, **Pakistan** 3) Khwaja Freed University of Engineering and Information Technology (KFUEIT), Rahim Yar Khan, **Pakistan**

ABSTRACT. **Background:** Continuous change is a vital factor for organization's sustainable growth and success. The implementation of modern information technology in business has become a core need of the hour. This study endeavours to answer how to cope with resistance to change when implementing new technology in the banking sector. A theoretical model has been developed with the blend of ADKAR change model, Technology Acceptance Model (TAM), and Hofstede dimensions of national culture to investigate the impact of the ADKAR change model on Technology Acceptance under the moderation of two national culture's dimensions.
Materials and Methods: In order to collect data, 500 self-administered questionnaires were dropped personally in five major banks of five cities of Pakistan using the convenience-based employee intercept sampling technique. The validated response rate was 68% by having 340 fit questionnaires for analysis using covariance-based structure equation modelling with the help of SmartPLS.
Results: The results uncover the significant existence of covariance between dimensions of the ADKAR change model and technology acceptance model. The findings are statistically significant, inferring the influential role of change management on technology adoption.
Conclusion: The study results provide promising implications based on these conclusions and findings for both theoretical aspects of these different models and practitioners.

Key words: ADKAR Change Model; Reinforcement, Uncertainty Avoidance; Perceived Ease of Use; Inbound and Outbound Open Innovation; Perceived Usefulness.

INTRODUCTION

Technology has become the primary element for organization's success. Innovative technology acceptance by end-user is designated as one of the best success factors in project excellent performance outcomes, in case of resistance in adopting technology leads to failure of project success [Pinto, Mantel, 1990]. KPMG asserted in a survey of European 134 companies that the IT project's cost of failures was from the range of $ 14 Million up to $240 Million. There had been faced an extreme level of unwillingness behavior of end-user with accepting Enterprise Resource Planning (ERP) software and many other software [Shehab, et al., 2004]. Similarly, Information Technology (IT) plays a tremendous role in resolving diversified business issues in every economic sector for the last two decades. The most crucial changes have occurred in the service sector due to the invention of information technology. With the inception of internet service, the financial services sector, especially the banking sector, brought a dramatic change in working; traditional banking was replaced with technological banking, including E-Banking, Automatic Teller Machine (ATM) and Phone

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Banking [Shima, Mohamadali, 2017]. Banking is only a sole sector that heavily takes information technology (IT) to obtain, process, and delivers it to its relevant technology user. Financial institutions have discovered that they must have to be innovative and updated their processes and system of working to save and retain their customers [Boonsiritomachai, Pitchayadejanant, 2017].

Online banking is now becoming an emerging concept promising vast benefits of online banking. Furthermore, the set-up cost of a new-fangled branch of any designated bank is roughly 3.7 up to 5 million in USA dollars, but on the other hand, online banking set up cost ranges from 1.8 $ up to 2.1 million USA dollar [Gkoutzinis, 2006]. Thus, online banking is considerably economical than any other traditional way of banking for bank's customers. Hence, the success point of online banking entirely depends on the adoption and usage behavior of end-users. Illinois National Bank (INB) of Springfield, USA, reported a 340% increase in staff productivity after implementing new technology. Only informational technology (IT) can be significant for a country, entity, and end-users if novel technology is accepted and used daily. In developed countries, innovative technology acceptance is considered an attractive area for research [Hu, 1999].

According to Fortune, 1,100 companies have exposed an elevated failure rate towards adopting and implementing new technology in business. The survey conducted by Fortune various executives represented that only major and core cause of IT failure is only resistance from the side of employees [Fomin, 2018]. Resistance to technology adoption is an emerging problem in every sector of the economy all over the world. The most significant issue is resistance to change from the side of employees when implementing the latest information technology in business. Organizational strategic goals remain unachieved without transitioning employees towards a new way of working from traditional working. National culture dimensions are also a big problem to mold employees' behavior.

In this regard, many models were proposed to envisage the use of a system, the Technology Acceptance/Adoption Model (TAM) is considered a helpful tool to put in plain words and see coming the reception of information technology by end-users [Chuttur, 2009]. Professor Fred Davis proposed the Technology Acceptance Model (TAM) renowned, high-ranking and thrifty model among many other models to measure the innovative technology acceptance level in users [Davis, 1989]. According to Davis, the use of a system is entirely predicted by user's motivation, which can be directly enhanced or influenced by an external stimulus. Historically, it was found that technology adoption is considered the hot research topic on the ground of information systems (IS) at the individual stage. Until now, TAM is over and over again installed in systems to gauge technology adoption level among individuals; it was inferred from over 100 studies on TAM from high-rank Information System (IS) journals from the past 20 years [Lee et al., 2003; Mugo, et al., 2017]. A case study on E-Banking concludes a highly positive influence of E-banking on satisfaction and loyalty of customers. The simplest use of technology will make service much more reliable, error and risk-free for both bank's employees as well as customers [Siyal, et al., 2019; Ferraris et al., 2019].

Open innovation is an essential component of business models [Bogers, et al., 2018]. Bogers et al. (2018) stated the first proposal, i.e., "Open Innovation" break the boundaries of the organization, have access to innovation processes; inside and outside enterprises that execute outside organization. Both businesses and organizations manage expertise and technological skills within the growth, and these innovations are more fundamental than incremental [Lauer, 2010]. Many processes are still under study regarding open innovation management.

There is a lack of room for insecurities, and there is the misuse of external resources for innovative ideas [Brettel, et al., 2015]. The outcomes of open inbound innovation to the organization for improvements and developments are the latest ideas and related

employee expertise Chang, Gong, and Peng (2012). A firm's capacity to improve new technology and ideas in terms of using information techniques efficiently and leveraging those.

On the other hand, change management used as a vast field in organizations for the past five decades [Diefenbach, 2007]. There are many models, theories, and concepts used by managers to cope with resistance to change from the side of employees. Organizational change management means how things and behavior of people are changed from its status quo (current) into the expected situation by passing it out from the transformational phase [Diefenbach, 2007]. This kind of change management deals with the analysis, bring into the structure and plan in change phases proposed by the early findings of Kurt Lewin research in the ground of organizational changes [Burnes, 2004]. Primarily, there are two core reasons for resistance to change: lack of motivation and lack of ability. Many employees are not informed about change concerning its aims and benefits. This problem can also be solved through transparent and clear communication. Organizations do not change, but people change themselves. Employee resistance is a major hindrance in the organizational change process. ADKAR is an acronym of five letters building blocks (ADKAR) for successful change [Hiatt, 2006].

At present, more than 3500 organizations have adopted and using the ADKAR change model to manage the people side of change successfully. The previous studies reflect that a new user should choose the ADKAR model for managing change elements because each phase of the ADKAR change model is clearly explained. The first and foremost rule, one should never forget that no change will bring and success unless individuals are willing to adopt change; no concern whatever, change model is being used [Calder, 2013]. The success of a change project depends entirely on the desire of an individual to accept, support, and implement the desired change in the organization effectively [Ruele, 2015].

In past studies, the high degree of uncertainty avoidance (UA) and collectivistic culture are more probably may lessen and discourage technology adoption behaviors [Lai et al., 2016; Alhirz, Sajeev, 2015]. Whereas, power distance (PD) positively encourages and moderates the technology adoption behavior [Baptista, Oliveira, 2015]. The discussion concludes that there has been amplification in usage due to the inception of IT, but many challenges have to be faced across the cultures of different countries. In progress, the work intends to pack up space by investigating the effect of the ADKAR change model on technology adoption under the moderation effect of culture in the banking sector. Given that, this study has been designed to examine how change management helps reduce resistance levels in employees when implementing informational technology in the banking sector.

LITERATURE REVIEW

Technology Acceptance Model (TAM)

A number of theoretically based models have been developed and used to study the behavior of the user in the direction of acceptance and the practice behavior of up-and-coming information technologies, including Rogers' diffusion theory, the Theory of Reasoned Action (TRA), and the Theory of Planned Behaviour (TPB) [Ruele, 2015; Gu, et al., 2019; Rafiqu, et al., 2020]. From this research stream, the Technology Acceptance Model (TAM) has emerged as a powerful and parsimonious model representing the antecedents of technology usage through beliefs related to the Perceived usefulness and Perceived ease of use of technology [Al-Rahmi, et al., 2019]. Previous research has also shown that the TAM explains a higher level of variance in systems use than the TRA, TPB and the Decomposed TPB. Therefore, the TAM will be used in this study to understand employee adoption of the banking industry [Rahman, et al., 2017; Kashada, et al., 2020].

TAM has been gone under the process of testing, and various researchers have adopted it in IS as well as in IT. It was broadened to evaluate the "acceptance" and "voluntary use" of mobile phone camera technology in Kuwait.

In his study, Davis (1986) proposed that consumers' inspiration could be elaborated via three major factors: Perceived Ease of Use, Perceived Usefulness, and Attitude in the direction of using the system. He conjectured that the usage tendency is a crucial determining factor in whether the consumer will consume or refute the system [Rafique, et al., 2020]. ATU is affected by two main presuppositions: Perceived Usefulness and Perceived Ease of Use, with Perceived Ease of Use imposing direct impact on Perceived Usefulness. So, mutually the presuppositions were speculated to be affected straight by the system-designed features.

Table 1. Literature review Sum-up of TAM

Year	Author(s)	Technology Examined	Sample	Findings
2011	Abbasi et al	Internet usage	504 academics	Perceived usefulness was founded as the most important and significant assemble in Internet acceptance.
2010	Autry et al.	Supply Chain and Technology	195 End users	The current study concluded in technologically chaotic environments and interaction between the firms' supply chain, perceived usefulness and ease of use intentions towards technology usage in the supply chain are proved stronger.
2008	Venkatesh & Bala	Various office IT systems	150 Employees	Overall concluded results are supported in order to the extended model. TAM3
2007	Chen et al.	Electronic tolls and tax collection	255 individual motorists	Perceived usefulness by end-user was found to encompass inconsequential weight on the user intention electronic toll and tax collection acceptance
2006	Yi et al.	PDA	222 physicians	Perceived usefulness by end users was found to have the most noteworthy element of physician's willingness to admit a technology.
2005	Wixom & Todd	Warehouse predefined reporting and Software.	456 employees from	Consequences concluded the relevance of information and user satisfaction as exterior variables towards traditional TAM.
2004	Ong et al.	E-learning system	140 engineers working in 6 companies	Computer self-efficacy was proven to positively result in both constructs' perceived usefulness and perceived ease of use by end-users.
2004	Vijayasara-thy	Online shopping	281 residents USA	Security, usefulness compatibility and ease of use, have been proven significant effecting constructs on the attitude of users towards online shopping usage
2004a	Shih	E-shopping	212 employees of SMEs	The findings of the study confirmed the theoretical postulation of the TAM
2003	Gefen et al.	Online commerce	business students	Trust, perceived usefulness, and perceived ease of use were significant determinants of online shopping intention
2001	Moon & Kim	World Wide Web	152 graduate students	Perceived usefulness and perceived playfulness are considered significant effects on intention to use.
2000	Venkatesh	Online help system Multimedia system	70 employees 212 employee	Anchor elements were used to form perceived ease of use about a new system and with increased experience, adjustments play an important role in determining system-specific PEOU.
1999	Agrawal & Prasad	Software applications	230 Technology Educated Staff	Authentication of the relationship of individual dissimilarities and technology adoption intervened by the TAM and center beliefs.
1995	Igbaria et al.	Usage of Minicomputer	236 Masters Students	Deep-rooted the consequence of exterior variables on usage and verified previous associations among TAM beliefs and constructs.
1992	Adams et al.	Voice and email Software's applications	192 Staff member of different organization	Confirmed validity and reliability of two main beliefs of perceived usefulness and perceived ease of use measurement. It also found a major role of perceived usefulness on system usage.
1989	Davis	Email and file editor, Plus, graphic systems	114 employees, 40 Master students	Six item scales with lofty reliability for the two constructs perceived usefulness and perceived ease of use.
1989	Davis et al.	Word Processor	107 Master students	Behavioral intentions towards technology adoption of consumers were found the chief component of technology usage behavior. Feelings and attitudes have no intervening effect between perceived usefulness and perceived ease of use towards technology behavioral intention.
2011	Kuanchin Chen et al.	Self-Efficacy and usage of smartphone	Service Company with sample size 376 in Taiwan.	The findings of this study portray in Taiwan that there is a major role of self–efficacy and technology usage.
2012	Judith Schoonen boom	Technological Learning system	One hundred and eight instructors of university	First, affected by task significance, an option is prepared to either carry out a definite task or not. Second, after the verdict has been ready to carry out the task, and affected by the usefulness and ease

Year	Author(s)	Technology Examined	Sample	Findings
				of use of the learning management system in school, an option is made between amateur dramatics the task using the LMS and using substitute means.
2012	Sun Joo Yoo et al.	Motivation and e-learning	261 employees in foodservice company in South Korea	The findings revealed that intrinsic motivators (effort expectancy, attitudes, and anxiety) affected employees' intention to use e-learning in the workplace more strongly than extrinsic motivators (performance expectancy, social influence, and facilitating conditions).
2013	Dr. Ibrahim Issa Abu-Nahleh	Information Technology and Leadership	Case Study at Al-Hikma Company" Size: 50	Leadership is a crucial element in organizational success and failure. IT helps bring organizational change. Therefore, dynamic leadership is an important part of most organizations for organizational competitive advantage and continued existence.
2014	Hsien-Cheng Lin	Culture, information technology and Knowledge Management System	146 physicians from the United States and 460 from Taiwan	The findings provide that disparities in culture might influence the perceptions of a physician of the united states and Taiwan about the system of knowledge management in adoption in the healthcare institutions of twin countries.
2014	Escobar-Rodríguez a, Carvajal-Trujillo	UTAUT Model and Electronic ticking	One thousand ninety-six customers of LCC flights	The study results show that significant buying factors behavior is trust, customer's habit, cost-saving behaviour, technology ease of use, the performance of e-ticking, and pleasant motivation and societal factors.
2015	Maria Tsourela, Manos Roumeliot-is	Technology readiness index (TRI) and TAM	Three Hundred Banking Employees	There are three mediators found with the four beliefs and intention of an employee towards using technology in a real-time scenario for developers and managers of the bank.
2016	Mohamed Abou-Shouk et al.	E-commerce	A sample size of four hundred fifty one travel agents of renowned entities of Egypt.	The results of the study show the noteworthy influence of environmental pressures lead to perceived advantages and constraints in e-commerce acceptance. Whereas the strategies of small and medium enterprises travel, agents are moving their business towards e-commerce in order to capture the global travel market share.
2016	Indrajit Sinha, Sujit Mukherjee	E-banking after working hours	From 428 bank employees in India	The following factors were found significantly influential in electronic banking acceptance by the end-users, as mentioned below. User trust in technology and financial institution User perception of ease and usefulness about technology with less complexity.
2017	Huayi Chen, Tieju Ma	heterogeneous agents and Technology Acceptance	Two hundred and fifty Sale Officers of china	When there are similar features in attitudes and foresight of commercial agents, an extreme level of resistance is faced by the entity due to people's common belief. Whereas, When there is a different and heterogeneous nature of features in attitudes and foresight of commercial agents, there are high chances of technology acceptance by end-users/ commercial agents.
2017	Rui Li, Te-Lin Doreen Chung,	E-auctions in the economy China	210 were current e-auctions' users	The findings of the study portray significant technology ingredients acceptance, like, social influence, technological playfulness, also recommended as the component to create an e-auctions environment in China business economy.

ADKAR Change Model

Organizations do not change, but people always change themselves. Employees' resistance is a first and foremost obstacle in the organizational change process. ADKAR is an acronym of five letters building slabs for successful change [Hiatt, 2006].

- Awareness about the necessitate of new changing
- Desire to shore up the changes
- Knowledge about how to bring change
- Ability to apply requisite talents and behavior
- Reinforcement to preserve the brought changes

ADKAR was initially discovered by Hiat in 2003, but after in-depth research carried out by Prosci on more than 700 companies that were gone through by major change project and ADKAR became a practical instrument of managing the people side of change. Prosci is the world's largest and leading change management consultancy center founded by

Hiat in 1994. It exclusively pays attention to the managing people side of change.

Uncertainty Avoidance

Uncertainty avoidance reveals the level to which the individual of a civilization believes is endangered by indistinctness and is rule-oriented based. According to the literature, fragile uncertainty avoidance cultures have some extent, better enthusiasm to receive risks connected with new processes and measures. This culture, for instance, might be supplementary willing to strive for new-fangled technology before it that has been demonstrated in erstwhile organizations [Shore, Venkatachalam, 1996]. Shore & Venkatachalam (1996) also said that while cultures are classified by strong uncertainty avoidance, the introduction of new technology will surely elevate the nervousness level of its mass for implements, top managers/bosses and end-users. There is always a vast, exciting demand for static regulations, more in written or unwritten form. Workers in well-built uncertainty avoidance cultures tend to reside amid their organizations for a very long time. In difference, those from weak and softness uncertainty avoidance cultures show more transportable towards Organizational changes, whereas, in strong and robust uncertainty avoidance cultures, employees are probably to entertain physically powerful resistance, which creates difficulty relocating to change the administer [Vörös, Choudrie, 2011].

Knowledge Transfer

This is obvious to technology transmit totally depends on knowledge transfer to execute new technology successfully. For several novel technologies, supplementary information ought to be transmitted to make use of not presently technological knowledge. Besides, community knowledge concerning who gets know what it is to smooth the progress of superior technology makes use of after it execution process. The information that perceived cultural distance persuades professional executive decisions to come into specific overseas markets consisted of the national cultures and cultural distance influencing the knowledge transfer process. This is because cultural characteristics have hampered the transfer and transit of technology due to substantial and insubstantial knowledge because of communication hurdles [Fletcher-Brown, et al., 2020].

Research conducted by Bhagat et al. (2002), at what time it is to receive and transfer knowledge, then individualists always looking for information in its relative contextual form, along with they emphasize the importance of information in printed form that are more to be expected to believe such information [Bhagat, et al., 2002]. Whereas persons in collectivist-based cultures are less expected except individualists to emphasize the importance of information in black and white and are supplementary expected than individualists to close the eyes to the same information? Individualistic cultures are additionally expected than collectivistic cultures to operationalize the risk.

Uncertainty avoidance states that individuals in the culture have a preference planned over shapeless and formless situations. In simple words, do persons think and feel endangered by confusing events, and have they formed attitudes, beliefs, and organizations that seek to keep away from these? According to Pauleen's (2007) research findings, these feelings are uttered from side to side anxious stress, avoidance or yet penalty of risk-based, and the necessitate for safekeeping, preventability, and in addition to in black and white plus unrecorded rules. Uncertainties avoiding based cultures are likely to encompass an additional institutionalized set of laws to transfer knowledge compared to uncertainty acceptance cultures because clear regulations are formed to preserve refuge and obviousness.

Inbound and Outbound Open Innovation

Inbound open innovation and outbound open innovation play a vital role in acquiring new knowledge and developments, specifically developing SI. The current studies define that open innovation has to pay ever-increasing attention to the research of strategic innovation. Chesbrough, 2006, described open innovation as purposive inflows and outflows

of knowledge to accelerate internal innovation and expand markets for external use of innovation. The managing board of open innovation (inbound or outbound) increasingly significantly incorporates strategies, and many scholars are able to find the OI that is the best crucial component to the achievements of organization's SI [West, Bogers, 2017].

On the other hand, we have faced a shortage of research in active explicit inquiry that is straightly capable of recognizing the paradigm of open innovation. Instead of consuming factual and concreting kind of open innovation (open inbound innovation) in past researches, th¬¬¬¬¬e scholars also focused patent analysis was emerging latest classification of our individual outcomes [Petruzzelli, et al., 2015]. Similarly, limited research was tried to choose realistic and rivals associates by open innovation, deprived of concern about diverse open innovation.

In recent times, the most significant way to emphasize open inbound innovation and the vigorous deviations by anticipating ways of cooperation and relationship [Yun, et al., 2016]. Therefore, this study intends to active functions and roles, classifying the open innovation system's vibrant revolution and imposing different technological techniques in open innovation. This research emphasizes vibrant "metaphor" in lieu of the open innovation types, inbound open innovation and outbound open innovation. These analysis metaphors of inbound open innovation and outbound open innovation performing quantitative and inevitable perceived (system power and relationship [Lee, et al., 2016].

Conceptual Framework

Based on a concentrated literature review, the following conceptual framework developed for research.

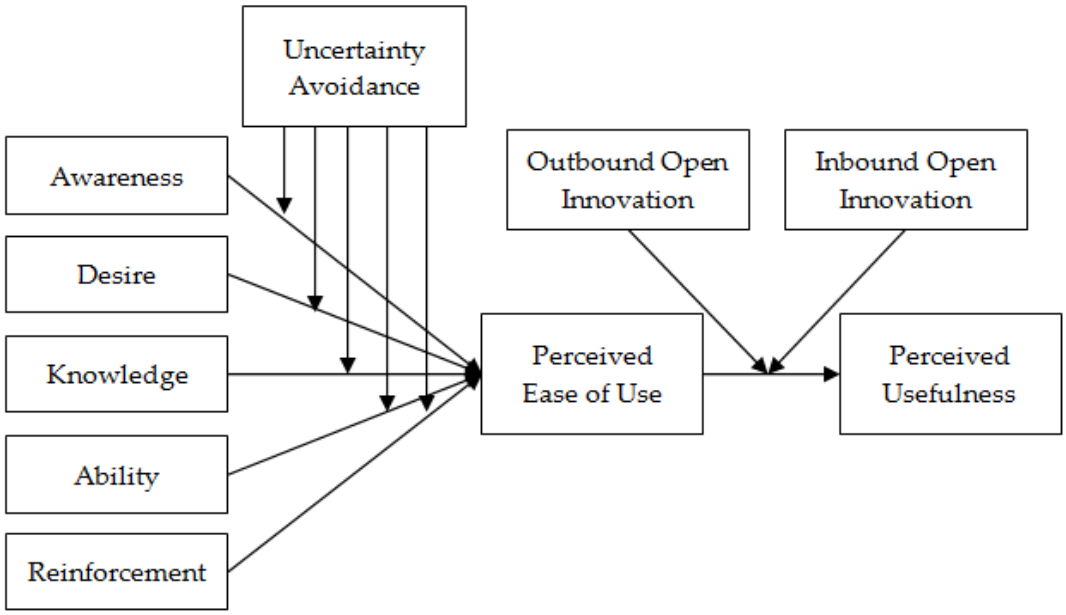

Fig. 1. Conceptual Framework

Research Hypothesis

H1: There is a significant relationship between Awareness and Perceived Ease of Use.

H2: There is a significant relationship between Desire and Perceived Ease of Use.

H3: There is a significant relationship between Knowledge and Perceived Ease of Use.

H4: There is a significant relationship between Ability and Perceived Ease of Use.

H5: There is a significant relationship between Reinforcement and Perceived Ease of Use.
H6: Perceived Ease of Use positively influence Perceived Usefulness.
H7: Perceived Ease of Use significantly mediates the relationship between Awareness and Perceived Usefulness.
H8: Perceived Ease of Use significantly mediates the relationship between Desire and Perceived Usefulness.
H9: Perceived Ease of Use significantly mediates the relationship between Knowledge and Perceived Usefulness.
H10: Perceived Ease of Use significantly mediates the relationship between Ability and Perceived Usefulness
H11: Perceived Ease of Use significantly mediates the relationship between Reinforcement and Perceived Usefulness.
H12: Uncertainty Avoidance significantly Moderates the relationship between Awareness and Perceived Ease of Use.
H13: Uncertainty Avoidance significantly Moderates the relationship between Desire and Perceived Ease of Use.
H14: Uncertainty Avoidance significantly Moderates the relationship between Knowledge and Perceived Ease of Use.
H15: Uncertainty Avoidance significantly Moderates the relationship between Ability and Perceived Ease of Use.
H16: Uncertainty Avoidance significantly Moderates the relationship between Reinforcement and Perceived Ease of Use.
H17: Outbound Open Innovation Moderates the relationship between Perceived Ease of Use and Perceived Usefulness.
H18: Inbound Open Innovation Moderates the relationship between Perceived Ease of Use and Perceived Usefulness.

RESEARCH METHODOLOGY

A research methodology and plan is known as a helpful pattern used by a researcher to define the research boundaries. According to Cooper and Schindler (2001), a research design is defined as an outline or plan to examine and answer the study questions, consisting of some critical elements: explaining study category, investigations of study, unit of analysis, and data collections techniques [Cooper, Schindler, 2001]. The present research is based on casual-oriented research that demonstrates the impact of the change management model, especially the ADKAR change model, on Technology Acceptance variables, whereas national culture dimensions are also considered in this respect. For this, the target population for the present quantitative cross-sectional research was employees of 05 chief market shareholding banks named ABL, HBL, MCB, NBP and UBL.

Talking about sampling, the convenience-based employee intercept sampling technique was used for data collection. A self-administered questionnaire using 5 points Liker scaling was used to collect data. In this study, the sample size (n) = 340 subjects comprised functional responses from everyone who participated in this study and representative of the population regarding generalizability. This sample size is used for statistical techniques in this type of research portrayed in a detailed topic underlying in the study. Five hundred self-administered questionnaires were dropped personally in 05 major banks of five cities of Punjab. The returned questionnaires were 400 out of which only 340 questionnaires at 68% response rate considered for final analysis using variance-based, on Structure Equation Modelling (SmartPLS-SEM) [Hult, et al., 2018].

STATISTICAL DATA ANALYSIS AND RESULTS

Descriptive Statistics

The very first part of the questionnaire and analysis is a descriptive segment. The entire 340 respondents who filled out the questionnaire were technology users in their banks' branches Table 2 provides the sum up a glimpse of descriptive statistics.

Table 2. Descriptive Statistic of Demographics Variable

Descriptive	Frequency	Valid Percentage	Descriptive	Frequency	Valid Percentage
Branch Visit			**Marital Status**		
ABL	12	21.80%	Single	215	63.20%
HBL	8	14.50%	Married	125	36.80%
MCB	13	23.60%	**Gender Category**		
NBP	7	12.70%	Masculine	197	57.80%
UBL	15	27.30%	Femininity	143	42.20%
Employees			**Highest Level of Education**		
ABL	73	21.50%	Bachelor	47	13.80%
HBL	55	16.20%	Master	270	79.40%
MCB	70	20.60%	M.Phil./Doctorate	23	6.80%
NBP	68	20.00%	**Managerial Experience**		
UBL	74	21.80%	Less than 2years	122	35.90%
Age			2-5 years	98	28.80%
Less than 30	152	44.70%	5-10 years	80	23.50%
30 to 50	145	42.60%	More than 10 years	40	11.80%
50 above	43	12.60%	**Total**	**340**	**100%**

A total of 340 respondents of banks' employees participate in completing this survey. While demographic variables like basic information about respondents were not added in the data analysis, their descriptive analysis is portrayed here. The results depict that 45 branches of five banks were considered for data collection from their employees. A majority of employees were in the range of fewer than 30 years (44.7%) regarding age factor, and male respondents were 196 (57.6%). Whereas according to education-wise, there were 270 (79.4%) master degree holders. Marital status-wise, a major portion of respondents was single 195 (57.4%). There was major participation towards questionnaire filling out of 122 (35.9%) respondents regarding managerial experience less than 2 years.

Instrument Content Validity

Content validity is also known as face validity that assesses the communication between the person items plus the concept in the course of ratings via specialist judges, along with pre-tests employing numerous sub-populations or any other means [Cooper, Schindler, 2001]. It was also used in this research. The present research has used both types of strategies to analyze content validity (face validity) by:

- To ask three specialists in information technology to offer their decisions at the questionnaire, particularly at the items in each set (idea), to determine whether individual items may make communication with the concept. A number of slight revisions were prepared to the questionnaire according to their recommendations.
- Further to this, the instrument has been twice pre-tested with a sub-population in addition to a cluster of PhD students plus with one pilot study was experienced and tested with a cluster of similar type subjects because of the population.

Reliability of Constructs

Reliability refers to the consistency of respondents' responses to all items of aquestionnaire [Thakkar, 2020; Larsson, 2015]. For evaluating the reliability of a variable or instrument, Cronbach alpha and composite reliability were considered to assess the internal consistency. The rule of thumb for reliability coefficient is suggested greater than 0.7 for both, which shows the goodness of a construct for testing the reliability and validity of the mentioned measures in the study. In other words, the term reliability of a measure/questionnaire points out the degree to which the measure taken is without bias and error-free. It helps review the goodness of measure and indicates accuracy in the measurement [Melchers, Beck, 2018].

Table 3. Reliability Results

Variables	Number of Items	Cronbach's Alpha	Composite Relaibility	Reliability Results
Awareness	4	0.770	0.854	Good
Desire	4	0.842	0.894	Good
Knowledge	4	0.840	0.892	Good
Ability	4	0.822	0.882	Good
Reinforcement	4	0.853	0.900	Good
Perceived Ease of Use	7	0.898	0.920	Good
Perceived Usefulness	6	0.749	0.833	Good
Uncertainty Avoidance	6	0.879	0.908	Acceptable
Outbound Open Innovation	4	0.872	0.940	Good
Inbound Open Innovation	5	0.886	0.915	Good

Table 3 presents the reliability coefficients for alpha and composite reliability values for the current study. According to Sekaran (2016), reliabilities < 0.6 are considered poor, acceptable in the 0.7 range, and those over 0.8 are good. The closer the reliability coefficient gets to 1.0, is regarded as the better. In others' point of view, the commonly decided upon lower edge for reliability is decided 0.70, however, this threshold value may decrease to 0.60 in exploratory nature research [Hult, et al., 2018]. The entire inner consistency reliabilities consist of reliability for the measurement items (for all interval scales) were > 0.70 and were ranked a good and acceptable threshold value. Approximately all types of reliability tests were fairly high (0.8 up), and it is indicated the items at each set (concept) were linked as positively correlated with one another. It is recommended that the questionnaire was considered a reliable measurement tool in the current study because the reliability of each construct (variables) is meet the threshold value and is regarded as a very good reliable instrument.

Factor Analysis

The factor analysis method is used to analyze the structure of the correlations within a great number. It considers multiple variables and summarizes (reduces) them by using a minor set of variables called components or factors [Melchers, Beck, 2018]. Consequently, at the initial stage, the researcher recognizes latent dimensions of the data arrangement and determines the level to which each factor elaborates understudy a test item (variable). The prime subsequently follows it uses factor analyses summarization and data reduction [Petruzzelli, et al., 2015].

Table 4. Factor Analysis Results

Variables	Items	Loading	AVE	Variables	Items	Loading	AVE	Variables	Items	Loading	AVE
Uncertainty Avoidance	UA1	0.801	0.623	Awareness	Aw1	0.659	0.597	Desire	De1	0.840	0.680
	UA2	0.821			Aw2	0.760			De2	0.850	
	UA3	0.850			Aw3	0.863			De3	0.846	
	UA4	0.783			Aw4	0.794			De4	0.759	
	UA5	0.750		Reinforcement	Re1	0.878	0.694	Perceived Usefulness	PU1	0.825	0.513
	UA6	0.723			Re2	0.789			PU2	0.803	
Perceived Ease of Use	PEu1	0.787	0.623		Re3	0.845			PU3	0.858	
	PEu2	0.621			Re4	0.817			PU4	0.608	
	PEu3	0.709		Inbound Open Innovation	IOI1	0.830	0.684		PU6	0.693	
	PEu4	0.847			IOI2	0.858		Ability	Ab1	0.743	0.653
	PEu5	0.831			IOI3	0.825			Ab2	0.778	
	PEu6	0.833			IOI4	0.776			Ab3	0.881	
	PEu7	0.869			IOI5	0.844			Ab4	0.823	
Outbound Open Innovation	OOI2	0.933	0.886					Knowledge	Kn1	0.819	0.675
	OOI3	0.950							Kn2	0.864	
									Kn3	0.821	
									Kn4	0.780	

Table 4 shows the value of each item with respect to its loading values and shows the average variance extracted for each variable. Item loading of each question supporting the factor analysis test meets the assumption of SEM in the prescribed acceptable range of normality and factor loading. Whereas AVE values are also higher than 0.5, showing support of convergent validity.

Discriminent Validity Fornell-Larcker Criteria

After discussing well reliability and convergent validity, next is to affirm discriminant validity, which is being tested through Fornell-Larcker correlational criteria, presented by Fornell and Larkcer in the 1970's. It basically discusses that each variable should have a maximum correlation value as compared to other variables.

Table 5. Fornell-Larcker Criteria

	Abl	Awr	Des	IOI	Kno	OOI	PEU	PUs	Ren	UAv
Abl	**0.808**									
Awr	0.690	**0.773**								
Des	0.578	0.653	**0.824**							
IOI	-0.182	-0.143	-0.165	**0.827**						
Kno	0.376	0.693	0.768	-0.200	**0.821**					
OOI	0.326	0.255	0.286	-0.480	0.364	**0.941**				
PEU	0.304	0.545	0.780	-0.195	0.385	0.364	**0.790**			
PUs	0.208	0.660	0.654	-0.207	0.668	0.343	0.416	**0.716**		
Ren	0.267	0.687	0.789	-0.176	0.279	0.321	0.435	0.602	**0.833**	
UAv	0.290	0.311	0.286	-0.143	0.248	0.219	0.315	0.307	0.269	**0.789**

Table 5 represents the Fornell-Larcker criteria results; as per recommendation, the upper diagonal values of the table show the value of each variable with its own, and below values show with other constructs. All the upper values are firstly having higher than 0.7. Secondly, it is also the maximum value with respect to other values in the table, which shows the significance of the discriminant validity of data.

Goodness-of-Fit Indices

Measurement of the goodness of fit typically summarizes the difference between observed values and the values expected underneath the model in the inquiry. Such type of measures can make use of it in statistical hypothesis testing. It involves CHI Square, GFI, NFI, CFI, and RMSEA tests for ensuring goodness [Sekaran, Bougie, 2016]. The chi-square test is widely used in the non-parametric statistical test that explains the size of discrepancy (divergence) between the observed as well as expected data that is to be obtained with a specific hypothesis.

Next, NFI is also known as the Bentler-Bonett normed fit index (NFI), the fit index varies from 0 to 1 range in which 1 is considered ideal. In simple words, an NFI with a value of 0.90 indicates the model of interest that improves the fit by 90% relative to the null (independence model). Next, the CFI compares the fitness of a target model with the fitness of an independent model. The value of CFI 0.95 or greater is considered a well-fitted model [Hadi, et al., 2016]. Lastly, the root means square errors of approximation (RMSEA) keep away from sample size issues by analyzing the difference between the hypothesized model and the population covariance matrix. It has a value ranging from 0 to 1, and the value of .06 or less indicates a good model fit.

Table 6. Goodness-of-Fit Indices of Measurement Model

Variables	CHI Square	GFI	NFI	CFI	RMSEA
Awareness	2.4	0.99	0.93	0.989	0.069
Desire	1.957	0.992	0.962	0.995	0.063
Ability	1.563	0.995	0.994	0.998	0.048
Knowledge	1.378	0.998	0.989	0.994	0.039
Reinforcement	2.3	.0.991	0.999	0.994	0.073
Perceived ease of use	0.195	0.901	0.998	0.999	0.024
Perceived usefulness	1.687	0.997	0.993	0.992	0.053
Uncertainty avoidance	1.67	0.92	0.912	0.95	0.057
Outbound Open Innovation	1.838	0.993	0.962	0.89	0.063
Inbound Open Innovation	1.78	0.909	0.972	0.9	0.043

According to the literature, four groups exist in the fitness of measure. The fit measures within each group give the same rank of ordering models [Hadi, et al., 2016]. The first group is RMSEA and TLI, the second group is CFI, the third group is CMIN and NFI, and the fourth group is GFI and AGFI. Among the many measures of fit, five popular measures are chi-square, normed chi-square (χ2 /df), the goodness of fit index (GFI), Tucker-Lewis Index (TLI), Root Mean-Square Error of Approximation (RMSEA). Table 5 shows the significant result of all the criteria's for the measurement model.

Measurement model and Correlation

Structural equation modeling (SEM) is a compilation of statistical models that finds details of relationships among multiple variables. It allows the researchers to inspect Interrelationships in many multiple dependent and independent variables at the same time. The reasons for choosing SEM for data analysis were that, initially, SEM could analyze underlying relationships between constructs with multiple measurement items [Mulaik, 1989]. Subsequently, it presents effective also precise statistical procedures to covenant with complex and composite models. The relationships amid many constructs as well as indicators (measurement items) are made validated through using confirmatory factor analysis (CFA), it is also recognized as the measurement model; furthermore, relationships that exist between constructs are tested by using the structural model [Marcoulides, Yuan, 2017]. The measurement models of all variables under study are obtained by the CFA procedure shown in figure 2.

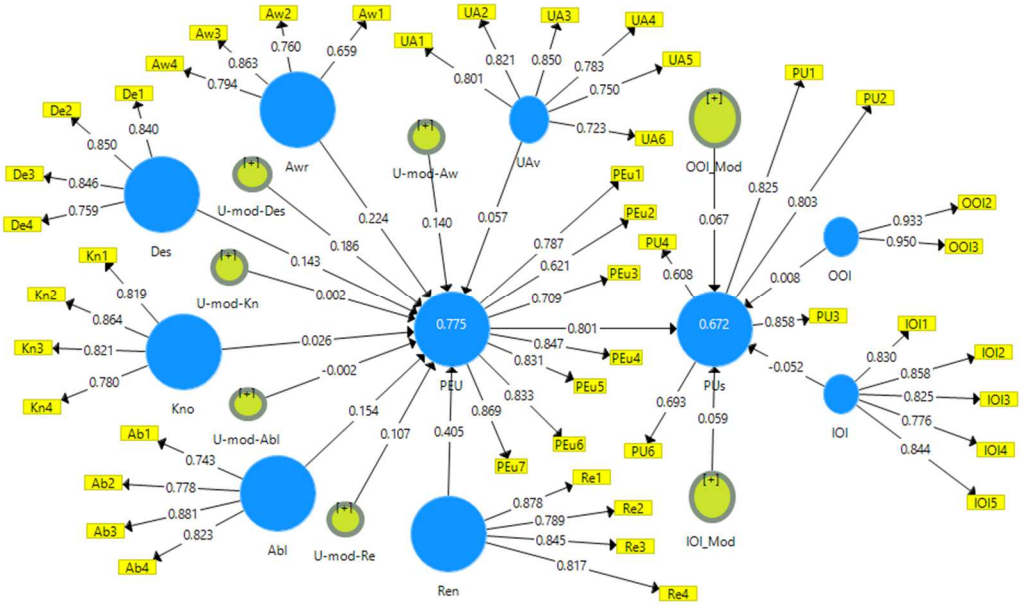

Fig. 2. Measurement model

In the structural equation model, the fit indices are established to analyze whether, on the whole, the proposed model is acceptable statistically or not. The proviso model has considered satisfactory. Then research scholars set up detailed paths for the model significant. Basically, it shows the two considerable models, i.e., inner model and outer model. The inner model shows the coefficient values for each relationship, whereas the outer model shows the significant factor loading values, which are higher than 0.6, recommended by Hair et al., 2015.

Direct and Mediation Hypotheses Testing

The first part of Table 7 portrays five direct hypotheses represented with causal paths that are used to make sure relationships amid latent constructs. Hence, showing results in the table for the shore up of all direct and mediation hypotheses, all hypotheses are shown in the feature mentioned in table 7 and Appendix A. The hidden constructs, which was used in the projected hypothetical model, were categorized into two major categories:

- Exogenous Constructs
- Endogenous Constructs

Exogenous constructs by name were Awareness (A), Desire (D), Knowledge (K), Ability (A) and Reinforcement (R), whereas endogenous constructs with the name were the Perceived Ease of Use (PEOU) in addition to Perceived Usefulness (PU). In this hypothetical link, the PEOU is playing the role of mediator between the ADKAR and PU. Lastly also moderation of (IOI) Inbound Open Innovation and (OOI) Outbound Open Innovation on the relationship of Perceived Ease of Use (PEOU) and Perceived Usefulness (PU). Results show the significance and non-significance of each path as well.

Table 7. Hypotheses Testing

Hypotheses	Path	Effect	Result	
H_1	Aw > PEOU	0.224(**)	Accepted	
H_2	D > PEOU	0.143(**)	Accepted	
H_3	K > PEOU	0.026(N/S)	Rejected	**Direct Impact of ADKAR Model**
H_4	Ab > PEOU	0.154(**)	Accepted	
H_5	R > PEOU	0.405(***)	Accpeted	
H_6	PEOU > PU	0.801(**)	Accepted	
		Mediation		
Hypotheses	**Path**	**Effect**	**Result**	
H_7	Aw > PEOU > PU	0.179(**)	Accepted	
H_8	D > PEOU > PU	0.114(**)	Accepted	
H_9	K > PEOU > PU	0.021(N/S)	Rejected	**Mediation in ADKAR Model**
H_{10}	Ab > PEOU > PU	0.124(**)	Accepted	
H_{11}	R > PEOU > PU	0.324(**)	Accepted	
		Moderation		
Hypotheses	**Path**	**Effect**	**Result**	
H_{12}	UA Mod- Aw > PEOU	0.140(**)	Accepted	
H_{13}	UA Mod- D > PEOU	0.186(**)	Accepted	
H_{14}	UA Mod- K > PEOU	0.002(N/S)	Rejected	
H_{15}	UA Mod- Ab > PEOU	-0.002(N/S)	Rejected	**Moderators**
H_{16}	UA Mod- R > PEOU	0.107(**)	Accepted	
H_{17}	OOI Mod- PEOU > PU	0.067(**)	Accepted	
H_{18}	IOI Mod- PEOU > PU	0.059(**)	Accepted	

Source: own work

The next portion of Table 7 portrays five numbers of hypotheses represented with causal mediation paths (from H7 to H11) and also explained moderation paths (from H12 to H18). The results are based on the SEM technique, which tests significance through t-Statistics and P values; t value should be greater than 1.96, whereas P value should be less than 0.05. Acceptance of both of these values resulting in supporting the hypothesis. Like H1, the impact of awareness on PEOU shows a 22.4% significant impact on accepting

the hypothesis. Next, in mediation, PEOU also mediates between Awareness and Perceived Usefulness by 17.9% under hypothesis H7, which is also significant. Lastly, moderation is explained as uncertainty avoidance moderates the relationship of Aw and PEOU by 14% significantly under hypothesis H12.

CONCLUSION AND DISCUSSION

Numerous other standardized technology adoption models (TAM2, TAM3, UTAUT, UTAUT2) can be linked with change management to gauge the behavior intention to use technology. Leadership and Human Resource Management Practices are also important for inspiring employees to opt and demonstrate a changed behavior. The results mentioned above for integrating the two different models, i.e., TAM and ADKAR model, provide empirical evidence. This hypothetical model was projected in this research and helped give details on the whole relationships amongst the predictor variables (ADKAR change model) plus the outcome variable (PEOU) and PU with the moderation of culture. ADKAR was bringing into being the most significant determinant in increasing PEOU and PU. PEOU mediates the PU partially, whereas Uncertainty Moderates the predictors and outcomes variables relationship negatively. Here, two other moderation of Inbound and Outbound open innovation are also found significant, showing that these innovations can enhance employee adaptability to technology.

Study results also provide promising implications based on these conclusions and findings for both theoretical aspects of these different models and practitioners. Firstly discussing the theoretical aspects, the study initially fulfills the literature gap because little researches had focused on two constructs that how these beliefs of usefulness and ease of use are produced, a current study examining the effects of external two variables on perceived usefulness (PU) and perceived ease of use (PEOU) in light of ADKAR model. Another aspect is that data of existing study based on empirical data was collected by using multi ways approach, for example via post/mail, or electronic mail, and face-to-face self-administered questionnaire method. In adding up, in this study, structural equation modeling (SEM) is run using the SmartPLS statistical package that was made in use to test the measurement and structural models, which provides empirical results regarding the integration of various theories.

Now talking about the implication for practitioners and diverse stakeholders, the unparalleled add to in the electronic-commerce in addition to paybacks. For example, communications-based firms, distribution, and online transactions are convincing various organizations and companies to build up systems that present users the right to use, anytime and anyplace, to carry out online transactions using internet-based technology. Understanding the underlying factors that influence the end users' acceptance of internet-based banking information systems helps the banks; consequently, they can prioritize their resources successfully. In addition, the ADKAR change model was found to put forth a considerable impact on the belief of technology that is perceived usefulness. This would assist in strengthening the users' trust in banks in addition to online banking channels. Additionally, banks could lend a hand to build users' faith by offering an undertaking to cover pecuniary losses faced by any illegal entrance. That could increase users' level of self-assurance on banks and online business conduits and boost the speed of acceptance of the online banking system.

Limitations for Future Researchers

The current study outcomes are precious because this research has concluded a wide variety of theoretical points of view and comprise a suitable large sample size that has covered banking staff within five major Banks located in five major cities of Pakistan. The research journey cannot be free from limitations; these always arise during the research procedure. Hence a good researcher should contribute something valuable addition to knowledge by keeping in mind research limitations. Non-probability-based sampling technique was also used, which was also a limitation because coverage of the suitability

of data might reduce from this type of sampling technique. This study is only conducted in a specific area of baking, and due to time constrain, it only focuses on five banks, which is also a limitation of this study. The geographical area coverage is also a limitation due to which a large number of geographical areas could not cover. Some theoretical limitations also exist in the study; for example, the study just considered one moderation of uncertainty, while hurdles in technology adoption may also be included and some cultural and personality traits. So, authors should consider cultural and personality trait factors that might strengthen the relationship between ADKAR and TAM model for future research.

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Muhammad Ahmad Ali
1Institute of Business & Management
University of Engineering and Technology, Lahore, **Pakistan**
e-mail: ahmad09137@gmail.com

Usman Zafar
Institute of Business & Management
University of Engineering and Technology, Lahore, **Pakistan**
e-mail: usman.zafar93@outlook.com

Asif Mahmood ORCID ID: https://orcid.org/0000-0003-1416-0390
Department of Business Studies
Namal Institute, Mianwali, **Pakistan**
e-mail: mahmood.engineer@gmail.com

Muhammad Nazim
Department of Management Sciences
Khwaja Freed University of Engineering and Information Technology (KFUEIT)
Rahim Yar Khan, Punjab, **Pakistan**
e-mail: muhammad.nazim@kfueit.edu.pk