

## **EMPIRICAL EXAMINATION OF THE ADOPTION OF ZOOM SOFTWARE DURING COVID-19 PANDEMIC: ZOOM TAM**

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### **ABSTRACT**

The novel corona virus disease 2019 (COVID - 2019) has spread across the globe. The Covid19 pandemic situation has created a necessity of following a social distancing for the well-being of the people. This requirement has actually supported innovative use of technology for conducting virtual meetings/lectures. The purpose of this paper is to develop an integrated model of adoption of Zoom platform by the faculties for conducting the virtual meeting/lectures in education institutes during the current Covid19 pandemic situation. Total 125 responses were collected through google form and this phenomenon is explored by Partial Least Square Structure Equation Modelling (PLS-SEM) in SmartPLS version 3.3.2. Results of the survey were examined to determine the degree to which the technology acceptance model was able to explain the faculties' acceptance of web-based learning system for conducting classes. The conceptual model for this study was developed on the basis of Technology Acceptance Model (TAM) and two external variables were incorporating in the model. The research results illuminate the factors that explain and predict the faculties' adoption of Zoom software for conducting online classes in this pandemic era. Total seven hypotheses were found to be significant except one. The findings included that faculties' adoption of Zoom software for virtual classes influenced by environmental concern of the institute and society in the Covid-19 pandemic time. Environmental concern of the faculties is a stronger predictor of attitude of faculties towards such technology.

**Keywords:** Adoption, PLS-SEM, Technology Acceptance Model, Corona, COVID-19, Digital, Web-classes, TAM, Intention

### **INTRODUCTION**

In December, 2019, the corona virus was initially originated in Wuhan, China. This disease is named as "novel corona virus" by the International Committee on Taxonomy of Viruses (ICTV) and "COVID-19" by the World Health Organization [WHO]. In a present scenario, this disease has spread across the globe. India has its first patient of Covid-19 on 30 January 2020. The condition of Covid-19 in India is better as compare to other countries (Krishnakumar and Rana, 2020) but, now cases of Covid-19 is increasing rapidly. The government of India took precautionary measures for preventing the spread of this virus. In many countries, government had taken a step towards restrict a movement of people for the purpose of reducing the spread of virus. It is also known as "lockdown". During lockdown, restrictions have imposed on the people for the temporary closure of

'non-essential' operations/businesses which in turn put the world for work from home condition. Most of the places like schools, colleges and social gathering places were closed (Alexander Richter, 2020). The lockdown has created lots of challenges for executing businesses and running the education institutes. Education institutes and universities are not able to conduct classes or meetings personally. The epidemic of corona virus has actually push a social distancing gesture as an important gesture for preventing the spread of corona virus which in turn accelerate the use of existing technology or innovative information technology for conducting activities in this current scenario (Nielsen, 2020). People have started work from home through the internet for executing their job work. This situation accelerates the habit of digital connectivity for conducting the official work at home. The lockdown has force

people to use and adapt tools which are available over the internet such as webinars and video conferencing (Davidson, 2020). The result is digital proficiency has escalated from its previous level during this lockdown period (Alexander Richter, 2020).

As per government order, education institute, school, colleges or universities will not open till the situation comes under control. Education institute, colleges and universities also have concern for completing the syllabus of the new semester of the students. In the current scenario, education institute or universities are using different online platforms such as Google meet, Go to webinar, Zoom, webex, Google Hangout, skype, and so on for conducting the webinars/ web-lectures/classes and the use of such online platforms allows employees to work more flexible (Richter, Leyer, & Steinhuser, 2020). Teachers/ faculties instructed by their institute for taking online classes (Abidah et al., 2020) and it provokes the use of such online platforms for conducting classes of the students.

Technology is playing an important role in creating a connecting link between students and education institutes (Mayordomo & Onirubia, 2015) and this technology provide a benefit of virtual display of learning progress to the students (Kapp, 2012). The Covid-19 pandemic actually instigates the adoption of online platforms for conducting online classes/webinars by the colleges/universities. People are learning to fulfill their needs through digitally (Knowles, Ettenson, Lynch and Dollens, 2020). The adoption of such online platforms for conducting online classes makes organization more digitally mature which in turn make them more flexible to cope with such situation (Gordon Fletcher and Marie Griffiths, 2020).

The aim of this paper is to identify how web-based tools are helping education industry for conducting virtual classes. Institutes are using Zoom platform for conducting virtual classes because it allows 100 participants for 40 minutes in free version, work with all platforms, background of the speaker can be changed (Jeff Parsons, 2020). The main concern of this study is to determine the adoption of Zoom communication software by the faculties in this pandemic situation.

## **Theoretical Background and Hypothesis Development**

The excessive use of World Wide Web (W.W.W) has created various opportunities and innovations in the education sector. Higher education institute have explored this opportunity and created number of online based courses for students and faculty. The education systems have assimilated digital competences in curriculum and assessments (Beller, 2013; Flórez et al., 2017; Siddiq F. et al, 2016). Teachers and faculties are motivated to incorporate digital technology in their teaching (Shute & Rahimi, 2017). Number of studies has conducted by researchers to compare the web-based learning with traditional learning system. Students have performed well in web-based learning instead of traditional learning classes (Kekkonen-moneta & Moneta, 2002; Hofmann, 2002). The changing technology has created a pressure on educational institutes (Romeo Llyod et al, 2013) therefore education institutes are aiming to make their students more digital literate (Fraillon et al, 2014). The application of technology in the school or education institute is still varied (Bishop & Spector, 2014; Fraillon et al., 2014) but the inclusion of digital technology in education institute is desideratum step for coping with the complex world (OECD, 2015; Siddiq, Scherer, & Tondeur, 2016). Currently, the COVID-19 pandemic forces the education institutes for adopting the online platforms for processing the online classes/webinars/entrances for completing the syllabus of the students or engaging the faculties in the productive manner. The faculties' behavior towards e-learning through zoom communication software in this COVID-19 pandemic time has not been accessed completely. This paper utilized Technology Acceptance Model (Davis et al., 1989) in order to examine the faculties' behavioral intention to use Zoom communication software for online classes, webinars and meetings. As per Yaakop A.Y., 2015, Technology Acceptance Model (TAM) can be applied to determine the students' behavioral intention to use web-based learning tools.

### **Technology Acceptance Model**

TAM is widely used for understanding the technology adoption in organization level. Originally TAM was based on two established theories of social psychological domain are

Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975) and Theory of Planned Behavior. The main focus of these models was on the user's intention to perform certain behavior. The TAM determines the impact of four internal variables such as Perceived ease of use (PEOU), Perceived usefulness (PU), Attitude to use (ATU) and Behavioral intention (BI) upon the actual use of the new technology (Constructs' definitions are present in Table 1). PEOU and PU are considered as key variables for explaining the adoption of new technology (Marangunić & Granić, 2015). The conscious decision making process formed behavioral intention to use system (Venkatesh et al., 2003). BI and actual use constructs are considered as outcome variables whereas BI is treated as a dependent variable to test the validity of the PU and PEOU variables and treated as independent variable when estimating actual usage (Davis 1989; Mark Tuner et al, 2010). TAM was revised to TAM2 (Venkatesh and Davis, 2000) which contained subjective norms and experience in the model and further revised to TAM3 (Venkatesh & Bala, 2008) which have incorporated perceived enjoyment and perception of external control. TAM was utilized in different domain because this model can include external variable. Different modifications were made of this model so that it can explain more percentage of variance and it can be adapt to different context (Hernandez Garcia, 2012) and these are significantly related to the TAM key variables (PEOU, PU, ATU) but with different proportion (Abdullah & Ward, 2016). TAM and its modified models have been utilized for explaining the user's behavior for different technologies such as e-government, e-tourism, web-based tools, and many more. The studies which used TAM for finding the adoption of technology in the field of education are increases in number. TAM considered as a dominating model for explaining the adoption of information system at organization level (King and He, 2006), dominant model for determining factors affecting user's acceptance of navel technical systems (Legris, P. et al, 2003), great predictive model of IT adoption (Adams, Nelson & Todd, 1992; Davis, et al., 1989; Venkatesh & Davis, 2000; Lee, Kozar, & Larsen, 2003; Venkatesh & Bala, 2008; Kiraz & Ozdemir, 2006; Teo, 2009) and explained variation in user's behavioral intention majorly for the adoption of information

technology (Hong et al., 2006). There are significant examples available of TAM used in research for both students and faculties/teachers at all educational level especially in the field of e-learning and higher education (Sanchez- Prieto J. C. et al, 2016; NafsaniathFathema et al, 2015; Ritter, 2017; Sumak et al., 2011; Scherer R., Siddiq F. &Tondeur J., 2018).

### **Perceived Usefulness**

Perceived Usefulness is defined as "the degree to which a person believes that using a particular technology would enhance his or her job performance" (Davis, 1989). High perceived usefulness is a core construct in explaining a positive user-performance relationship (C.S. onget al, 2006). Previous research indicated that perceived usefulness has a positive effect on attitudes and behavioral intention of a user (Davis et al, 1989; Venkatesh, 2000; Venkatesh & Davis, 1996, 2000; Venkatesh & Morris, 2000). Faculties are embracing new digital technology for conducting classes which in turn bring positive change on his or her practice (Mac Callum et al, 2014). Thus, the hypothesis is formulated:

H1: Perceived Usefulness (PU) has a significant positive effect on faculty's attitude towards usage (ATU).

### **Perceived Ease of Use**

Perceived ease of use (PEOU) is defined as "the degree to which an individual believes that using a particular System would be free of physical and mental effort" (Davis, 1985). PEOU has a significant strong effect on attitude to use (ATU) and Behavioral Intention (BI) (Kaplan et al, 2017; Park et al., 2015). Perceived ease of use influences Perceived usefulness. If the functions of new technology are easy to use then users consider it as useful technology (Davis, 1985). There is a positive relationship between PEOU and PU (Yang, 2005; Yang, 2012; Hsu, Chen, & Lin, 2017). Studies focused on e-learning in education institute pointed out that PEOU has influence on PU (Okazaki and Renda Dos Santos, 2012). Thus, the hypothesis is:

H2: Perceived ease of use (PEOU) has a significant positive effect on faculty's attitude towards usage (ATU).

H3: Faculty's perceived ease of use of Zoom communication software has a positive influence on their perceived usefulness.

As Covid-19 pandemic forces the education institutes to re-strategies for functioning of the classes in the institutes so that there will be a minimum loss of the students in terms of the syllabus, viva and other activities. Faculties are conducting classes online so that they can cope with this situation as instructed by their universities and schools (Abidah, A. et al, 2020). For conducting online classes, faculties are using different web based communication software (N. Kapasia et al, 2020). Faculties are feeling anxiety as this software is new to them. As this situation, there is a need of adding two variables in the TAM model which will include the anxiety faces by the faculties while using new technology and the condition of environment which forces faculties for using this new technology. In this study two new variables are incorporated in the TAM model for taking the concern of the users towards Environment and anxiety of the users.

#### **New Technology Anxiety**

New Technology anxiety is defined as an anchoring belief, influences the perceived ease of use of a system ( Venkatesh, 2000; Venkatesh and Bala, 2008; Demoulin and Djelassi, 2016). New technology anxiety has a negative impact on perceived ease of use (PEOU) of using new technology (Demoulin and Djelassi, 2016) and has a negative impact on technology acceptance (Chen and Chang, 2013), which would impact the acceptance of Zoom communication software for conducting online classes. Those people who feel tension while working with new technology may not feel comfortable with Zoom communication software. Thus, hypothesis is formulated as:

H4: New Technology anxiety negatively influences the perceived ease of use (PEOU) of Zoom communication platform.

H5: New Technology anxiety negatively influences the perceived usefulness (PU) of Zoom communication platform.

#### **Environmental Concern**

The Covid-19 ones again remind the environmental problems which aroused from industries development and human changing habits of eating. Worsening of environment motivates the world for environmental

protection awareness (Wang et al., 2017). The attitude towards environmental issues indicates the public awareness towards environment problems is pointed out the environment concern of the users (Russell & Joan, 1978). Previous studies indicated that environmental concern is positively related with people's environmental friendly attitude and behavior (Minton & Rose, 1997) and there are studies available for the green products (Ozaki et al., 2011; Wang, Zhao, et al., 2017). In this current pandemic situation; strategies are re-produced by education institute for conducting online classes. Environment concern is the most essential requirement in this epidemic era. Here, Zoom communication software is considered as green products because this technology helps the institute for conducting the classes as per the requirement of the current environment.

H6: Environmental concern (EC) will have positive influence on the attitude towards usage.

#### **Attitude towards Usage and Behavioral Intention**

Attitude is defined as "an individual's positive or negative evaluation of a given object" (Ajzen, 1991). Behavioral intention is defined as "an individual's probability that he or she will perform a specified behavior" (Fishbein and Ajzen, 1975). Previous research indicated a positive significant relationship between a person's attitude and that person's behavior (Brown and Stayman, 1992, Yang and Jolly, 2009; Yang 2012). Actual use is defined as "A person actual technology use" (Scherer R., Siddiq F. & Tondeur J., 2018). There are certain research studies considered Actual use as an outcome variable and some other studies considered BI and Actual use as outcome variables (Marangunić and Granić , 2015). There were studies which determined that behavioral intention is the determinant of the actual use of an e-learning system (S. Zhang, J. Zhao, and W. Tan ,2008 ; C. Yi-Cheng et al. 2007).

H7: Attitude towards usage will have a positive influence on user's behavioral intention (BI) the Zoom communication software.

H8: Behavioral intention (BI) will have a positive influence on Actual use(AU) of the Zoom platform by the users.

**Table1: Definitions of the Constructs**

Constructs	Definitions	Authors
Perceived Ease of use	"The degree to which a prospective users expects the targets system to be free of effort"	Davis et al., 1989; p.985
Perceived Usefulness	"Defined as a prospective user's subjective probability that using a specific application system will increase his or her job performance within an organizational context".	Davis, Bagozzi, &Barsaw, p.-985
Environment concern	The attitude, recognition and response towards environmental issues indicate the public awareness towards environment problems is pointed out the environment concern of the users.	Russell & Joan, 1978
New Technology Anxiety	Technology anxiety is defined as "an individual apprehension, or even fear, of using, or simply considering using, technology in general".	Venkatesh, 2000
Attitude towards usage	Attitude towards usage referred as "the evaluating effect of positive or negative feeling of individuals in performing a particular behavior".	Ajzen&Fishbein, 2000
Behavioral Intention to use	"A measure of the strength of one's intention to perform a specific behavior", in this case the use of Zoom communication software.	Davis et al., 1989; p.984
Actual Use	A person actual technology use.	Scherer R., Siddiq F. &Tondeur J., 2018

Source: Author Calculation

**Table 2: Application of TAM in Various Contexts**

Context	Authors
Health informatics	Hung and Jen, 2012; Zhang et al, 2010; Kowitlawakul Y., 2011; Schnall R. et al, 2011. Escobar- Rodriguez et al, 2012, Su S.P. et al, 2013.
Environment context	Ju, S. R., and Chung, M. S. (2014);
M-Learning	Prieto et al, 2015; Sánchez-Prieto et al,2016 ; Brown, C. P., Englehardt, J., &Mathers, H., 2016; Reid, P., 2014; José Carlos Sánchez-Prietoa et al, 2019; Fathema& Sutton, 2013, Park et. al.,2012
Education context	Ali Tarhini, Kate Hone and Xiaohui Liu, 2015; Cano-Giner et al, 2015; Kiraz&Ozdemir, 2006; Yuen, A. K., & Ma, W. K., 2008; Teo, 2009; Park, S. Y. , 2009; Teo, T., 2010; Park, S. Y., Nam, M., & Cha, S. ,2012; Tan et al, 2014; NafsaniathFathema et al, 2015; Scherer R., Siddiq F. &Tondeur J., 2018.
Cloud based e-learning	Burda and Teuteberg, 2014; Aharony, 2015; Senyo et al. , 2016; Tarhini et al., 2014; Tarhini et al., 2015; Arpaci, 2016; Ashtari and Eydgahi, 2015
Web-based Technology	Johnson &Hignite, 2000; Lee, 2006; Ngai et al, 2007, M.J. Sanchez- Franco et al, 2010;
Educational Video Games	Yang, Chien and Liu, 2012; Sung, Hwang and Yen, 2015; De Bie and Lipman, 2012; Shute, Ventura and Kim, 2013; Reinders and Wattana, Antonio Sánchez-Mena et al., 2014.

Source: Author Calculation

**Research Framework & Methodology**

On the basis of above previous literature, the research framework is developed which shows

a structural relationship between constructs. Statistical multivariate technique is used for analyzing the model. Structural equation

modeling is used for analyzing the relationship between constructs. Structural equation modeling (SEM) is a combination of factor analysis and multiple linear regression analysis technique which indicates the multiple causal effect relationship between the constructs (Hair et al, 2017).

pandemic situation. The data for this study collected during the month of May to June 2020. Data includes the responses of faculties/teaching staffs of various colleges of Gorakhpur and New Delhi to represent the adoption behavior of the Indian faculties for adopting the Zoom platform for online

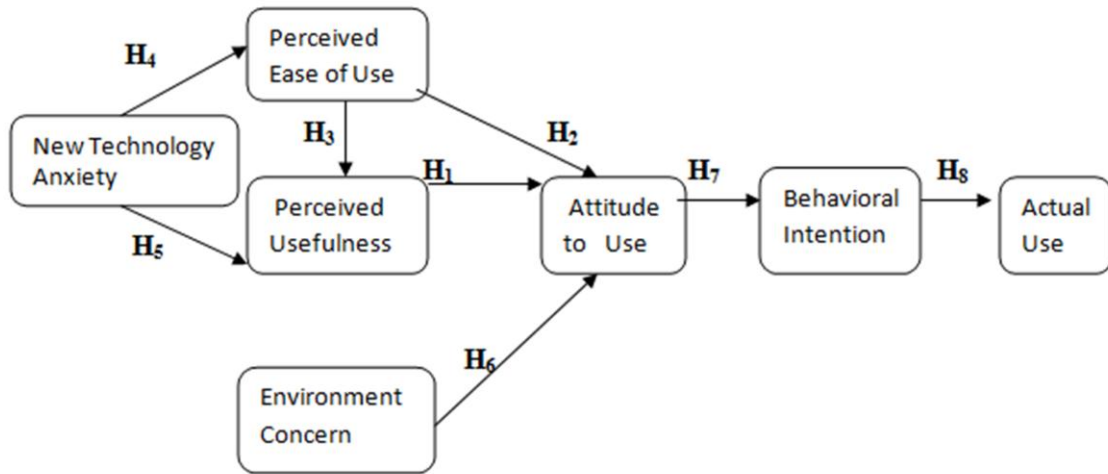


Figure1: Proposed Conceptual Model of Zoom-TAM

The present research was conducted on the education institutes/colleges/universities located in India majorly from Gorakhpur, and New Delhi. Data was collected through Google forms only for the purpose of maintaining the social distancing in this

classes/webinars/conferences. Non-probability purposive sampling method is used for collecting the data through online survey. The questionnaire was adapted and constructs to be assessed by reflecting modeling, then PLS-SEM in smartPLS which is

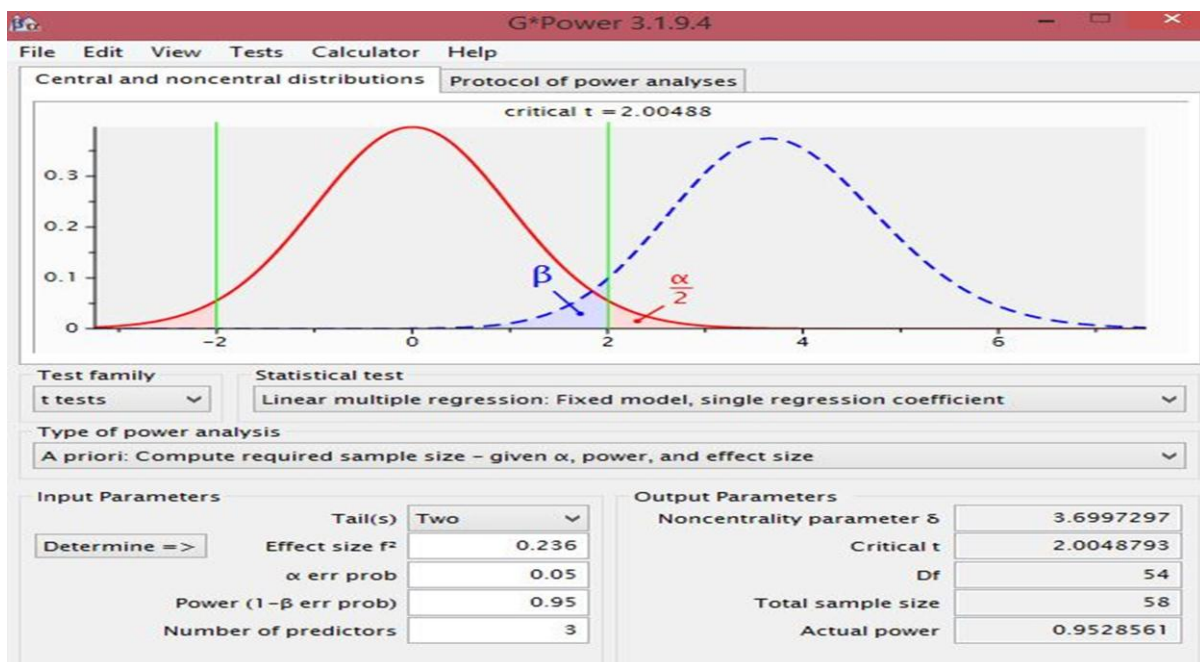


Figure 2 G\* Power Analysis (Faul et al. 2007; 2009)

Source: Author Calculation

a widely accepted multivariate analytical method (Hair et al., 2017; Hair et al., 2019). This study explored the behavioral intention of faculties towards the adoption of Zoom platform for conducting online classes and other activities by the education institutes in this COVID-19 situation. The sample size for the study is determined by the G\*Power software 3.1.9.7 version for the purpose of getting the minimum required sample size (Faul et al., 2007;2009). The minimum sample size required for the study is 58 respondents whereas sample size of 125 was utilized which satisfies the appropriate sample size requirements. The minimum sample size estimations are reported in Figure 2. The survey instruments consisted of 27 items

(given in Appendix A) to assess seven construct of the proposed model. Items were adopted from previous studies and modifications of the items in terms of content are done for making these items relevant to this study. Six constructs were measured on a seven point Likert scale ranging from 1 “Strongly disagree” to 7 “Strongly Agree”. To determining the actual usage of the Zoom communication software of the respondents were asked to rate the frequency of the usage on a seven-point scale 7 being “more than once a day” and 1 being “not at all”.

The core work of this paper is to determine the behavioral intention of the faculties of the universities and colleges towards the use of

**Table 4: Assessment Results of the measurement model for the constructs**

Construct/ Associated Items	Indicator Loading	Composite Reliability	AVE
<b>Perceived Usefulness</b>			
PU1	0.814	0.914	0.618
PU2	0.848		
PU3	0.816		
PU4	0.826		
PU5	0.820		
<b>Perceived Ease of Use</b>			
PEOU1	0.833	0.936	0.745
PEOU2	0.815		
PEOU3	0.885		
PEOU4	0.862		
PEOU5	0.917		
<b>New Technology Anxiety</b>			
NTA1	0.889	0.939	0.795
NTA2	0.896		
NTA3	0.887		
NTA4	0.895		
<b>Environment Concern</b>			
EC1	0.884	0.891	0.731
EC2	0.861		
EC3	0.819		
<b>Attitude towards Use</b>			
ATU1	0.834	0.914	0.726
ATU2	0.857		
ATU3	0.849		
ATU4	0.868		
<b>Behavioral Intention</b>			
BI10.745	0.843	0.641	
BI20.851			
BI30.803			
<b>Actual Use</b>			
AU10.836	0.862	0.676	
AU2	0.826		
AU3	0.805		
Note: AVE: Average variance explained			

Source: Author Calculation

the Zoom communication software in their teaching practices in this Covid-19 pandemic situation and ultimately behavioral intention is actually lead to the actual usage of the Zoom platform. The respondents were majorly from Delhi University, Deen Dayal Upadhyaya University and rest belongs to others. The sample of this paper includes 49.6% were female and 50.4% were male. The majority of the faculties were from New Delhi (52%). The majority of the faculties were Assistant professor (32.8%), total 27.2% were lecturers, 23.2% were Associate professor and only 16.8 % were Professor.

**Model Assessment**

PLS-SEM technique is used for model assessment. It start from the analyzing the reliability of the items. It can be done through standardized loadings analysis (Table 4). Each item scored loading above than 0.708. Each item retained in the model. The convergent and discriminant validity is checked. The next step is assessing the composite reliability for checking the internal consistency of the

construct which in turn indicate the internal consistency reliability (Shashi K. Shahi, Atul Shiva and Mohamed Dia, 2020).

The convergent validity is verified by employing the composite reliability index (CRI) and average variance explained (AVE). All construct’s AVE is above than 0.50 which is a minimum threshold requirement for validity (Hair et al, 2017).

Fornell-Larcker criterion is used for checking discriminant validity (Fornell&Larcker, 1981). As per Fornell-Larcker criterion, discriminant validity will be there if the variance among the constructs is lower than the variance that each construct shares with its items. We consider that there is discriminant validity when the square root of the AVE is higher than the correlation index. As per Table 5, all construct comply with the Fornell -Larcker criterion.

Discriminant validity is also checked by HTMT. The HTMT method is a new technique to assess discriminant validity developed by

**Table 5: Discriminant Validity - Fornell-Larcker Criterion**

	ATU	AU	BI	EC	NTA	PEOU	PU
ATU	<b>0.852</b>						
AU	0.396	<b>0.822</b>					
BI	0.568	0.609	<b>0.801</b>				
EC	0.678	0.376	0.636	<b>0.855</b>			
NTA	-0.523	-0.233	-0.4	-0.48	<b>0.892</b>		
PEOU	0.759	0.42	0.579	0.546	-0.683	<b>0.863</b>	
PU	0.768	0.383	0.539	0.55	-0.6	0.786	<b>0.825</b>

Note: ATU: Attitude towards Use; AU: Actual use; BI: Behavioral Intention EC: Environment Concern;NTA: New Technology Anxiety; PEOU: Perceived ease of use; PU: Perceived Usefulness  
Source: Author Calculation

**Table 6: Discriminant Validity -Heterotrait Monotrait Ratio (HTMT)**

	ATU	AU	BI	EC	NTA	PEOU	PU
ATU							
AU	0.484						
BI	0.698	0.812					
EC	0.798	0.469	0.823				
NTA	0.581	0.278	0.496	0.551			
PEOU	0.847	0.5	0.711	0.631	0.746		
PU	0.871	0.467	0.659	0.645	0.662	0.872	

Note: ATU: Attitude towards Use; AU: Actual use; BI: Behavioral Intention EC: Environment Concern;NTA: New Technology Anxiety; PEOU: Perceived ease of use; PU: Perceived Usefulness  
Source: Author Calculation



Henseler, Ringle and Sarstedt (2015). The indexes obtained by the HTMT ratio should be below 0.85 applying a more restrictive criterion (Kline, 2011). To a liberal view, the paper of Gold et al, 2001, the HTMT can go to 0.90. Table 6 indicated that all the relationship have scores under 0.90.

### Structural Model Assessment

After establishment of reliability and validity of the measurement model, the coefficient of multiple regression equation is estimated with the purpose of determining the relationship between the constructs which includes dimensions of attitude and behavioral intention of faculties to use Zoom platform and ultimately result into the actual use of the Zoom. The variance inflation factor (VIF) examined the collinearity between the exogenous variables using the latent variable scores of the PLS-SEM results, to ensure the regression results are unbiased. VIF value under 5 indicates that no collinearity issues among predictor variables (Kock and Lynn, 2012).

In this study, model has values of VIF range from 1.353 to 3.31 except PEOU5 which has 4.197 VIF value. Except PEOU5, rest of the variables met the requirement of threshold value of 3.33 (Diamantopoulus and Sigouw, 2006). Although all variables' VIF is below 5 means no collinearity issue. After investigating collinearity issue, the significance and relevance of the path coefficients should be checked (Shiva et al., 2020).

The hypotheses in the structural model are tested using the bootstrapping method which assesses the significance of the path coefficient and evaluates their confidence intervals. The regression coefficients for path for one such bootstrap sample are shown in Figure 2. Coefficient of determination, R<sup>2</sup> value is also determined for each regression equation in the structural equation model. R<sup>2</sup> values measures the variance in each of the endogenous constructs, which is explained by the explanatory variables and is a measure of the model's explanatory power, also referred to as in-sample predictive power (Hair et al., 2017).

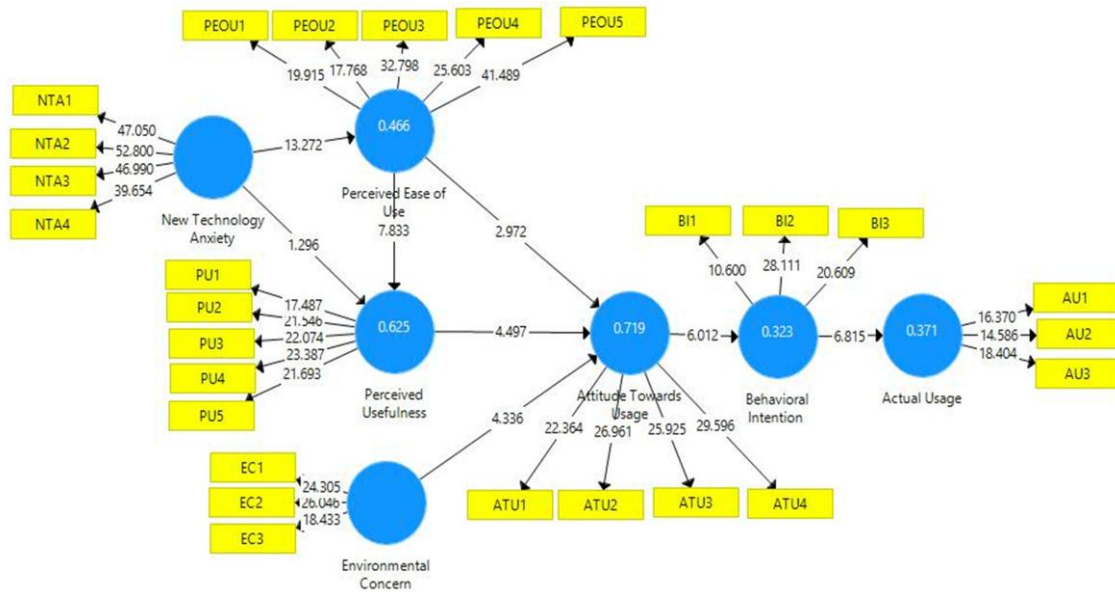
The minimum threshold acceptable value of R<sup>2</sup> value is based on the context, although low values of R<sup>2</sup> are considered satisfactory in the

PLS-SEM analysis (Raitheletal.,2012). The R<sup>2</sup> values in this study ranged between 32.3 to 71.9%. The proposed model is able to explain over a 32.3 percent of the variance of the participant's behavioral intention and 37.1 percent of the variance of the faculties' actual use of the software for conducting online classes. This model is able to explain the 46.6 percent of perceived ease of use (PEOU) through the influence of New Technology Anxiety (NTA). Perceived ease of use (PEOU) and New technology anxiety (NTA) are able to explain 62.5% of perceived usefulness. Perceived ease of use (PEOU), Perceived Usefulness (PU), New Technology Anxiety (NTA) and Environmental concern (EC) is able to explain 71.9 percent of attitude towards usage (ATU).

The result found six hypotheses are supported at 1 percent level of significance (Table 7). Perceived usefulness ( $\beta=0.348$ , p value=0.00) and Perceived ease of use ( $\beta=0.313$ ; p value=0.00) has a significant positive influence on the Attitude of the faculties towards use of the zoom platform for conducting online classes and other activities in this pandemic time. So, H1 and H2 alternative hypotheses were duly supported by the result. Perceived ease of use has significant positive influence on perceived usefulness as Beta ( $\beta$ ) is 0.704 and p value is 0.00 which indicated that alternative hypothesis H<sub>3</sub> was duly supported that the perceived ease of use positively influences the perceived usefulness.

In Technology acceptance model, two constructs were added by taking proper consideration of previous literature. New Technology Anxiety and Environmental Concern constructs were added in the TAM model as per the requirement of the current pandemic situation.

Although New technology anxiety has a significant negative influence on the perceived ease of use ( $\beta= - 0.683$ , p-value = 0.00) so alternative hypothesis H<sub>4</sub> was supported but New Technology Anxiety has a negative (non significant) influence on the perceived usefulness ( $\beta= - 0.12$ , p=0.19) which fails to reject the null hypothesis H<sub>5</sub>.



**Figure 3: Testing the Structural Equation Model of Zoom-TAM**

The Covid-19 epidemic reminds the people about awareness regarding environment requirements. Environmental concern has a significant positive influence on the attitude of the faculties for using Zoom communication software as  $\beta=0.316$ ;  $p$  value = 0.00 so  $H_6$  was supported by the analysis. Attitude of faculties towards using Zoom communication software is positive and significantly influences the behavioral intention as  $\beta = 0.568$ ;  $p$ -value = 0.00 so in this case  $H_7$  is also supported. Behavioral intention is considered as the determinant of the actual usage of the software by the faculties.

As per the result, behavioral intention was positive and significant in influencing the actual usage of the Zoom platform by the faculties. The present study assessed the predictive power of the model by processing the Stone-Geisser's (Q<sup>2</sup>) cross-validated redundancy, a blindfolding procedure in PLS, setting omission distance of 7 as a criterion for predictive relevance (Hair et al., 2016; Chin, 2010). Q-square measures the predictive relevance of a model and Q-square evaluated for this model is presented in Table-8 which showed that this model has strong predictive power.

**Table 7: Hypothesis testing using PLS structural Model for the Adoption of Zoom Communication Software by the Indian Faculties**

Hypotheses	Original Sample (Beta)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics ( O/STDEV )	P Values	Decision
H <sub>1</sub> : PU -> ATU	0.348	0.345	0.075	4.614	0.00***	Supported
H <sub>2</sub> : PEOU -> ATU	0.313	0.316	0.106	2.964	0.003***	Supported
H <sub>3</sub> : PEOU -> PU	0.704	0.701	0.09	7.839	0.00***	Supported
H <sub>4</sub> : NTA -> PEOU	-0.683	-0.682	0.052	13.248	0.00***	Supported
H <sub>5</sub> : NTA -> PU	-0.12	-0.119	0.091	1.311	0.19	Not Supported
H <sub>6</sub> : EC -> ATU	0.316	0.313	0.073	4.315	0.00***	Supported
H <sub>7</sub> : ATU -> BI	0.568	0.565	0.094	6.077	0.00***	Supported
H <sub>8</sub> : BI -> AU	0.609	0.61	0.089	6.831	0.00***	Supported

**Note: \*\*\* significant at 1%; ATU: Attitude towards Use; AU: Actual use; BI: Behavioral Intention EC: Environment Concern; NTA: New Technology Anxiety; PEOU: Perceived ease of use; PU: Perceived Usefulness**

Source: Author Calculation

**Table 8: Predictive Power of the Model**

Constructs	R <sup>2</sup>	Adj-R <sup>2</sup>	Q <sup>2</sup>
<b>Attitude towards Usage (ATU)</b>	0.719	0.712	0.529
<b>Actual Usage (AU)</b>	0.371	0.366	0.348
<b>Behavioral Intention (BI)</b>	0.323	0.318	0.293
<b>Environmental Concern (EC)</b>	-	-	0.443
<b>New Technology Anxiety (NTA)</b>	-	-	0.637
<b>Perceived Ease of Use (PEOU)</b>	0.466	0.462	0.61
<b>Perceived Usefulness (PU)</b>	0.625	0.619	0.511
<b>Note: R<sup>2</sup>: Coefficient of determination; Adj-R<sup>2</sup>: Adjusted R<sup>2</sup></b>			

Source: Author Calculation

### Discussions and Managerial Implication

This paper attempted to test the Zoom-TAM research model in the context of use of Zoom platform for conducting online classes or other activities by the faculties of Indian universities in the Covid-19 era therefore this study contributed to the research in the field of e-learning acceptance based on the technology acceptance model(TAM).The study confirms that the TAM predicts user behavior efficiently for all the users of a new technology (Pynoo et al.,2011) and there are studies available which provide evidence of the appropriateness of applying TAM to determine the acceptance of Web based tools for learning in higher education institute (E.W.T. Nagai et al, 2007). This study sought to assess the impact of environmental concern as an external variable to the TAM. The testing of fit of TAM on entire sample of faculties is done in this paper and also examined the extent of external variable is able to explain variation in PEOU and PU. This paper included New technology anxiety as an external variable (Ainsworth Bailey et al. 2017) and Environmental Concern (Yoo, W., Yu, E., Jung, J., 2018) for analyzing the adoption of Zoom communication software for online classes by the faculties. Concern for environment actually forces the faculties for the acceptance of this technology so that lockdown period was efficiently used by the faculties. The respondents were using Zoom platform for the first time for academic or classes' purpose. While using new technology, users generally have anxiety regarding operational activities of the technology and privacy concern of the technology. It is most suitable constructs which are as per the current scenario added to the model. The hypotheses were tested with the help of PLS-SEM. This study fails to reject one null hypothesis and rest 7 hypotheses were

supported. The majority of the faculties have started using online platforms for taking online classes as per the instruction of their colleges/universities in the covid-19 era (Abidah et al., 2020). The results of this study revealed that the perceived usefulness and perceived ease of use key constructs of TAM that directly influences the faculties' attitude (Heather Holden & Roy Rada, 2011; Teo and Noyes, 2011) and ultimately attitude influence Behavioral intention of the faculties towards using Zoom platform (Yang, 2012; Smith et al., 2014). The behavioral intention of the faculties significant and positively influences the faculties for actual use of the system, the result is consistent with the study of W.T. Wang et al. 2009. This study also found the positive and significant incorporating additional perceived usefulness by perceived ease of use as consistent with the study of Heather Holden & Roy Rada, 2011; W.T. Wang et al. 2009; Franklin, 2007). In online learning, Perceived ease of use is proofed as an essential for the perceived usefulness and attitude of the faculties towards using Zoom software for processing web-classes (Wu and Zhang, 2014). New technology gave anxiety to users during usage of technology (Venkatesh, 2000; Demoulin and Djelassi, 2016). This study indicated that New Technology Anxiety have a negative and significant influence on perceived ease of use and the link between New technology anxiety and perceived usefulness are proving insignificant as consistent with the study in different domain of Ainsworth Bailey et al, 2017. Environmental concern construct was added in the model as an external variable which is comes out significant for influencing the attitude of the faculties towards such web-based tools. Although this result is not consistent with the study of Yoo, W., Yu, E., Jung, J., 2018 and the

reason might be the exploration of this relationship in this study was in different domain. Perceived ease of use, perceived usefulness and environmental concern are three predictors of users' Attitude towards accepting the Zoom platform for processing online classes/ webinars during this pandemic time. All three predictors of attitude of faculties have positive and significant influence on the Attitude of the faculties. Effect size indicated that environmental concern has a largest effect on Attitude towards usage and the reason behind is faculties were started using such platforms more only after the government announced lockdown across the nation. The only possible way out faculties has in this lockdown period is starting the web-classes of the students and webinars for executing the academic sessions and other university activities. Government of India has closed the colleges till the situation get better for showing the concern for environment and people (MINISTRY OF EDUCATION, 2020), therefore environmental concern was a strong predictor of the attitude towards usage of such technology. Majority of the faculties were using Zoom platform for online classes/ webinars in this pandemic time only.

## CONCLUSION

This study has developed an integrated model for explaining and predicting faculties' adoption of Zoom communication software for conducting online classes/webinars during this Covid-19 pandemic time. This study is processed in the context of higher education and there is also an inclusion of faculties' intention towards such technology which ultimately leads to the actual use of the technology. The proposed model was examined by PLS-SEM. Seven out of eight hypotheses were supported providing insight of faculties' adoption of Zoom platform for web-based learning system.

This study included some limitations. This research determined the acceptance of faculties so this paper is as per the higher education context. The findings of this research may not be generalized to other domain such as primary school and intermediate school. This study utilized the purposive sampling (Straits & Singleton, 2017) for data collection process. The purposive sampling holds one limitation that the sample doesn't generally represent the whole

population. This study has investigated the adoption of Zoom platform by the faculties by adding exogenous variables from different perspective and these variables were able to explain a significant amount of the variance of actual use of the system (37.1%) so still there is a portion available for improvement. The context of this study was around the adoption of Zoom platform for conducting classes during Covid-19 period. The responses were collected with the intention of getting responses purely on the basis of changes faced by the faculties during the Covid-19 period. It was also considered as mandatory adoption of Zoom platform for conducting classes by the faculties as per the instruction of institutes/ colleges in the Covid- 19 period. Further research is required to determine the actual adoption of such technology by the education institutes for learning after Covid-19 and results of both the study can be compared for getting more insight information.

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