Employee Perception and Behavioral Intention to Adopt BYOD in the Organizations

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Abstract—With increasing entrenchment of Information & Communication Technologies (ICT) around the globe, organizations are considering formalize the phenomenon of "Bring Your Own Devices (BYOD)". It emerges to be a best way for organizations to reduce cost on latest high technical devices and off from future investments that have been already made by employees. It costs nothing in comparison to its high advantages. Still, till date there is petite research being undertaken to analyze the extent to which organizations is embracing this concept. Therefore, the rationale of the study is to evaluate the employees' perceptions towards BYOD & their intentions to make use of their own devices for organizational purpose. For the study, a survey was conducted among the employees of various companies in the National Capital Region of Delhi. SPSS AMOS being used for the purpose of analysis. The results & findings can facilitate companies devise strategies to enhance the use of BYOD concept in India.

Keywords—BYOD, Employees Perceptions, Intention to Adopt, Personal Innovativeness

I. INTRODUCTION

"Bring Your Own Device" is a rapidly emerging work policy adopted by modern organizations. It permits employees to use their own devices like smart phones, tabs, I pads, laptops and other technological devices which can help them for their work at inside or outside the workplace. During the last decade it has become very common in the organizations for employees to have dual-use and dual purpose, twin use as devices used both at home and at work as per convenience and dual purposes are professional and private purposes. It emerges to be a best way for organizations to reduce cost on latest high technical devices and off from future investments that have been already made by employees. It costs nothing in comparison to its high advantages- Employees familiar with their own devices and its operating system so this would be time saving approach with less technical difficulty. It also brings flexibility and more convenience. Employee doesn't need to carry two different devices i.e. personal and professional device and also bring freedom to employee to work from anywhere any time. In such a scenario, it becomes imperative to understand employee perceptions regarding BYOD and its implications so as to formalize policies regarding BYOD. Therefore, this paper is intended to study the employees' perceptions towards BYOD & their intentions to adopt their own devices for organizational purpose.

A research study conducted in this regard reveals that 96% of organizations permit their employees to utilize some of their personal devices, that show 36% support for all employee-personal devices, and that 49% give support to selected devices (Brodin, Rose.2015). Some past studies also indicate that BYOD has many positive indications from employee's perspective in terms of employee's mobility, productivity, efficiency and overall satisfaction from work life. It also reduces operational cost (Askar, Shen,2016). Gartner Research specifies that in an employee survey 39% employees rely on their own devices at the workplace. Only 10% employees have shown interest in organizational owned devices which is very less in comparison. So it is very obvious that people are declining their interest in corporate devices, which reduces high burden cost for organization (Stamford Gartner survey, 2016). Using your own device for work increases mobility and flexibility in work life which increases employee satisfaction.

Though, at the same time there are several threats identified such as privacy infringement, extension of working hours and likewise. The employee who easily understands BYOD might contribute in enhancing his own performance and can give potential contribution at work. However, organizations offer this option to the employee who is not familiar with BYOD which tends to perceive more threats rather those benefits (Chountalas, Karagiorgos, 2015). In some past studies, it was found that organizations lack proper system for auditing of such devices. Some top officers reported that employee's own devices have never been audited and some stated this device frequently audited. Overall study indicates that organizations needs to set some compliance with respect to security policy (Garb, Armarego, Murray,2015)

Technological devices are backbone when it comes to business operations, productivity and outcome. BYOD becomes a movement in the organizations; it has numerous benefits for company and workers alike. Tech Pro Research surveyed 206 professionals to find out how BYOD is affecting their organization around the world. 57% employees shown their interest and their organization are also supporting their own device working system (Tech pro Research, 2015).

Scholars found BYOD has room to improve and needs to work on its existing loopholes. Expert's advices applying multilayered approach when developing BYOD security policy. Existing BYOD system will eventually grow in broaden way with the flexibility of business needs and also with security from cyber crime (Downer, Bhattacharya). It's been a decade when BYOD introduced in some form in the

organizations. It only requires an organized and well stated policy. In the education sector government and IT companies may support to BYOD system with aim to enhance learning resource within their comfort zone (Rahat afreen, 2015). Research says more than 240 organizations are supported by TNC for the development of mobility strategy to place in current market for more solutions in BYOD and set in market trends in telecom sector(TNC Research,2018).

According to Cisco survey BYOD shows that employees feel very comfortable and homely environment at their work place. Their productivity also rises as report says it increases productive time of 37 minutes per week (GetHppy Cisco Research, 2014). Current BYOD statistics can facilitate us to understand the effect of BYOD in the workplace. Target of BYOD market reach approx 367 billion by 2022 from 30 billion in 2014. Approx 59% Organizations allow their employees to use BYOD system for work purposes. Another 13% have planned to implement BYOD within a year, as seen in Figure1; There are six out of ten companies who followed BYOD friendly system.(Michael Lazar.2017).
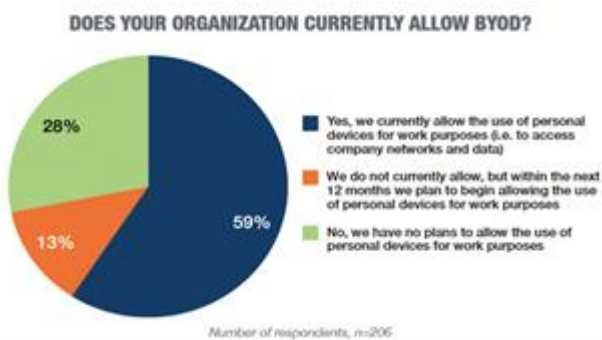

Fig. 1. Does Your Organization Currently Allow BYOD [24]

According to Capgemini report, 19% of organizations admits that BYOD plays great role to enable employee satisfaction on the other hand 17% perceived that it helps to raise productivity at workplace (Capgemini report). New literature on BYOD shows that employees like this approach and large number of employees opting to use and apply their personal devices for professional purpose. Organizations have created formal policies for BYOD. Intel is an example which started BYOD journey in 2010 with 19,000 employees.

II. LITERATURE REVIEW

TAM, i.e., Technology Acceptance Model is a proven model useful in understanding and demonstrating behavior and performance in the implementation of Information system. TAM has been observed and experienced in several practical research studies and its tools and techniques are of great quality and have proven statistically reliable results. In the field of education, learning and development, the "Technology Acceptance Model" plays vital role and directs researchers to plan and design various user's interface for

diverse online customers, and therefore it achieves usage of high user in various application areas (Shih-Chih Chen, Chien-Yi Li, Shing-Han Li.2011).

Similarly, TRA i.e Theory of Reasoned Action model comprises 3 different theoretical factors namely perceived usefulness (PU), behavior intention (BI) & perceived ease of use (PEU) (Lai, 2017). Several studies state that managerial performance and organization growth will increase if there is high rate of employees' satisfaction and flexibility.As a result, growth of organizations is strongly tangled amid employees' growth & benefits provided to them such that organization's wants to increase benefit only when employee is beneficial for them. Keeping this in view, this study observes BYOD as the gift of wealth & implements BYOD policy as an endowment from organizations to their employees (ChunXiao Yin, Lili LIU, Libo Liu 2014).

TAM has wide significance in explaining and demonstrating ILS professionals' answer to use and adoption of Information technology. The regular utilization and applications of the TAM is correct and justifiable, particularly with several associations specified by the TAM repeatedly authorized and confirmed in the IT profession and huge degree explained variables which are dependent in nature. (Durodolu, 2016). TAM developed by Davis (1989), is a very strong model in the research area of technology and ICT. Over past decade, TAM has established substantial consideration in research area of information system for the researchers (Chen, LI.2011).

Many NGOs and government organizations are highlighting and emphasizing the essential need to turn out digitally knowledgeable, technologically literate and able graduates who are employable in the worldwide spreaded information economy. ICTs "Information and communication technologies" are captivating on an ever-bigger fame in education and also at the work place. Many teachers, Mentors and instructors have focused to develop students who must be creative, Educational approaches are assisting by smart classes concepts, use of digital techniques while others emphasize the role of collaboration in building well connected and well aware global citizen and online communication in which BYOD plays significant role (Franklin, Ismail Z,2015).

Employee emotional reactions, and observance regarding BYOD policies in terms of confidentiality and security is a constant challenge for organizations to check, continuous monitor, hold and maintain. Policies are required to include strategies and guidelines for managing situations where employees reveal resistance, using mobile phones for private activities or experience challenge adjusting with technological changes. This is a predisposition and tendency of employees to not follow proper guidelines set by organization or unaware with changes happening in organizations in the fix tenure, which emphasizes the requirement of continuous reinforcement, counseling and training. Employees who are not admitting or are in opposition with limitations imposed by BYOD security

policies, will aggressively seek loopholes to exploit (Downer ,2015).

III. HYPOTHESES DEVELOPMENT AND RESEARCH MODEL

After an extensive literature review, a "Conceptual Research Model" with research hypotheses have been formulated as given (Fig. 2). This new proposed model adopted the TAM (Davis 1989) as the theoretical foundation owing to its simplicity, robustness & parsimony (Mathieson et al. 2001, Cheng et al. 2006, Venkatesh & Bala 2008, Abbasi et al. 2011).

It is argued that in addition to the basic TAM- PEOU and PU, Personal Innovativeness should also be considered as a factor influencing the intentions & attitude of employees to opt for BYOD. Therefore, this research study developed & analyzed a model to envisage the perceptions and intentions of employees in organizations to adopt BYOD.
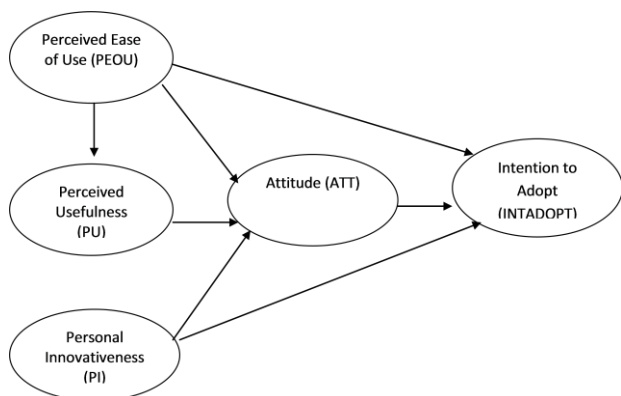

Fig. 2. Proposed Model

The proposed model suggests the relation amongst various latent variables- Personal Innovativeness (PI), Perceived Ease of Use (PEOU), Attitude (ATT), Perceived Usefulness (PU) and Intention to adopt (INTADOPT). In this model, the adoption intention is determined by various constructs namely- Personal Innovativeness (PI), Perceived Ease of Use (PEOU), Perceived Usefulness (PU) and Attitude. Various research hypotheses framed for the study are given below:

TABLE I. DEFINITION OF RESEARCH HYPOTHESES

Hypotheses	Description	Path
H1	Perceived Usefulness (PU) significantly affect Attitude (ATT)	PU →ATT
H2	Perceived Ease of Use (PEOU) significantly affect Attitude (ATT)	PEOU →ATT
H3	Perceived Ease of Use (PE) significantly affect Intention to Adopt (INTADOPT)	PEOU →INTADOPT
H4	Perceived Ease of Use (PEOU) significantly affect Perceived Usefulness (PU)	PEOU → PU
H5	Personal Innovativeness (PI) significantly affect Attitude (ATT)	PI→ATT
H6	Attitude (ATT) significantly affect Intention to Adopt (INTADOPT)	ATT→ INTADOPT
H7	Personal Innovativeness (PI) significantly affect Intention to Adopt (INTADOPT)	PI→ INTADOPT

IV. RESEARCH METHODOLOGY

Research Instrument

To test the hypothesized model, a quantitative approach been adopted the survey instrument for data collection where responses collected from the employees of various companies in Delhi-NCR. Respondents were requested to fill up a survey questionnaire which comprises of two sections. Section 1 consists of questions regarding various items like personal innovativeness (PI), perceived ease of use (PEOU), perceived usefulness (PU), intention to adopt (INTADOPT), attitude (ATT) and section 2 includes several demographic questions. However, in the questionnaire not all items have been used for the purpose of this research. Likert scale (Five Point) is used for survey which consists of options varying from "Strongly Agree" to options "Strongly Disagree" for section 1.

Pretesting of the questionnaire was undertaken by discussing with 2 officials responsible for formulating BYOD strategies for their organizations. Also, a pilot study been carried out with twenty respondents to assess the efficacy of the questionnaire. Based on this, the questionnaire was then modified incorporating the suggestions made. For all the items, cronbach alpha values been calculated and the items for which the value was greater than 0.7 have been retained and few items with lesser values were dropped.

The results from the sample were analyzed using SPSS AMOS v. 24.0 Software. SEM i.e Structural Equation Modeling been used for hypotheses testing so as to validate the proposed research model. SEM 2-step approach as suggested by Anderson & Gerbing's (1988) been used whereby the evaluation of CF Measurement Model (MM) leads the estimation and evaluation of Structural Model (SM) so as to investigate the relationship between the model constructs.

Data Collection

For data collection, the modified questionnaire has been used and a total of 400 questionnaire been circulated. Total 367 feedback and responses were collected of which 11 responses were incomplete. Therefore, for the purpose of data analysis 356 responses have been used.

The survey respondents have been people who are residing in the National Capital Region of Delhi and

working with organizations more specifically related to IT or ITES. The sample demographics of survey respondents (Table 2) indicate a fair proportion amongst female and male respondents' i.e 48% male and 52% female. A vast majority of respondents are young- 61% are of age group up to 30 years and 32% are in age group 31 to 40 years, whereas only 7% is above 40 years of age. With respect to their educational qualification, 76% are Post Graduate and remaining 24% did graduation only. Finally, 16% of respondents have gross monthly income exceeding 100,000; 32% between 50,000- 100,000; 35% have in between 25,000- 50,000 whereas only 17% had an income upto 25,000.

TABLE II. SAMPLE DEMOGRAPHICS OF RESPONDENTS

Demographics		Frequency	Percentage (%)
Gender	Male	171	48
	Female	185	52
Age	21-30 Year	219	61
	31-40 Year	115	32
	41-50 Year	22	7
Gross Monthly Income (Rs)	Upto 25,000	63	17
	25,000- 50,000	124	35
	50,000- 100,000	112	32
	Exceeding 100,000	57	16
Educational Qualifications	Graduate	88	24
	Post Graduate	267	76

V. RESULTS

Reliability and Validity

Confirmatory factor analysis has been used to analyze and evaluate the reliability & validity of the research instrument, cronbach alpha values greater than 0.7 represent good reliability (Chin 1998). All the constructs have cronbach alpha values exceeding 0.7 which indicates good reliability (Table 3).

Further, in structured equation modeling the factor loadings serve as a marker for convergent validity. Result of this research shows that all the items have factor loadings greater than 0.7 i.e the suggested level(Hair *et al*. 2006). As per the recommendation of Fornell and Larcker (1981), the composite reliability (CR) values should exceed the level of 0.7 & value of average variance extracted (AVE) should be than greater than 0.5. As given in Table 3, the CR values and AVE of all the items have been greater than the recommended values, therefore we ensure convergent validity.

By comparing the AVE with squared inter-construct corelation the discriminant validity has been evaluated for every construct. . The discriminant validity was verified since the AVE value for every construct was found to be greater than squared inters construct correlation for that construct. (Table 4) as recommended by Fornell and Larcker (1981) and again by Hair *et. al.* (2006).

TABLE III. RELIABILITY AND VALIDITY MEASURES

Construct	Items	Standardized Factor Loadings	Cronbach's Alpha	CR	AVE
PI	PI1	0.86	0.85	0.85	0.75
	PI2	0.87			
PEOU	PEOU1	0.87	0.79	0.80	0.79
	PEOU2	0.77			
PU	PU1	0.85	0.82	0.83	0.71
	PU2	0.83			
ATT	ATT1	0.91	0.86	0.91	0.77
	ATT2	0.86			
	ATT3	0.87			
INTADOPT	INTADOPT1	0.72	0.76	0.76	0.62
	INTADOPT2	0.84			

Note: PI- Personal Innovativeness; PEOU- Perceived Ease of Use;
PU- Perceived Usefulness; ATT- Attitude; INTADOPT- Intention to adopt

TABLE IV. DISCRIMINANT VALIDITY

	PI	PEOU	PU	ATT	INTADOPT
PI	0.86				
PEOU	0.30	0.88			
PU	0.14	0.36	0.84		
ATT	0.19	0.20	0.30	0.87	
INTADOPT	0.14	0.26	0.19	0.14	0.78

Note: Diagonal (i.e. italics) values are square root of AVE and off diagonal are inter-construct squared correlations.

Model Fitness

To analyze and evaluate the measurement model (CFA model) which fit of overall goodness, the study uses 7 most commonly recognized fit indices: "Ratio of chi square to Degrees of Freedom ($\chi 2$/d.f), Normalized Fit Index (NFI), Comparative Fit Index (CFI), Tucker- Lewis Index (TLI), Goodness of Fit

Index (GFI), Adjusted Goodness of Fit Index (AGFI), and Root Mean Square Error of Approximation (RMSEA) as recommended by Browne and Cudeck (1993), Doll *et. al* (1994) and Hair *et. al* (2006)". All the results go beyond the suggested level thereby justifying the validity of the MM (CFA) Model (Table 5).

TABLE V. GOODNESS OF FIT STATISTICS OF MM (CFA) MODEL

Fit Indices	Recommended Value	Measurement Model
χ2/d.f.	≤0.05	4.34
NFI	≥0.90	0.93
CFI	≥0.90	0.94
TLI	≥0.90	0.93
GFI	≥0.80	0.81
AGFI	≥0.80	0.84
RMSEA	≤0.08	0.07

Hypotheses Testing

The proposed hypotheses as to test, the study conducted a path analysis. Figure 2 & Table 6 shows the results of path coefficients between the variables and hypothesized testing results. For the purpose, standardized regression weights have been used as recommended by Hair, Black, Babin, Anderson and Tatham (2006) since these weights helps evaluating the relative effect of independent variable on the dependent ones. Out of the 7 hypotheses, 5 were positively considerable and significant at acceptance levels of $p<0.001$ and $p<0.05$.

TABLE VI. REPORT OF HYPOTHESES TESTING

Hypotheses	Relationship (Positive)	Standardized Regression Weights	Supported
H1	PU →ATT	0.139	Yes
H2	PEOU →ATT	0.397	Yes
H3	PEOU →INTADOPT	0.354	No
H4	PEOU → PU	0.077	Yes
H5	PI→ATT	0.098	No
H6	ATT→ INTADOPT	0.453	Yes
H7	PI→ INTADOPT	0.432	Yes

Discussion

This study observed the perceptions and adoption intention of employees for BYOD using an extended TAM. The outcome of the study provides support for proposed research model. The basic TAM suggests that there are only two factors PU and PEOU are significant factors or determinants of Intention to adopt/ use (Davis 1989). The results of this study too demonstrate the same. In addition, the outcome of this empirical study provides several other attention-grabbing insights. Both determinants of the study PEOU and PU proved to be important antecedents of attitude, while personal innovativeness was found to have insignificant impact on attitude.

Likewise, attitude and personal innovativeness significantly affect the employees' intention to adopt BYOD whereas PEOU seems to have no impact on adoption intention. So it implies that that ease of use is not a major factor that could attract the employees to opt for BYOD. This is surprising and needs a more detailed analysis to understand this strange behaviour. One reason for this might be the security issues and the costs incurred for maintaining these devices which overpower the ease of use. On the other hand, PEOU affects attitude & that attitude significantly affect adoption intention (INTADOPT). Therefore, perceived ease of use indirectly affects adoption intention. Also, the significant impact of personal innovativeness on adoption intention indicates that if the organizations have more innovative employees, the rate of BYOD adoption would increase.

Results of this study also advocate the major impact of PU on PEOU. The same results have been demonstrated by previous research in this field. (Davis, Bagozzi, and Warshaw 1989; Adams, Nelson & Todd, 1992; Taylor and Todd 1995; Venkatesh and Morris 2000; Park, S Y 2009; Dauw et al 2012; Alsamydai 2014).

Conclusion, Limitations & Future Research

With increasing entrenchment of ICT, adoption of BYOD is gaining momentum these days in most organizations. Organizations more specifically IT and ITES, have either already formulated or are in the process of formalizing the phenomenon of BYOD. In such a scenario, understanding the employees' perceptions and intention to adopt is of utmost importance. The first and foremost outcome of this research is the research model proposed and validated which demonstrates key factors of employees' adoption intention in context of BYOD. Secondly, this study supports results of past studies validating personal innovativeness to be an important predictor of adoption intention. Besides, the results attained validated the relationship defined by proposed research model based on the goodness of fit indices. Therefore, this research model can be further studied extensively in similar fields of research.

Though the results of the study are valuable and encouraging, it also endures various limitations. A limitation of this study is that it was confined to employees of the organizations in the National Capital Region of Delhi only. Since India is a very large country a larger sample size and which is more geographically dispersed across the country may be carried out to confirm the results of this study. Another limitation has been the respondents who are the people already employed; thereby ignoring the perceptions of a larger segment who are likely to join organizations in a year or so.

Therefore, we expect further research in the following directions: First, a more detailed study having respondents spread across the country. Second, a study to understand the perceptions and intentions of final year university students who will join the organizations soon. Lastly, a more detailed analysis to understand the relationship between intentions to adopt and perceived ease of use BYOD.

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