

FACTORS INFLUENCING ERP IMPLEMENTATION IN HIGHER EDUCATION THROUGH EXTENDED TAM2 MODEL: FACULTY PERSPECTIVE.

Dr. B. Naresh, Assistant Professor – Marketing, Pune Institute of Business Management, Pune

Dr. Aditi Dang, Assistant Professor – Marketing, Pune Institute of Business Management, Pune

Prof. Gaurav Hans, Assistant Professor – Marketing, Pune Institute of Business Management,
Pune

ABSTRACT

The aim of the present study aims on the extension of the original TAM model with the groups of external factors which significantly influence the use of ERP system. The data has been collected through survey from the users of the ERP software. Here, the faculty members in a higher education system are considered as the ERP users who are exposed to the ERP system which has operated the system for more than one year. The proposed theoretical framework has been analyzed using PLS approach. The results depict that all the paths are significant except the relation between subjective norms and perceived ease of use. The present research paper is an empirical based paper.

Keywords. ERP, TAM2, perceived ease of use, perceived usefulness, intention to use

INTRODUCTION

Enterprise resource Planning (ERP) is a system of integrated business solutions that reinforce institutions and organizations in achieving their competitive aspirations, usually in real – time and mediated by technology and innovation. ERP solutions can be regarded as the set of packaged application software modules, which is accompanied by an integrated framework that is useful as a primary engine for assimilating data, processes and IT in real time across all internal and external value chains. Further, ERP is responsible for the profound information of businesses that merchants have amassed and put away from executions in an extensive variety of customer associations and that can apply significant impact on the outline of procedures inside new customer associations (Seddon, Shanks, & Willcocks, 2003; Zabukovsek & Bobek, 2013).

The execution of ERP application has been administered in a number of institutions but there is still a dilemma for the institutions to understand the most important offerings of the system. Ross, Vitale, and Willcocks; Shanks, Seddon, & Willcocks, (2013) have determined the five important

steps for ERP lifecycle as – design, implementation, continuous improvement, and transformation (Zabukovsek & Bobek, 2013). It has been realized that the use of ERP solutions help institutions share information and there is a significant reduction in the time to complete the business process (Lee, Lee, Olson, & Hwan Chung, 2010). Zabukovsek & Bobek, (2013) has also focused on the enhanced work environment for their users as it is believed that the users are equipped with the more efficient system within which they work. Kwahk & Lee, (2008) have realized the fact that despite of the above advantages in using ERP, the system is afflicted with more failures and also do carry an inability to achieve the benefits it carries. It has been seen that the success rate of the ERP solution lies within the operational stage. Authors like Bradford (2015), has also mentioned that, at the maturity stage, the institutions using the ERP solutions must focus on improving the process and must put more of their efforts on the people using the same, after the stabilization stage. This is the stage where the users become more acceptable towards the system and it becomes a daily routine for them. It is generally believed that even the experienced users become user friendly to the ERP system after many months or years. Gradually, after the acceptance, users feel more comfortable and start looking at its advantages which motivate them to explore its functions leading to the success in its use. It is believed that the impact of ERP system on users and their acceptance have been recognized as the key factors that have led to its implementation success. There is a need to explore the factors that lead to the satisfaction of the users in order to improve the efficiency and effectiveness of the ERP system use (Zabukovsek & Bobek, 2013). Hence, in this context, Technology Acceptance Model is widely used model that helps in explaining the behavioral intention and the actual usage of the user and can further help in improving the understanding regarding the influence on actual usage that can help in increasing the efficiency and the effectiveness of the ERP system use (Shih, 2009). It has been analyzed while reviewing the literature that a very few studies have been published that have focused on the user's adoption of ERP system through TAM (Lee et al., 2010; Shih, 2009; Youngberg, Olsen, & Hauser, 2009; Zabukovsek & Bobek, 2013). Majority of the studies reviewed have focused mainly on examining the factors on the basis of context that has significantly influenced the intention to use an ERP system in the stabilization phase. Further, a limited studies have discussed about the technology acceptance of ERP system, especially the one who have been dealing with the autonomous ERP users (Sun, Bhattacharjee, & Ma, 2009). Through their scientific work, researchers have recognized that the generality of TAM and their research of small numbers of additional factors that impact TAM fail to supply more meaningful information on users' opinions about a specific

system - especially an ERP system, which is considered a strategic information services in organizations. Further, across the many empirical tests of TAM, perceived usefulness has consistently been a strong determinant of usage intentions, with standardized regression coefficients typically around 0.6. Since perceived usefulness is such a fundamental driver of usage intentions, it is important to understand the determinants of this construct and how their influence changes over time with increasing experience using the system. Perceived ease of use, TAM's other direct determinant of intention, has exhibited a less consistent effect on intention across studies. Whereas some research has been done to model the determinants of perceived ease of use (Venkatesh & Davis, 2016), the determinants of perceived usefulness have been relatively overlooked. A better understanding of the determinants of perceived usefulness would enable us to design organizational interventions that would increase user acceptance and usage of new systems. Hence, there is a need to explore the new factors that can help in the improvement of its specificity and exploratory utility (Agarwal & Prasad, 1999; Iu, 2003).

This paper focuses on the extension of the original TAM model with the groups of external factors which significantly influence the use of ERP system. The data has been collected through survey from the users of the ERP software. Here, the faculty members in a higher education system are considered as the ERP users who are exposed to the ERP system which has operated the system for more than one year. The proposed theoretical framework has been analyzed using PLS approach. Further, the paper is organized as follows: literature review, the extended theoretical framework, research methodology, analysis and interpretation, results, discussion and conclusion.

LITERATURE REVIEW

Enterprise Resource Planning (ERP)

The inventory control was regarded as an important part of the business in the year 1960. Majority of the businesses used to keep inventories in order to fulfill their customers' demands and achieve competitive advantage over others. In this regard, most of the software packages are developed in order to manage the inventories that are framed on the basis of traditional inventory concepts (Ptak & Schragenheim, 2000). Further, in 1970's, businesses started using material requirement planning (MRP) systems. Then, in 1980's manufacturing resources planning (MRP II) system evolved to the financial accounting system and financial management system along with the manufacturing and materials management system because of the reason that the companies started digging advantage of the availability of affordable technology and increased power. This system help

making businesses more integrated business system (Ptak & Schragenheim, 2000). The businesses started to expand MRP II at the beginning of 1990's in order to assimilate the complete resource planning for throughout the business. Hence, ERP was evolved and it can be used not only in the manufacturing sectors but in any organization/ institute that aims at enhancing the competitiveness while using all of their assets including information (Shankarnarayanan, 2000).

Enterprise system software packages helps in integrating the information about finance, accounting, human resources, supply chain, customer, dealer, and so on. But, the system needs time and investment for its successful implementation. This can even result in disturbing the company's culture, creation of the extensive need of training, can even lead to the productivity and mistreat the orders of the customers and can even deface the bottom line, at least for the short duration of time (Stein, 1999).

There is a need to do business reengineering while implementing the ERP system software almost at all times, because of the fact that there is always a need to adapt to the processes of the organizations in order to match up with the capabilities of the software. It has been believed by the researchers that the ERP systems are organization wide systems and their implementation involves multiple stakeholders, often in geographically dispersed locations. It requires information institutionalization, mix of the framework with other IS and the need to deal with a few experts and merchants (Soh, Kien, & Tay-Yap, 2000). Customary venture administration challenges are amplified in such situations, making the usage more troublesome, costly and disappointment inclined. This many-sided quality recommends that we ought not to accept that the outcomes acquired in other less complex innovation execution conditions promptly apply to ERP situations (Markus, Tanis, & van Fenema, 2000).

Technology Acceptance Model (TAM)

There are a number of models such as theory of planned behavior (Ajzen, 1991); theory of reasoned action (Fishbein and Ajzen, 1975); and the theory of technology acceptance model (F.D. Davis, Bagozzi, & Warshaw, 1989) that have been used to understand the determinants of acceptance and the use of the new information technology. The theory of reasoned actions (TRA) (Jennings & Seaman, 1990) is crucial theory to clarify the human conduct, which asserted that both the attitude towards an action and subjective norm have an impact on behavioral intention, which in turn affects how people perform the action. It is believed by many researchers that TAM model is more of parsimonious, predictive, and robust (King & He, 2006; lu, 2003; Venkatesh & Davis, 2016) while comparing to the other competitive models. It is been observed that the IT and

IS researchers use more of TAM model in their researches (Ajzen, 1991; Amoako-Gyampah, 2007; F.D. Davis et al., 1989). The primary objective to use TAM model is to explore the impact that external factors have on the internal beliefs, attitudes and their intentions.

An audit of past ERP contemplates in regards to TAM shows that few examinations have explored ERP client acknowledgment and use, and just few articles have been distributed. Besides, every one of them uncover little quantities of external variables which could impact ERP acknowledgment and use in various periods of an ERP framework lifecycle (Zabukovsek & Bobek, 2013). The present study has incorporated TAM2 that has further included more of theoretical constructs that influence the perceived usefulness of the ERP system. It is a combination of basic TAM model and the other external factors. Research endeavors have been committed to expand the hypothesis by looking at the predecessors of perceived usefulness (PU) and perceived ease of use (PEOU). As noticed by (Venkatesh & Davis, 2016) a superior comprehension of these variables would empower us to plan viable hierarchical mediations that may prompt expanded client acknowledgment and utilization of new IT frameworks.

Utilizing TAM as the beginning stage, TAM2 consolidates extra theoretical constructs that builds social impact processes (subjective norms, image, job relevance, output quality, and result demonstrability) (Venkatesh & Davis, 2016).

Underneath we characterize every one of these variables and build up the theoretical rationale of reasoning for the causal connections of the model.

Subjective Norms

TAM was an early endeavor to apply psychological elements to IS and computer reception. It accepted that perceived usefulness and perceived ease of use were having significant impacts of a person's state of mind (attitude) towards utilizing the technology and in this way eventually identifying with real utilization. Monitoring its potential significance, Venkatesh & Davis, (2016), have hypothesized that subjective norms impacted perceived usefulness and perceived ease of use in TAM2.

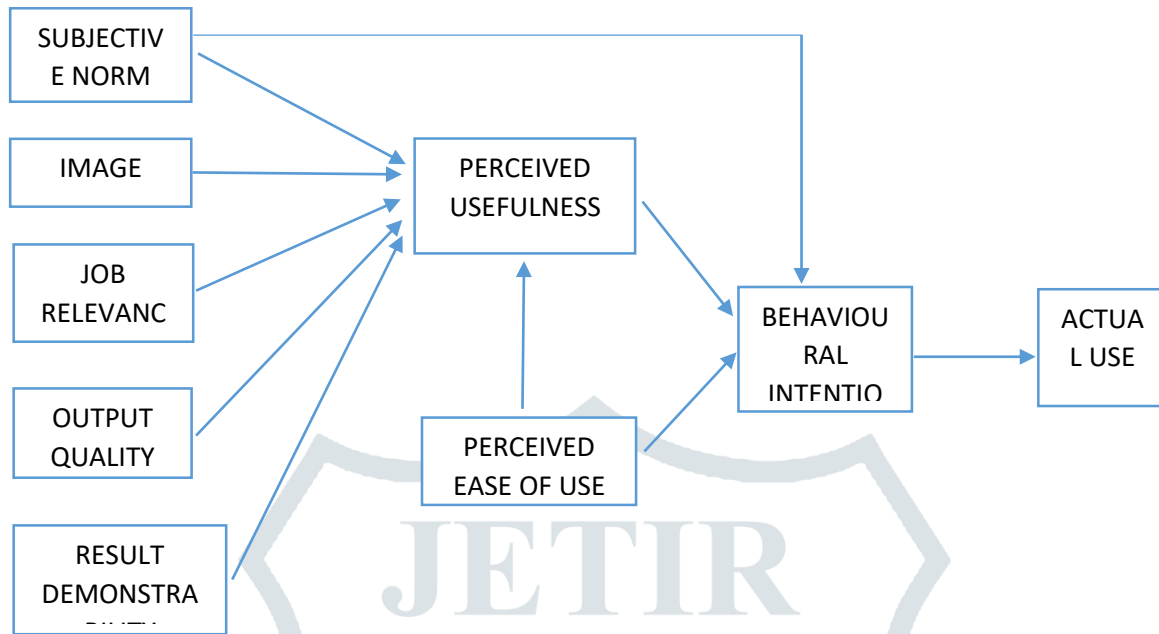


Figure 1: Theoretical Framework

Reliable with TRA, which was a key hypothetical supporting for the first advancement of TAM, authors take advantage of social impacts by *subjective norms*, defined as a, “*person's perception that most people who are important to him think he should or should not perform the behavior in question*” (Fishbein and Ajzen 1975, p. 302). Subjective norm is incorporated as an immediate determinant of conduct aim in TRA (Fishbein and Ajzen 1975) and consequently TPB (Ajzen, 1991). Subjective norms has an impact on the acceptance of technology through perceived usefulness, *the compliance effect and internalization effect* (Schepers & Wetzels, 2007). This speaks to the human inclination to decipher data from critical others as proof about the real world. The reason for an immediate impact of subjective norms on intention is that individuals may play out a conduct, regardless of whether they are not themselves great toward the conduct or its results, on the off chance that they trust at least one critical referents figure they should, and they are adequately motivated to consent to the referents.

Hypothesis 1: Faculty members’ subjective norm will have a positive direct effect on intention to use ERP when system use is perceived to be mandatory.

Internalization of Social Influence

While the immediate connection between subjective norm and goal in TRA and TPB depends on consistency, TAM2 envelops two extra theoretical mechanisms by which emotional standard can impact goal in a roundabout way through perceived usefulness: *“internalization and identification”*. Kelman, (1958) and Davis et al., (1989) have define Internalization as – *“the process by which, when one perceives that an important referent thinks one should use a system, one incorporates the referent's belief into one's own belief structure”*. Also, Deutsch & Gerard, (1955), defined internalization as - *“influence to accept information from another as evidence about reality”* (p. 629). In the present setting, if a prevalent or colleague recommends that a specific framework may be helpful, a man may come to trust that it really is valuable, and thus shape an expectation to utilize it. On account of disguise, emotional standard indirectly affects expectation through perceived usefulness, rather than an immediate consistence impact on intention.

TAM2 hypothesizes that internalization, not at all like compliance, will happen whether the setting of framework utilize is intentional or compulsory. That is, notwithstanding when framework utilize is authoritatively commanded, clients' perceptions about usefulness may at present increment because of powerful social data.

Hypothesis 2: Faculty members' subjective norm will have a positive direct effect on perceived usefulness for ERP.

Image

People frequently react to social standardizing impacts to build up or keep up an ideal picture inside a reference gathering (Kelman, 1958). Moore & Benbasat, (1991) defined Image as, *“the degree to which use of an innovation is perceived to enhance one's ... status in one's social system”*. It is believed that the expanded control and impact coming about from hoisted status gives a common premise for more noteworthy efficiency.

An individual may hence see that utilizing a framework will prompt upgrades in his or her activity execution (which is the meaning of perceived usefulness) by implication because of image improvement, far beyond any execution benefits straightforwardly inferable from framework utilization (Venkatesh & Davis, 2016).

This distinguishing proof impact is caught in TAM2 by the impact of subjective norm on image, combined with the impact of image on perceived usefulness (Venkatesh & Davis, 2016). TAM2 speculates that identification, similar to internalization however not at all like compliance, will happen whether the setting of framework utilize is intentional or obligatory.

Hypothesis 3: Faculty members' image will have a positive effect on perceived usefulness for ERP.

Job relevance

One key part of the coordinating procedure talked about above is a potential client's judgment of job relevance that has been defined by Venkatesh & Davis, (2016) as – “*an individual's perception regarding the degree to which the target system is applicable to his or her job*” Kieras, (1985) and Polson (1987) has also revealed that clients have unmistakable learning about their activity circumstance, which they can use as a reason for figuring out what errands can be performed with a given framework. The presence of very much characterized learning structures in regards to critical employment objectives is supported by research from work personnel psychology (Roberson, 1989). This research paper has regarded job relevance as “*a cognitive judgment that exerts a direct effect on perceived usefulness, distinct from social influence processes*” (Venkatesh & Davis, 2016).

Hypothesis 4: Faculty members' job relevance will have a positive effect on perceived usefulness for ERP.

Output Quality

TAM2 sets that, far beyond contemplations of what assignments a framework is equipped for performing and how much those undertakings coordinate their job goals (job relevance), individuals will think about how well the framework plays out those errands, which we allude to as view of *output quality*. Observationally, the connection between perceived output quality and perceived usefulness has been appeared previously (F.D. Davis et al., 1989).

We anticipate that output quality will be observationally particular from, and to clarify noteworthy one of a kind change in, perceived usefulness well beyond work significance in light of the fact that an alternate fundamental judgmental process is included.

Hypothesis 5: Faculty members' output quality will have a positive effect on perceived usefulness for ERP.

Result Demonstrability

Indeed, even viable frameworks can neglect to gather client acknowledgment if individuals experience issues crediting picks up in their activity execution particularly to their utilization of the framework. Henceforth, TAM2 theoretically mentions that *result demonstrability* is defined by Moore & Benbasat, (1991) as “*tangibility of the results of using the innovation*” and it leads to

directly influencing the perceived usefulness. This further states that the individuals are expected to frame higher positive perceptions about the system's usefulness when the co-variation between the perceived usefulness and positive results is significantly observable. The connection between result demonstrability and perceived usefulness is additionally steady with the job characteristics model, which stresses learning of the genuine after effects of work exercises as a key mental state fundamental work inspiration (Hackman & Oldham, 1976).

Hypothesis 6: Faculty members' result demonstrability will have a positive effect on perceived usefulness for ERP.

Perceived Ease of Use

TAM2 has preserved *perceived ease of use* from TAM which determines the perceived usefulness directly (F.D. Davis et al., 1989). There has been a lot of research conducted that showcase that the perceived ease of use has a significant impact on the behavioral intention, in both direct and indirect ways passing through perceived usefulness to use the ERP system software (F.D. Davis et al., 1989; Venkatesh, 1999). According to Davis et al., (1989), perceived usefulness has been impacted by the perceived ease of use while perceived ease of use significantly impact the attitude towards the use of ERP system software which further leads to the actual use (Amoako-Gyampah & Salam, 2004; F. D Davis & Venkatesh, 1996; F.D. Davis et al., 1989; Fred D Davis, 2013; Schepers & Wetzels, 2007; Venkatesh, 1999; Venkatesh & Davis, 2016; Zabukovsek & Bobek, 2013) of the ERP system software by the end users, i.e., the faculty members of the higher education institutions.

Hypothesis 7: Faculty members' perceived ease of use will have a positive effect on perceived usefulness for ERP.

Hypothesis 8: Faculty members' perceived usefulness will have a positive effect on behavioral intention to use ERP.

Hypothesis 9: Faculty members' perceived ease of use has a positive effect on behavioral intention to use ERP.

Hypothesis 10: Faculty members' behavioral intention to use has a positive effect on their actual use of ERP

RESEARCH METHODOLOGY

The present study focused on testing the significant effects of external factors on perceived usefulness, effect of perceived ease of use on perceived usefulness and combinedly on behavioral intentions and finally on actual use of ERP system software by the faculty members of the higher education institutions in Pune region. The nature of the research study proposed is Mixed Method Approach. It is both quantitative and qualitative in nature. The proposed research model is tested using cross sectional data from the faculty members of the higher education institutions such as MBA. The convenience sampling technique is used in the study to collect data. There are eight independent variables and one dependent variable. The questionnaire for extended TAM2 model was adopted from the Fishbein and Ajzen, (1975); and Venkatesh & Davis, (2016).

Total of 140 faculty members from different higher education institutes of Pune region were approached to fill up the questionnaires, from which 128 were returned and only 106 were used after data cleaning for the purpose of analysis. The data was analyzed using the Smart – PLS version 3 because of the fact that the sample size was small, the proposed model is predictive in nature and also, the minimum sample size criteria for using PLS software at 5% significant level is 147 (Vinzi, Trinchera, & Amato, 2010).

DATA ANALYSIS AND INTERPRETATION

Reliability and Validity

According to Christmann and Van Aelst (2006), Cronbach's alpha is a popular method to measure reliability of the construct. The Cronbach's alpha value obtained for each construct is greater than 0.7 (the suggested threshold value is 0.7) which is a positive indicator for the proposed model.

In this model Cronbach's alpha value of all the items in each constructs are greater than 0.7 and it's ranged from 0.707 to 0.863.

Composite Reliability value shows the reliability of all the variables used in the research as per Bagozzi, Yi, & Nassen, (1998). Composite reliability value should be 0.7 or higher which show the internal consistency reliability. The value for composite reliability ranges from 0.727 to 0.888.

Table – 1 depicts the values of Cronbach's alpha as well as composite reliability.

	Cronbach's Al...	rho_A	Composite Rel...	Average Varian...
ACTUAL USE	0.851	0.876	0.880	0.515
BEHAVIOURAL INTENTION TO USE	0.757	0.785	0.817	0.602
IMAGE	0.709	0.778	0.797	0.536
JOB RELEVANCE_	0.712	0.719	0.785	0.551
OUTPUT QUALITY	0.782	0.797	0.749	0.536
PERCEIVED EASE OF USE	0.707	0.755	0.727	0.536
PERCEIVED USEFULNESS	0.863	0.890	0.888	0.585
RESULT DEMONSTRABILITY	0.727	0.758	0.757	0.514
SUBJECTIVE NORM	0.778	0.773	0.815	0.591

Table 1 – Reliability Values

Questionnaire validity have been evaluated using Convergent validity and Discriminant validity. As per Bagozzi et al., (1998), the AVE value of all the variable should be greater than 0.5 as it confirms the convergent validity. And the square root of AVE of each latent variable should be greater than the correlation among the latent variable (Fornell & Larcker, 2016) or confirms the discriminant validity of the variables.

Discriminant Validity

Discriminate validity can be understood as the extent to which any single construct is different from the other constructs in the model (Carmines and Zeller, 1979). Discriminant validity was evaluated by the test provided by Fornell & Larcker, (2016).

	ACTUAL ...	BEHAVIOURAL...	IMAGE	JOB RELEVA...	OUTPUT Q...	PERCEIVED E...	PERCEIVED US...	RESULT DEMO...	SUBJECTIVE N...
ACTUAL USE	0.828								
BEHAVIOURAL ...	0.204	0.776							
IMAGE	0.570	0.681	0.670						
JOB RELEVANC...	0.278	0.040	0.040	0.742					
OUTPUT QUAL...	0.144	0.233	0.448	0.444	0.732				
PERCEIVED EAS...	0.240	0.646	0.538	0.023	0.251	0.732			
PERCEIVED USE...	0.448	0.107	0.788	0.065	0.111	0.144	0.891		
RESULT DEMO...	0.254	0.371	0.551	0.040	0.247	0.040	0.042	0.717	
SUBJECTIVE N...	0.658	0.111	0.642	0.216	0.144	0.650	0.107	0.621	0.772

Table 2: Validity Values

MEASUREMENT MODEL: STUDENT PERSPECTIVE – ERP

The inner model suggests that Behavioral Intention to use has the strongest effect on actual use (0.670). This clearly indicates that a 100-point change in the behavior intention will bring 67-point change in actual use. The theoretical relation (path) forecasted between all constructs is statistically significant except the relation between subjective norm and behavioral intention to use (-0.307) because of the fact that the standardized path coefficients should be more than 0.1 (S.S Bhakar et. Al., 2007).

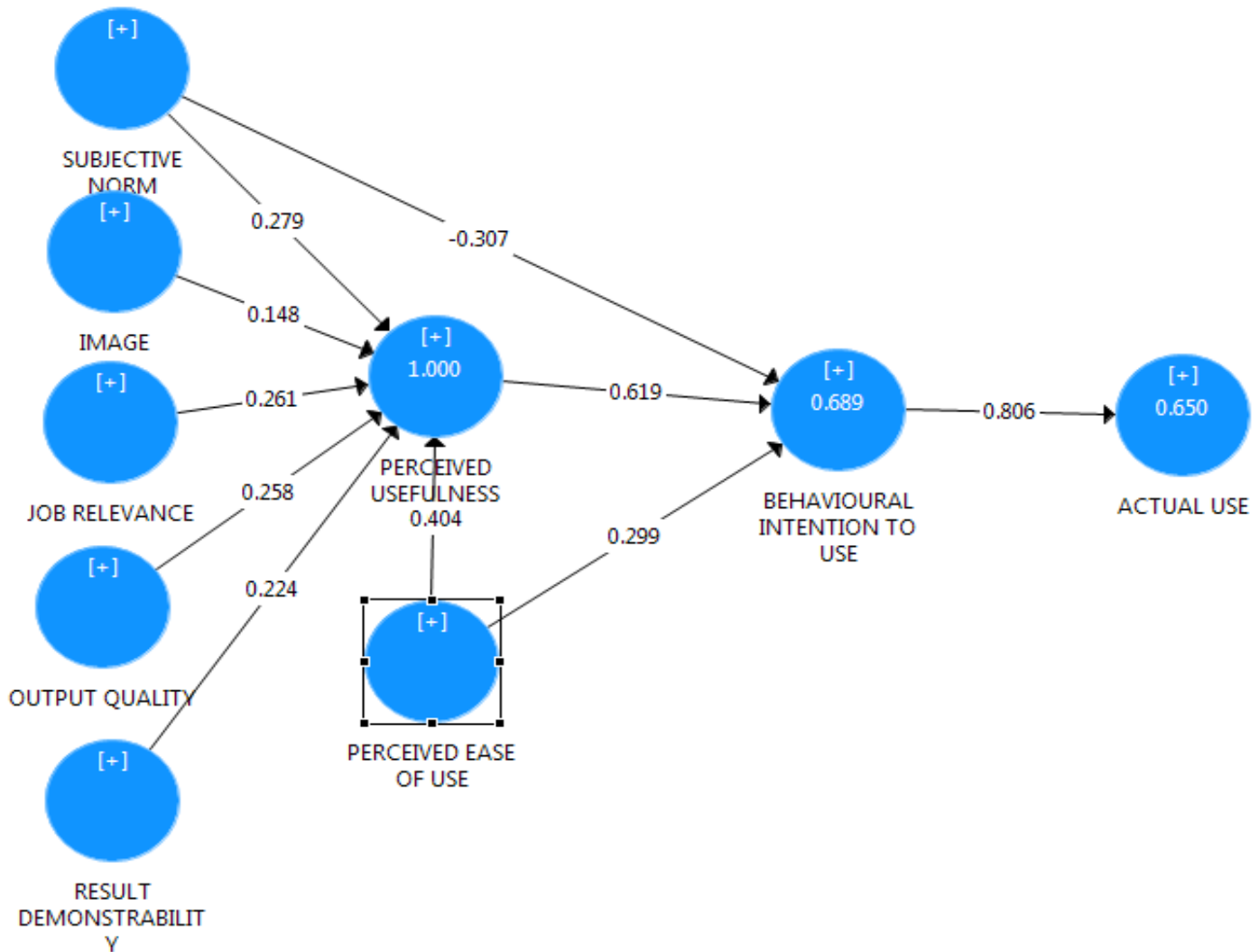


Figure 2: Measurement Model

BOOTSTRAP MODEL

Smart - PLS provides t - statistics to test the significance of the inner and outer models, using a procedure called bootstrapping. In this process, a large number of subsamples are produced based

on the original sample, with replacement, to obtain the standard bootstrap errors, which in turn permit the approximate estimation of t - values for significance tests of the structural paths (Wong, 2013). For the present study, 5000 subsamples were produced through bootstrapping technique. The Bootstrap values for the relation between subjective norm and perceived usefulness is not significant after conducting bootstrapping.

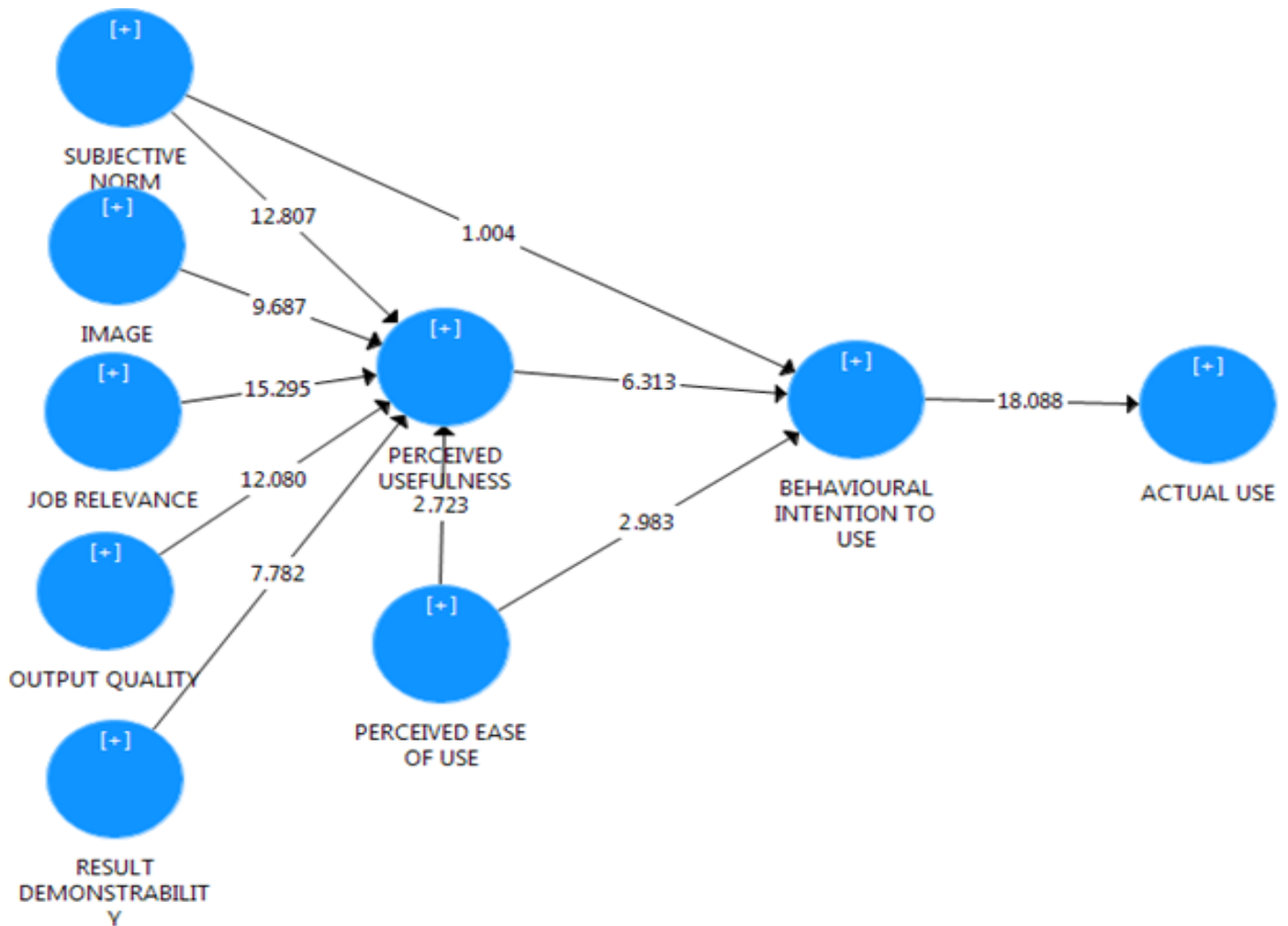


Figure 3: Bootstrap Model

MEAN, STANDARD VALUES, t – VALUES

After concluding the estimation process in the path modeling, the t - statistics are reported in the following Table 3. The Path Coefficients (Mean, STDEV, t-values) values are representing the significance of the model. As observed, the values in the column t-statistics are superior to 2.57 (significance level = 0.01). If the t-statistics value will be larger than 1.96 when using a two-tailed t-test (significance level of 5%) it shows that path coefficient will be significant (Hair, Ringle, &

Sarstedt, 2011). In this study it is found that all the linkages are significant except for the link between subjective norm and perceived usefulness.

	Original Sampl...	Sample Mean (...)	Standard Devia...	T Statistics (O...	P Values
BEHAVIOURAL INTENTION TO USE -> ACTUAL USE	0.806	0.809	0.045	18.088	0.000
IMAGE -> PERCEIVED USEFULNESS	0.148	0.150	0.015	9.687	0.000
JOB RELEVANCE_ -> PERCEIVED USEFULNESS	0.261	0.259	0.017	15.295	0.000
OUTPUT QUALITY -> PERCEIVED USEFULNESS	0.258	0.259	0.021	12.080	0.000
PERCEIVED EASE OF USE -> BEHAVIOURAL INTENTION TO USE	0.099	0.105	0.100	2.983	0.326
PERCEIVED EASE OF USE -> PERCEIVED USEFULNESS	0.404	-0.002	0.005	2.723	0.470
PERCEIVED USEFULNESS -> BEHAVIOURAL INTENTION TO USE	0.619	0.988	0.161	6.313	0.000
RESULT DEMONSTRABILITY -> PERCEIVED USEFULNESS	0.224	0.223	0.029	7.782	0.000
SUBJECTIVE NORM -> BEHAVIOURAL INTENTION TO USE	-0.307	-0.275	0.153	2.004	0.046
SUBJECTIVE NORM -> PERCEIVED USEFULNESS	0.279	0.275	0.022	12.807	0.000

Table 3: Mean, Standard Values, t – values and p - values

CONSOLIDATED ANALYSIS

H1: Faculty members' subjective norm will have a positive direct effect on intention to use ERP when system use is perceived to be mandatory	Not Accepted
H2: Faculty members' subjective norm will have a positive direct effect on perceived usefulness for ERP	Accepted
H3: Faculty members' image will have a positive effect on perceived usefulness for ERP	Accepted
H4: Faculty members' job relevance will have a positive effect on perceived usefulness for ERP	Accepted
H5: Faculty members' output quality will have a positive effect on perceived usefulness for ERP	Accepted
H6: Faculty members' result demonstrability will have a positive effect on perceived usefulness for ERP	Accepted
H7: Faculty members' perceived ease of use will have a positive effect on perceived usefulness for ERP	Accepted
H8: Faculty members' perceived usefulness will have a positive effect on behavioral intention to use ERP	Accepted
H9: Faculty members' perceived ease of use has a positive effect on behavioral intention to use ERP	Accepted
H10: Faculty members' behavioral intention to use has a positive effect on their actual use of ERP	Accepted

FINDINGS AND CONCLUSION

In this study, the present TAM model has been extended to TAM2, adding the external factors as Subjective norm, image, job relevance, output quality and result demonstrability, all that leads to the perceived usefulness. The extended TAM2 model was tested in context of the ERP implementation of faculty members of higher education institutions in Pune region.

TAM2 model was strongly supported by the higher education institutions in the Pune region. Integrating both the social influence process (Subjective norms) and the cognitive instrumental processes (job relevance, output quality, result demonstrability and perceived ease of use).

TAM2 gives a definite record of the key powers fundamental judgments of perceived usefulness, disclosing approximately up to 62% of the difference in this critical driver of behavioral intention to use, which is line which is in line with the studies such as (Venkatesh & Davis, 2016).

The impacts of social influence process were reliable with TAM2. Subjective norm essentially affected perceived usefulness by means of both internalization, in which individuals fuse social impacts into their own particular perception of usefulness, and identification, in which individuals utilize a framework to pick up status and impact inside the work gathering and subsequently enhance their job performance. It has been realized that the computer usage is so common today, utility, usability, and social perspectives are presently less essential in molding state of mind (attitudes), intentions and behavior.

For the educational institutions that need to launch technology for the use of their faculties, efforts must not be put into the acceptance of the system at individual faculty level but at the institutional level while considering subjective norms as significantly influencing the usefulness.

The research was depended on extended version of TAM through second-arrange components to enhance the clarification of ERP utilization. The PLS approach for examination of the model was utilized. Such research has the potential for clarification of the level of ERP framework utilization. By affirming external variables, institutions should work at their institutional culture and business process fit, and on the other hand on their ERP framework, to guarantee better information quality, framework execution, and client manuals for their clients, subsequently enhancing the level of state of mind towards an ERP framework.

LIMITATIONS OF THE STUDY

This examination has certain constraints which may show an open door for additionally look into. Since the respondents to the study were restricted to educational institutions and that too for Pune region only, this examination ought to be reached out to different sectors and regions. Additionally

inquire about is expected to investigate the significance of exhibited external factors in various phases of the ERP lifecycle and additionally incorporate more external components (e.g., top level administration). Since ERP arrangements are implemented by various systems and methodologies, the significance of external factors by ERP arrangements could likewise be investigated. The effect of external factors on work compatibility and in addition the effect of work compatability on TAM ought to be examined.

REFERENCES

- Agarwal, R., & Prasad, J. (1999). Are individual differences germane to the acceptance of new information technologies? *Decision Sciences*, 30(2), 361–391.
<https://doi.org/10.1111/j.1540-5915.1999.tb01614.x>
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
- Amoako-Gyampah, K. (2007). Perceived usefulness, user involvement and behavioral intention: an empirical study of ERP implementation. *Computers in Human Behavior*, 23(3), 1232–1248. <https://doi.org/10.1016/j.chb.2004.12.002>
- Amoako-Gyampah, K., & Salam, A. F. (2004). An extension of the technology acceptance model in an ERP implementation environment. *Information and Management*, 41(6), 731–745. <https://doi.org/10.1016/j.im.2003.08.010>
- Bagozzi, R. P., Yi, Y., & Nassen, K. D. (1998). Representation of measurement error in marketing variables: Review of approaches and extension to three-facet designs. *Journal of Econometrics*, 89(1–2), 393–421. [https://doi.org/10.1016/S0304-4076\(98\)00068-2](https://doi.org/10.1016/S0304-4076(98)00068-2)
- Bradford, M. (2015). Modern ERP: select, implement, and use today's advanced business systems. Lulu. com.
- Davis, F. D. (2013). Information Technology Introduction, 13(3), 319–340.
- Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: a comparison of two theoretical models. *Management Science*.
<https://doi.org/10.1287/mnsc.35.8.982>

- Davis, F. D., & Venkatesh, V. (1996). A critical assessment of potential measurement biases in the technology acceptance model: Three experiments. *International Journal of Human-Computer Studies*, 45(1), 19–45. <https://doi.org/10.1006/ijhc.1996.0040>
- Deutsch, M., & Gerard, H. B. (1955). A study of normative and informational social influences upon individual judgment. *Abnormal and Social Psych*, 51, 629–636.
- Fornell, & Larcker, D. F. (2016). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39–50. <https://doi.org/Article>
- Hackman, J. R., & Oldham, G. R. (1976). Motivation through the design of work: test of a theory. *Organizational Behavior and Human Performance*, 16(2), 250–279. [https://doi.org/10.1016/0030-5073\(76\)90016-7](https://doi.org/10.1016/0030-5073(76)90016-7)
- Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a Silver Bullet. *The Journal of Marketing Theory and Practice*, 19(2), 139–152. <https://doi.org/10.2753/MTP1069-6679190202>
- Jennings, D. F., & Seaman, S. L. (1990). Aggressiveness of response to new business opportunities following deregulation: An empirical study of established financial firms. *Journal of Business Venturing*, 5(3), 177–189. [https://doi.org/10.1016/0883-9026\(90\)90031-N](https://doi.org/10.1016/0883-9026(90)90031-N)
- Kelman, H. C. (1958). Compliance, identification, and internalization three processes of attitude change. *Journal of Conflict Resolution*, 2(1), 51–60. <https://doi.org/10.1177/002200275800200106>
- Kieras, D. (1985). An approach to the formal analysis of user complexity. *International Journal of Man-Machine Studies*, 22, 365–394.
- King, W. R., & He, J. (2006). A meta-analysis of the technology acceptance model. *Information and Management*, 43(6), 740–755. <https://doi.org/10.1016/j.im.2006.05.003>
- Kwahk, K. Y., & Lee, J. N. (2008). The role of readiness for change in ERP implementation: Theoretical bases and empirical validation. *Information and Management*, 45(7), 474–481.

<https://doi.org/10.1016/j.im.2008.07.002>

Lee, D., Lee, S. M., Olson, D. L., & Hwan Chung, S. (2010). The effect of organizational support on ERP implementation. *Industrial Management & Data Systems*, 110(2), 269–283. <https://doi.org/10.1108/02635571011020340>

lu2003. (n.d.).

M. Fishbein, I. Ajzen. (1975). *Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research*, Addison- Wesley, Reading, MA, 1975.

Markus, M. L., Tanis, C., & van Fenema, P. C. (2000). Enterprise resource planning: multisite ERP implementations. *Communications of the ACM*, 43(4), 42–46. <https://doi.org/10.1145/332051.332068>

Moore, G. C., & Benbasat, I. (1991). Development of an Instrument to Measure the Perceptions of Adopting an Information Technology Innovation. *Institute for Operations Research and the Management Sciences*, 2(3), 192–222.

Polson, P. G. 1987. A quantitative theory of human-computer interaction. J. M. Carroll, ed. *Intefacing Thought*. MIT Cambridge, MA. 184-235.

Ptak, Carol A., & Schragenheim, E. (2000), *ERP: tools, techniques, and applications for integrating the supply chain*, St. Lucie Press.

Roberson, L. (1989). Assessing personal work goals in the organizational setting: Development and evaluation of the work concerns inventory. *Organizational Behavior and Human Decision Processes*, 44(3), 345–367. [https://doi.org/10.1016/0749-5978\(89\)90013-7](https://doi.org/10.1016/0749-5978(89)90013-7)

Schepers, J., & Wetzels, M. (2007). A meta-analysis of the technology acceptance model: Investigating subjective norm and moderation effects. *Information and Management*, 44(1), 90–103. <https://doi.org/10.1016/j.im.2006.10.007>

Seddon, P., Shanks, G., & Willcocks, L. (2003). *Introduction : ERP – The Quiet Revolution?* Cambridge University Press, 1–19. Retrieved from http://assets.cambridge.org/97805218/19022/excerpt/9780521819022_excerpt.pdf

- Shanks, G., Seddon, P. B., & Willcocks, L. P. (2013). *Second-Wave Enterprise Resource Management Systems. Journal of Chemical Information and Modeling* (Vol. 53).
<https://doi.org/10.1017/CBO9781107415324.004>
- Shih, Y. (2009). The Actual Usage of ERP Systems : An Extended, *41*(3), 263–276.
- Soh, C., Kien, S. S., & Tay-Yap, J. (2000). Enterprise resource planning: cultural fits and misfits: is ERP a universal solution? *Communications of the ACM*, *43*(4), 47–51.
<https://doi.org/10.1145/332051.332070>
- Sun, Y., Bhattacharjee, A., & Ma, Q. (2009). Extending technology usage to work settings: The role of perceived work compatibility in ERP implementation. *Information and Management*, *46*(6), 351–356. <https://doi.org/10.1016/j.im.2009.06.003>
- Venkatesh, V. (1999). Creation of Favorable User Perceptions: Exploring the Role of Intrinsic Motivation. *MIS Quarterly*, *23*(2), 239–260.
- Venkatesh, V., & Davis, F. D. (2016). Studies Linked references are available on JSTOR for this article : A Theoretical Extension of the Technology Acceptance Model : Four Longitudinal Field Studies, *46*(2), 186–204.
- Vinzi, V. E., Trinchera, L., & Amato, S. (2010). *Handbook of Partial Least Squares*.
<https://doi.org/10.1007/978-3-540-32827-8>
- Youngberg, E., Olsen, D., & Hauser, K. (2009). Determinants of professionally autonomous end user acceptance in an enterprise resource planning system environment. *International Journal of Information Management*, *29*(2), 138–144.
<https://doi.org/10.1016/j.ijinfomgt.2008.06.001>
- Zabukovsek, S. S., & Bobek, S. (2013). TAM-based external factors related to ERP solutions acceptance in organizations. *International Journal of Information Systems and Project Management*, *1*(4), 25–38. <https://doi.org/10.12821/ijispm010402>