An empirical study of determinants of intention to use Enterprise Resource Planning (ERP) System in Universities

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Abstract

In today's business environment, most of the businesses have been able to achieve greater competencies and operational efficiency because of successful adoption of ERP system(s). However, adoption of ERP has been not-so-encouraging in Universities or equivalent institutions in India. For a technology-based solution like ERP, an individual's behavioral intention to use it helps in predicting its overall adoption and the aptitude towards using it. Results of this research paper brings out interesting facts of the selected determinants of intention to use ERP in Universities or equivalent institutions.

Key words :

ERP System, Higher Education Institutions, Intention to Use, Perceived Ease of Use, Perceived Usefulness.

Introduction

Enterprise Resource Planning, to be commonly referred as ERP, seems to be the key source of innovation as a part of technology linked process innovation. Standardizing processes and workflows in a complex and/or large-scale business environment is one of the key expectations from a good ERP solution besides others. Significant number of Universities or equivalent institutions, including Universities, mostly in developed countries, have successfully implemented an integrated end-to-end ERP solution. However, count of successful adoption of ERP in developing country like India is not-so-encouraging. Such count would have been further poor for the under-developed nations. Though there are visible improvements seen in overall conduct of a University business, there are certain points that the Universities are less inclined towards implementing a robust ERP system to gain improved efficiency.

Adoption of ERP from end-users' Perspective

Thought the top management's view point, inclination, and conviction plays a vital role for the adoption and implementation of the ERP in University or equivalent institutions, one of the critical factors that affect the adoption is the end-user. It has been predominantly highlighted in many studies that the technology

does not fail at its own, it fails because of the users. Hence, the intention-to-use from the end-users, consisting the staff and other key stake holders in Universities or equivalent institutions, play an important role in the adoption and implementation of ERP system.

One another important factor is organizational openness to cope up with changing business environment because of adoption of ERP system. Once in place, a good ERP solution will change the way that the end-users used to transact with their day-to-day task (at any level). Sometimes this makes people uncomfortable to adopt the change and cope up with it. Thus, end-user's intention to use specific technology based solutions like integrated ERP is one of the key factors that organizations must not ignore.

Literature Review

Perceived Usefulness and Perceived Ease of Use

In Information System (IS), several models have investigated determinants of technology adoption. Some of the most widely used IS models are task technology fit (Goodhue and Thompson, 1995), computer self-efficacy (Compeau and Higgins, 1995), theory of planned behaviour (Ajzen, 1985) and technology acceptance model (Davis, 1989). Among all these IS models TAM is most powerful in predicting user intentions. TAM is derived based on Theory of Reasoned Action by Azjen and Fishbein (1980). The proposition of model suggests that perceived usefulness and perceived ease of use (Venkatesh and Davis, 2000) are the main determinant of individuals' intention to adopt technology-based solution. Out of which, perceived usefulness is defines as "the degree to which a person believes that using a particular system would enhance his or her job performance" whereas Perceived ease of use is defined as "the degree to which a person believes that using the system will be free of effort" (Davis, 1989). In majority of previous research usefulness is considered as more important determinants of individuals' intention to adopt technology-based solution like ERP then ease of use (perceived usefulness was significantly related to usage (Fusilier and Durlabhji, 2005).

Perceived Intention to Use

Behavioral intention to use an ERP system plays a vital role in determining ERP's overall acceptance or adoption by the users. Many researches that have been conducted so far, have emphasized on the influential effect of user's behavioural aspect towards an intention to use ERP on its overall or large-scale adoption. This construct has been examined by wide range of samples in respect to a technology adoption model. Intention to use a technology is directly linked with its continued use and affects its overall usage in long term or short term. (Venkatesh et al., 2002). Over the time, it has been essentially most critical factor affecting actual use (Venkatesh et al., 2003; Legris et al., 2003). Ignoring the behavioural factor of intention to use while predicting overall acceptance of any technology like ERP may decrease the overall impact and power of the model to guess user behavior with it (Taylor and Todd, 1995). Since user's attitude also involves reaching to a judgment if behavior is good or bad and if the user would like to put some efforts to use it (Leonard et al., 2004). Hence, intention to use is a significant predictor and most affecting behavioral aspect that defines the accuracy of predicting overall adoption of ERP system (Philmore and Marcia, 2013).

Problem Statement

Defining a problem in correct context is very much important to conduct any research. The more the researcher is clear about the problem, the more he/she can develop research based solutions or outcomes for a problem. It is the most important being the first step in research process (Malhotra, 2004). Therefore, the problem statement for present study is:

"To analyze the 'Perceived Usefulness' and 'Perceived Ease of Use' as key determinants of intention-to-use ERP System among individuals working with Universities or equivalent institutions in Gujarat."

Scope & Objective of the Study

This study is intended to understand the impact of 'Perceived Usefulness' and 'Perceived Ease of Use' as the key determinants of Intention-to-Use ERP system in Universities or equivalent institutions. The geographic scope of the present study is limited to the Universities or equivalent institutions, which are operational within the territorial jurisdiction of the state of Gujarat. Scope of this study is limited to understanding the stated variables and its relative impact on intention to use ERP system.

Research objective is the main tool that gives a clear understanding about the intention of studying one particular area and helps in deciding the methodology to get solution of problem defined for the study. According to Malhotra and Dash (2010), "research objective is a declarative statement that focuses on the identification and the description of variables or concepts and sometimes on determination of relationships of variables". Hence, synchronization between objectives and results is important for any study. Therefore, the objectives of the present study are set as:

• To check an impact of perceived usefulness on intention to use ERP

• To check an impact of perceived ease of use on intention to use ERP

Hypotheses of the Study

To fulfil the objectives set previously, hypotheses needs to be developed and tested accurately. The outcome of tested hypotheses will lead to the results for deriving conclusions and recommendations for further research in this subject area. Based on the literature review, following hypotheses have been formed for this study:

$H0_1$: *There is no positive impact of perceived usefulness on intention to use ERP.*

$H0_2$: *There is no positive impact of perceived ease of use on intention to use ERP.*

Research Methodology

Research Design

Present study was aimed at collecting data for testing impact of two variables on the intention to use ERP system. Hence, it is important to go for exploratory research design (to explore ERP adoption) and descriptive research (relationship establishment between dependent and independent variables) to deal with objectives and hypotheses formulated.

Population of the study

The population targeted for this research consisted of Top Management (including President/Chancellor) and employees (working at various levels) in 64 Universities or equivalent institutions in Gujarat state:

Table 1: Universities / Equivalent Institutions in Gujarat

Type of Institution	Number of Institutions
State (Public) Universities	26
Private Universities	25
Institutes of National Importance	06
Agriculture Universities	04
Central Universities	03
Total	**64**

Sampling Method

Present study is an attempt to understand ERP adoption in Universities or equivalent institutions of Gujarat State. Study tries to capture responses from five main regions of Gujarat state namely Kutchh, Saurastra, North Gujarat, South Gujarat and Central Gujarat. However, there is no structured data available about the people working in Universities on some positions like Assistant Registrar, Associate Dean, Associate Professor, CFO (Chief Finance Officer), Chairman, Chairperson, Chancellor, CoE (Controller of Examination), Dean, Director, Dy. Director, Dy. Registrar, Executive Dean, Head, Clerk, HoD (Head of the Department), OS / OSD, Other President, Principal, Pro Vice Chancellor, Prof. & Head, Professor and Program Head. Looking at the complex nature of the study, convenience sampling method was used. Basically, this sampling method uses recruiting participants which are convenient.

Sample Size

As absolute population was unknown, by considering 95% of confidence level at 7% tolerance error the calculated sample size was about 195. Whereas present study is based on 242 samples which is greater than threshold sample size. The pilot sampling was done by approaching 40 respondents. Based on review from respondents, slight modifications were made to make questionnaire easy to understand. Respondents were sent the questionnaire through online mode and were asked to fill the questionnaire at their convenient time. Two reminder were sent to respondents to fill the questionnaire and after second reminder total 269 respondents were received. However, 27 incomplete / inappropriate responses were discarded and 242 usable response were utilized for data analysis purpose.

Instrument for data collection

Instrument and tool designing plays a pivotal role in fulfilling the objectives of the study. Based on the objectives of the study, structured questionnaire was developed, which is divided into two broad sections i.e. (1) Basic information of Respondents through close ended questions and (2) various variable specific information through five point Likert type scale (where 5 means strongly disagree and 1 means strongly agree).

Measure of the Study

Table 2: Variables and its source

Name of Variable	Source
Perceived Usefulness	Moore & B enbasat, 1991
Perceived Ease of Use	Moore & Benbasat, 1991
Perceived Intention to Use	Azjen & Fishbein, 1980

To ensure proper outcome of the study, the measures of the study have been adopted from previous studies. Source of various variables has been mentioned above:

Conceptual Framework
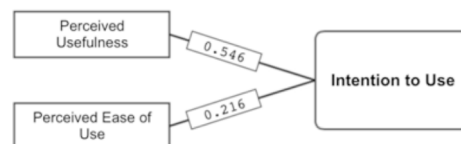
Data Analysis

Data analysis section begins with Sample Profile and Reliability Statistics of the scale used to measure various constructs proposed. Subsequent part in analysis deals with testing hypotheses by appropriate data analysis technique. All proposed hypotheses have been tested through various multivariate data analysis techniques (I.e. Multiple Regression Analysis and Analysis of Variance).

Table 3: Sample Profile

Variable	Categories	Frequency	Percentage
Gender	Male	174	71.90%
	Female	68	28.10%
Age in Years	18 - 25	2	0.80%
	26 - 35	140	57.90%
	36 - 45	86	35.50%
	46 - 55	8	3.30%
	55 and Above	6	2.50%
Length of Total Service (Total Work Experience)	0 to 2 Years	3	1.20%
	2 to 5 Years	34	14.00%
	5 to 10 Years	92	38.00%
	10 to 15 Years	56	23.10%
	15 Years and More	57	23.60%
What is a type of Organization you work with?	Institute of National Importance (IIM / IIT / NID / NIT / NIFT etc.)	4	1.70%
	Public (Govt.) University	27	11.20%
	Private University	142	58.70%
	Standalone (Autonomous) Higher Education Institute/College	7	2.90%
	Standalone (Affiliated) Higher Education Institute/College	62	25.60%
Location (City/Village) of your organization/institute?	Kutch	0	0.00%
	Saurashtra	43	17.80%
	North Gujarat	57	23.60%
	East Gujarat	7	2.90%
	Central Gujarat	74	30.60%
	South Gujarat	61	25.20%
What is your core functional area?	Core Academics	84	34.70%
	Core Administration	23	9.50%
	Academics & Administration	135	55.80%
What is your Role in your current organization?	Top-Level	43	17.80%
	Middle-Level	40	16.50%
	Low-Level	159	65.70%

Variable	Categories	Frequency	Percentage
What is your highest level of formal Education Qualification?	Ph.D. (Doctorate)	92	38.00%
	Postgraduate (Master's Degree)	141	58.30%
	Professional Qualification (CA/CS/ICWA/CFA etc.)	5	2.10%
	Postgraduate Diploma (One-year PG Diploma after graduation)	0	0.00%
	Undergraduate (Bachelor's Degree)	4	1.70%
	Diploma	0	0.00%
Your Education Qualification is in which Main Stream?	Management	80	33.10%
	Engineering	45	18.60%
	Computer Applications	79	32.60%
	Architecture	4	1.70%
	Pharmacy	12	5.00%
	Commerce / Arts / Education	7	2.90%
	Social Works	0	0.00%
	Medical	0	0.00%
	Sciences	15	6.20%
Are you familiar with the concept of ERP?	Yes	170	70.20%
	Somewhat	64	26.40%
	No	8	3.30%
Have you ever used Education ERP System in last Five years?	Yes	121	50.00%
	No	121	50.00%
Have you ever worked abroad (out of India) for at least ONE year in a University setup in last FIVE years?	Yes	12	5.00%
	No	230	95.00%

Reliability Analysis

Before researching the relationship between factors affecting intention to use ERP that leads to a positive adoption of ERP, the strength of scale was evaluated by checking its reliability. Later, the instrument was subjected to the computation of coefficient alpha (Cronbach, 1991). Cronbach's alpha was computed to ascertain the extent to which items making up each variable shared a common core. In reliability analysis, construct reliability is used to check internal consistency which refers to degree of inter correlations among the items that constitute a scale (Nunnally, 1988) and hence the alpha (α) coefficient was calculated to find out the internal consistency of the items on the scale. Coefficient alpha was used to establish internal consistency of the items on the scale. All scales found to be greater than threshold value 0.6 (Varshney & Goyal, 2006).

Table 4: Reliability Statistics of Constructs (prior to data analysis)

Variable	No. of Items	Cronbach's Alpha
Perceived Usefulness	4	0.925
Perceived Ease of Use	3	0.834
Perceived Intention to Use	2	0.892

Multiple Regression Analysis

In line with the objectives set for this research and to know the impact of independent variables on intention to use ERP among persons from different demographic characteristics and working in a University or equivalent institutions in Gujarat, Multiple Regression Analysis was performed to test the Hypotheses. Multiple regression analysis is useful to test the relationship between one dependent variable and multiple independent variables. This test was performed to develop a model considering: *Perceived Intention to Use* as a dependent variable and 2 external and independent variables.

Table 5: Model Fit (ANOVA)

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	57.789	2	28.894	106.234	0.000*
Residual	65.005	239	0.272		
Total	122.794	241			

Note: *p<0.05

Table 6: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.686	0.471	0.466	0.521

Table 7:Multiple Regression with Perceived Intention To Use as a Dependent Variable

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	ß	Std. Error	Beta			Tolerance	VIF
(Constant)	0.540	0.113		4.762	0.000		
Perceived Usefulness	0.536	0.055	0.546	9.818	0.000*	0.715	1.398
Perceived Ease of Use	0.200	0.052	0.216	3.875	0.000*	0.715	1.398

Note: *p<0.05

This model contains Two Independent Variables (IV), which found to be significant namely Perceived Usefulness and Perceived Ease of Use with R^2 =0.471, F = 106.234 and P<0.05.

The abovementioned relationship result into acceptance of H_1 and H_2. The predictability of the significant variables in abovementioned table seems to be highest in Perceived Usefulness (ß=0.546) followed by Perceived Ease of Use (ß=0.216).

While performing Multiple Regression, itis extremely important to check if there are any symptoms of multicollinearity between independent variables. From the abovementioned table, it can be observed that there are no symptoms of multicollinearity since all results reflected Tolerance Value above 0.2 and VIF (Variance Inflation Factor) less than 10. No variable indicated any serious symptom of multicollinearity (Menard, 1995).

Findings

Table 8: Findings

	Hypotheses / path to check impact	Coefficient	*t*-value	Results
H_5	There is a positive impact of perceived usefulness on intention to use ERP;	0.546	9.818	*Supported*
H_6	There is a positive impact of perceived ease of use on intention to use ERP;	0.216	3.875	*Supported*

Discussion And Implication

The results conclude that the Perceived Usefulness and Perceived Ease of Use positively affect the behavioural Intention to Use ERP. Perceived Usefulness seems to be one of the strongest determinants of adoption of technology. The more an individual can perceive about the benefits of using an ERP, the more he/she will be likely to have an intention to use it. On the other hand, if the individual is not able to perceive any significant benefits or values out of using a technology-based system, he or she is less likely to put efforts to use it. Perceived Usefulness also helps individuals to develop a conviction to share the usefulness to the prospective users around him. Most users, while thinking of expressing their natural intention to use such system, usually think of the direct benefits that can complement their primary responsibilities at the workplace. They start perceiving about how the system is going to help them to save time and effectively perform their job accurately. For any system, until and unless the usefulness is clearly communicated to the users on their own perspectives, no matter how good the system is, users are less likely to take a first step towards using it or even expressing their intention to use it.

With the similar importance, Perceived Ease of Use is also the major predictor of adoption of an ERP. Individuals, at large, feel comfortable to try working with technology solution like ERP, if they perceive it easy to use as the end user. On the other side, if such technology solution is perceived to be difficult and complex to work with, users are likely to avoid trying even. This indicates that that the easier to use an ERP system, the more it is to be adopted. Another benefit for the organisation of having a most user-friendly system is, they won't have to invest heavily and repeatedly in to system-specific training for the users. An user who finds himself well-conversant with the system, will be happy to extend his help to the other users even though it is out of his core job role.

Limitations of Study

Several limitations are affecting this study. Firstly, the sample selected is non-random, which may raise an issue of concern of over sampling. Such limitation about sampling will obviously affect generalizability of the findings. The performed tests may not provide accurate results in case in case of abnormal distribution of sample. Secondly, this study has focused analyzing the intensity to use ERP and ignored analyzing the actual adoption of ERP. Research in future can address these specific issues for better generalizable results. Thirdly, to find better and improved results, other relevant variables can be considered, which are not considered for the current study. Not much and exhaustive literature focusing determinants of intention-to-use ERP in University or equivalent institutions are either available or found difficult to locate hence most part of the literature review taken in to consideration are from the sectors other than Universities and that too in Indian context.

Reference :

Aiman-Smith, L., & Green, S. G. (2002). Implementing new manufacturing technology: The related effects of technology characteristics and user learning activities. *Academy of Management Journal*, *45*(2), 421-430.

Addo-Tenkorang, R., & Helo, P. (2011). Enterprise resource planning (ERP): A review literature report. In *Proceedings of the World Congress on Engineering and Computer Science*, 2, 19-21.

Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In *Action control Springer Berlin Heidelberg*, 11-39.

Alleyne, P., & Lavine, M. (2013). Factors influencing accountants' behavioural intentions to use and actual usage of enterprise resource planning systems in a global development agency. *Journal of Financial Reporting & Accounting*, *11*(2), 179-200.

Basoglu, N., Daim, T., & Kerimoglu, O. (2007). Organizational adoption of enterprise resource planning systems: A conceptual framework. *The Journal of High Technology Management Research*, *18*(1), 73-97.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS quarterly*, 319-340.

Etgar, M. (2008). A descriptive model of the consumer co-production process. *Journal of the academy of marketing science*, *36*(1), 97-108.

Fusilier, M., & Durlabhji, S. (2005). An exploration of student internet use in India: the technology acceptance model and the theory of planned behaviour. *Campus-Wide Information Systems*, *22*(4), 233-246.

Law, C. C., & Ngai, E. W. (2007). ERP systems adoption: An exploratory study of the organizational factors and impacts of ERP success. *Information & Management*, *44*(4), 418-432.

Legris, P., Ingham, J., & Collerette, P. (2003). Why do people use information technology? A critical review of the technology acceptance model. *Information & management*, *40*(3), 191-204.

Leonard, L. N., Cronan, T. P., & Kreie, J. (2004). What influences IT ethical behavior intentions—planned behavior, reasoned action, perceived importance, or individual characteristics?. *Information & Management*, *42*(1), 143-158.

Moore, G. C., & Benbasat, I. (1991). Development of an instrument to measure the perceptions of adopting

an information technology innovation. *Information systems research*, *2*(3), 192-222.

Rajan, C. A., & Baral, R. (2015). Adoption of ERP system: An empirical study of factors influencing the usage of ERP and its impact on end user. *IIMB Management Review*, *27*(2), 105-117.

Rizvi, H. (2005). *Investigating factors related to individuals' intention to use new information technology: An extension of TAM* (Order No. MR10332). Available from ABI/INFORM Global. (305389139).

Venkatesh, V. (2000). Determinants of perceived ease of use: Integrating control, intrinsic motivation, and emotion into the technology acceptance model. *Information systems research*, *11*(4), 342-365.

Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management science*, *46*(2), 186-204.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS quarterly*, 425-478.

Venkatesh, V., Speier, C., & Morris, M. G. (2002). User acceptance enablers in individual decision making about technology: Toward an integrated model. *Decision sciences*, *33*(2), 297-31.