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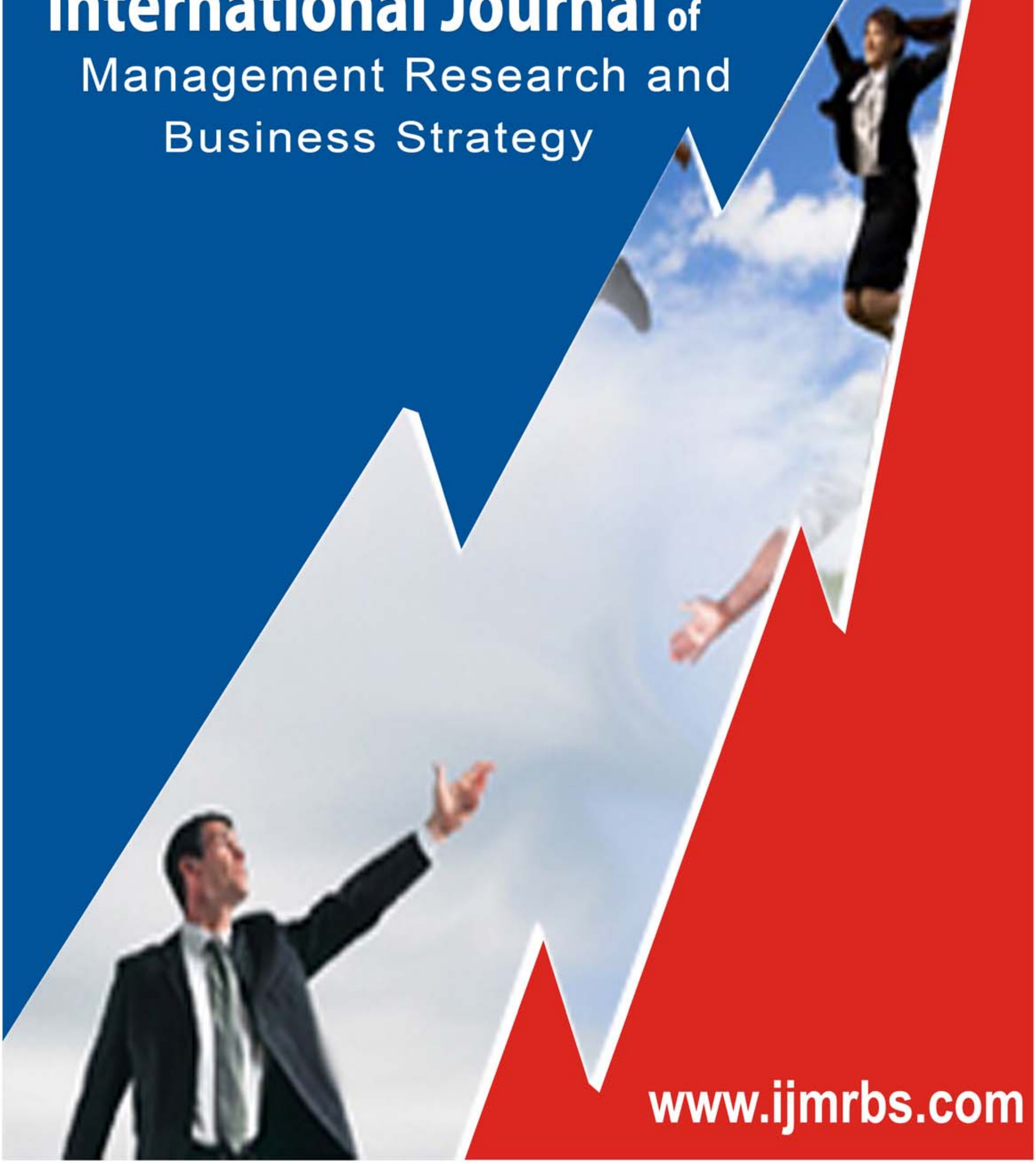

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CLOUD TECHNOLOGY AS AN ALTERNATIVE FOR MARKETING INFORMATION SYSTEM: AN EMPIRICAL STUDY

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The future has already shocked us as predicted by Alvin Tefler. In such a volatile environment, survival and grow of any society or organization largely depends on its ability to adapt. The ability to adapt depends largely on the availability of the information. There are many Enterprise Resource Planning software's available today in the market to collect the data pertaining to various activities within the organizations. Also many powerful search engines are available to capture macro changes. Their implementation and maintenance requires huge investments. As an alternative, this study address' the scope of using "Cloud Computing Technology" . The use of such technology in collecting, storing and dispersion of real time information at low costs enhances decision making by managers. A study was conducted to know the intension of various stake holders—industrialists, academicians, traders and managers of established business houses. The study made use of established "Technology Adoption Model" and measured perceived use, usefulness and risk associated with use of cloud technology and their impact on intension to use.

Keywords: Adaptation, Enterprise Resource Planning, Cloud Computing Technology, Technology Adoption Model, Structural Equation Modeling

INTRODUCTION

Various forces from external and internal environment act continuously on the organization. Based on the ability of the establishment to manipulate these forces, they are classified as either controllable or uncontrollable. Therefore no activities of an organization be it marketing, finance or human resource can be carried out separately. The decision taken by each department within the organization in particular and organization in general depends on which type of force is acting on the organization and its impact on it. Therefore there is a need to collect information from theses environments continuously.

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Each department within the organization has unique requirements of data. Hence they design a data collection system to suit their requirements or develop organization wide system called Management Information System (MIS) to capture the relevant data and deliver department specific information. As early as 1960's a concept of Marketing Information System (MKIS) originated. There are many parallels between MIS and MKIS with respect to use of new technologies and application of conceptual frame works (Wierenga and Bruggen, 1997, Burns and Bush, 2000)

Marketers gather market information using MKIS. MKIS gathers information from various sources and synthesizes it. A MKIS can be viewed as that system which collects marketing data formally, stores it for analyses and distributes to managers for decision making when required. It is an interrelated set of procedures and methods designed to convert data into useful information. Such information is used for several aspects of marketing at various levels like operational, managerial or strategic.

REVIEW OF LITERATURE

Definitions of MIS

The scope of information generation and use alters the definition of MIS/MKIS. James (1998) defines MIS as "A structured, interacting complex of persons, machines and procedures designed to generate an orderly flow of pertinent information collected from both intra and extra-firm sources for use as the bases for decision making" highlighting the interactions between both internal and external environments. Boone and Kurtz (2007) focus more on architecture of MIS which makes use of computers. They define MIS as "a planned computer-based system designed to provide managers with continuous flow of information relevant to their specific decisions and areas of responsibility.

The other approach taken by Kotler (1997) and Burns and Bush (2000) instead focuses more on application of MIS/MKIS than limited definitions. It shows the relationships between management tasks, generation of relevant information and decisions taken. They propose a model with several subcomponents, some of these components include, Marketing Intelligence, Internal Records (Data base), Marketing Research and decision support system for data analysis.

Collection of internal data is much easier and cost effective hence many managers rely more on internal data base to identify opportunities and threats and to assess performances (Kotler and Armstrong, 2008, Pride and Ferrell, 2006). Marketing intelligence involves collecting information about competitors and markets on continuous basis. Whereas marketing research involves proactive search for necessary information to define and solve specific problems related to business (Malhotra, 2007). Organizations make use of Decision Support Systems (DSS) to analyse information.DSS systems make use of computers and many advanced tools to make semi structured and unstructured decisions (Power, 2002,. Ezine, 2010, James, 1998).

MIS and Decision Making

The quality of marketing management decision is linked with the quality, quantity, adequacy and speedy availability of data (Delone and Mclean, 1992). But, it is very difficult to develop a perfect MKIS system as there are differences in the views of different stake holders—customers, suppliers, and other partners with respect to system requirements (Jiang *et al.,*1997). Still efforts are on to build a good MKIS systems, as they increase the number of options available to decision maker and support every element of marketing strategy (Harmon, 2003). A study conducted by Jobber and Fahy (2006) has shown that the design of MKIS plays an important role as the quality of information generated influences the effectiveness of decision making within the organization. Further a positive relationship between success of organization and utilization of MKIS has been established empirically by Shaker (2011).

Cloud as an Alternate

A study by Krishnan *et al.* (1998) has shown that cost of ownership for MKIS systems delivered by corporate intranets was low and end users are satisfied. Today due to advances in IT and ITES organizations are not required to invest huge amount of money to build, maintain and to develop information or decision support systems. Alternatively organizations can rely on Cloud computing. With five essential characteristics like On demand self service, Broad network access including mobiles to PDAs, Resource pooling, Rapid elasticity and measured service a managers need not first adopt the technology and then decide what to do with it (Appelgate *et al.,* 1988, Grance and Mell, 2011).

Users of Cloud computing pay based on how much they use just like any public utilities electricity, Telephone, gas, etc. Depending on the type of data and the level of security required a user can rely on public, private or hybrid clouds (Hurwitz *et al.* , 2009).

Also based on utility and level of complexity involved clouds can be classified as Software-as-a-Service (SaaS), Infrastructure as a Service (IaaS) or Platform as a Service (PaaS). SaaS allows users to take care of their business with minimum IT infrastructure like web browsers and Interactive Voice Response (IVR). The examples for Saas are Microsoft Business Productivity Suite, Force.com, and Zoho, etc. Whereas; IaaS provider basic infrastructure to end users like virtual machines with lot of flexibility to build own operating systems, storage, and applications on it. The examples for IaaS include Amazon and Go-Grid, etc. In PaaS system coders, programmers and IT application developers develop and set up their own applications on the cloud. The best known examples for PaaS are Microsoft Windows Azure platform and Google App Engines (Goulding, 2010). The availability of cloud in various levels allows end users to concentrate more on their core businesses and competencies.

This allows firms to concentrate more on their core competencies leaving all the issues related to IT infrastructure, licenses for software, software applications and their up gradation, updates, maintenance, etc., to the third party experts (Mell and Granee, 2009).

Many companies from the world have migrated to Cloud computing. The list of large organizations utilizing Cloud Computing includes Salesforce.com, Google App Engine, Novatium, IBM, Oracle, VeriSign, Microsoft, US Department of Energy, GE and British. The list also includes large enterprises like Infosys, Tata Motors, Mahindra Renault, Schiller Corp, Welspun, HDFC Bank, Sify and ESPN-Star from India (Anudeep Rawal, 2011).

MSME and Cloud Technology

Many small firms do not use MKIS as much as large firms due to their inability to build such complex systems for cost considerations

(Li *et al.*, 2001*).* But, Ronald *et al.* (2004) has shown that new ways of using a potential and popular technology brings cost effectiveness to marketing decision making. Bernard (2010) advocates that shared technology like Cloud even suits Micro, Small and Medium Enterprises (MSME) very well at all stages of operations and help these firms to evolve to become Small and Medium Business (SMB) entities. Janakiramm (2010) also supports this technology for its 'elastic' nature and feels it is most suitable for budding entrepreneurs.

NEED FOR THE STUDY

Many firms MSME like Su-Kam, Janalakshmi Financial Services, Tulip Telecom, Netmagic, Nustreet, Affordable Business Solutions, India Info line, Redbus, Wildcraft and Karnal Agro Forging are early adopters of cloud computing in India (Anudeep Rawal, 2011). Keeping in mind the above facts a study was under taken in Hubli-Dharwad to know entrepreneur's perception towards Usefulness, Ease of use and Risks involved in adopting cloud technology and their intension to use it.

OBJECTIVES OF THE STUDY

The study focuses on following objectives

1. To study whether perceived risk influences perceived usefulness of the cloud technology.

H_0 : *Perceived risk does not influence perceived usefulness of the cloud technology.*

2. To study whether perceived risk influences perceived ease of use of cloud technology.

H_0 : *Perceived risk does not influence perceived ease of use of the cloud technology.*

3. To study whether perceived ease of use influences perceived usefulness of the technology.

H_0 : *Perceived ease of use does not influence perceived usefulness of the technology.*

4. To study whether perceived ease of use influences intention to use the technology.

H_0 : *Perceived ease of use does not influence intention to use the technology.*

5. To study whether perceived usefulness influences intention to use the technology.

H_0 : *Perceived usefulness does not influence intention to use the technology.*

6. To study whether perceived risk influences intention to use the technology.

H_0 : *Perceived risk does not influence intention to use the technology.*

METHODOLOGY

This study makes use of both primary and secondary data. A questionnaire is designed with a five pint scale to measure the perceptions of entrepreneurs and managers of MSMS in and around Hubli-Dharwad twin cities situated in Karnataka state, India. In all 83 respondents were contacted in convenience sampling.

This study makes use of well established Technology acceptance Model developed by Davis (1998). This model has undergone many changes from its and finally has evolved into Unified Theory of Acceptance and Use of Technology. Now the researchers have proposed TAM 3 model (Venkatesh and Davis, 2000, Venkatesh, 2000, Venkatesh *et al.,* 2003, Venkatesh and Bala, 2008).

The model is built and analyzed using Smart PLS 2.0. The Factorial Validity is calculated by using Convergent Validity and Discriminant

Validity. Convergent Validity is shown when each of the measurement items loads with a significant t-value on its latent construct, typically the p-value of this *t*-value should be significant at least at the 0.05 alpha protection level. On the other hand Discriminant validity is captured when the correlation of latent variable scores with the measurement items needs to show an appropriate patterns of loadings, one in which the measurement items load highly on their theoretically assigned factor and not highly on others.

DISCUSSION

The cross loadings Table 1 explains whether the selection of observed variables to form a respective latent variables like ease of use, intention to use, risk and perceived usefulness is justified. From the table below, it is observed that, with respect to latent variable usefulness, variables anytime, expertise and sharing have the highest loadings. A similar analysis reveals that there are no high cross loadings, indicating no change to be made for the present model. This analysis is a first step and is similar to exploratory factor analysis.

In the second stage researchers evaluated how well these latent variables Ease of use, intension to use, Risk perception and perceived usefulness have been defined by observed variables. The Average Variance Extracted (AVE) is used to know how much of variance in all the observed variables is captured by the respective latent variable (Table 2). It is observed that intension to use has the maximum AVE, indicating that the variation in is captured by the latent variable. On the other hand Perceived usefulness and risk show low AVE. The other parameter of interest is Composite reliability. It measures how much

Figure 1: TAM Model for Cloud as an alternative to Marketing Intelligence

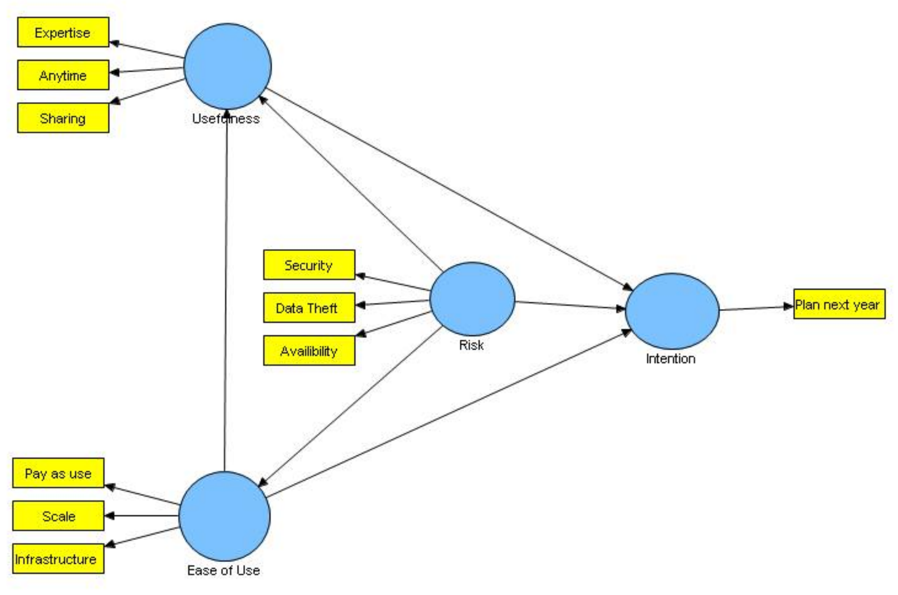

Table 1: Cross Loadings

	Ease of Use	Intention	Risk	Usefulness
Anytime	0.326141	0.215417	0.077002	**0.520067**
Availability	0.517096	0.389283	0.787253	0.293425
Data Theft	0.419041	0.344007	0.706133	0.234451
Expertise	0.076885	0.154993	-0.056339	**0.32348**
Infrastructure	0.830044	0.597579	0.64658	0.407189
Pay as use	0.841567	0.487112	0.564149	0.454128
Plan next year	0.646452	1	0.504134	0.444817
Scale	0.763326	0.482699	0.360162	0.610808
Security	0.056771	0.01576	-0.128946	0.24032
Sharing	0.551002	0.403547	0.473755	**0.892561**

Table 2: Overview of the Model

Overview	AVE	Composite Reliability	R Square
Ease of Use	0.659958	0.853199	0.42516
Intention	1	1	0.434753
Risk	0.378339	0.499559	
Usefulness	0.390591	0.622447	0.357907

Table 3: T Statistics for Factors

Relations	T Statistics
Anytime <- Usefulness	2.40506
Availability <- Risk	8.265443
Data Theft <- Risk	6.935475
Expertise <- Usefulness	0.994804
Infrastructure <- Ease of Use	9.18652
Pay as use <- Ease of Use	16.595159
Plan next year <- Intention	
Scale <- Ease of Use	8.888646
Security <- Risk	0.992278
Sharing <- Usefulness	6.794172

observed variables explain about the latent variables. Except for Risk, all other variables corresponding to latent variables have good observations (Reliability >0.6). The extent of variation , explained by various variables is shown by R square. Since, Risk has been taken as first point does not show any *R*-square values.

The relationships between various observed factors and latent variables is given by Table 3. T-statistics below here, higher value of T signifies better contribution. The contribution of pay as use towards ease of use is the highest.

The next level of interaction between latent variables is given by Table 4. The table gives path

Table 4: Total Effects

Total Effects	Ease of Use	Intention	Risk	Usefulness
Ease of Use		0.55274		0.584925
Intention				
Risk	0.652043	0.50413		0.401538
Usefulness		0.08805		

Table 5: Latent Variable Coefficients

	Ease of Use	Intention	Risk	Usefulness
Ease of Use	**0.812377991**			
Intention	0.646452	1		
Risk	0.652043	0.504134	0.615093	
Usefulness	0.598058	0.444817	0.401538	0.6249728
Note: The values in bold are Sqrt of AVE)				

Table 6: Hypothesis Testing

Hypothesis	Relations	T Statistics	Accept/ Reject
H_4	Ease of Use→Intention	5.205408	Reject
H_3	Ease of Use→Usefulness	4.462697	Reject
H_2	Risk→Ease of Use	11.907302	Reject
H_6	Risk→Intention	6.559585	Reject
H_1	Risk→Usefulness	4.346088	Reject
H_5	Usefulness→Intention	0.913795	Accept

loadings. The higher values indicate the higher contributions. The impact of risk perception on ease of use is highest compared to that on intention to use and perceived usefulness.

The overall goodness of fit for this model is checked by comparing square root of AVE with all the latent variable coefficients. Since, all the values are less than the square root of AVE, the model is good (Table 5). The goodness of fit is measured by taking a geometric mean of average AVE and *R* square. From Table 2 it is calculated. The value of Goodness of fit equals 0.43, which indicated moderate fit (Wetzels, 2009) .

CONCLUSION

The present model has high levels of loadings on all the latent variables namely: Usefulness, Ease of use and Risk, except for two variables-Scale and Security. This means that the respective variables to not belong to the groups Perceived usefulness and Risk factors, respectively. Also, it is observed that the present questionnaire fails to capture the actual variables explaining the variations in above two factors. The composite reliability is fair except for Risk factor, meaning that the present data cannot be trusted to evaluate respondent's risk perception towards cloud as an alternative. But, the data explains more than 35% of variation in all these latent variables. The overall model fit is (0.43) large with the average values of AVE and R^2 (Wetzels, 2009).

The Table 6 shows that the highest impact of perceived risk is on perceived ease of use, followed by usefulness. The perceived Ease of use influences end users to adopt Cloud technology as an information gathering, processing or as DSS more than perceived risk and perceived usefulness has no role to play. Also, it can be inferred that they are ready to bear the risk to make MIS simple. This suggests that the MSME are going to use cloud technology for their MIS requirements not because it is more useful but because it is easy to use.

REFERENCES

1. Anudeep Rawal (2011), "Adoption of Cloud Computing In India, Journal of Technology Management For Growing Economies", Vol. II, No. 2, pp. 65-78.

2. Appelgate L M, Cash J I and Mills D Q (1988), "Information Technology And Tomorrows Managers", *Harvard Business Review,* Nov-Dec., pp. 128-36.

3. Wierenga B and Van Bruggen G H (1997), "The Integration Of Marketing Problem-solving Modes And Marketing Management Support Systems", *Journal Of Marketing,* Vol. 61, pp. 21-37.

4. Bernard G (2010), "'Cloud Computing : A Perfect Fit For Mid Sized Companies", Cio, (Online) (Cited On Aug 26, 2010) Available At <Url: Http://Www.cio.com/Article/ 606222>

5. Boone L E and Kurtz D L (2007), *Contemporary Marketing,* Harcourt College Publisher, New York.

6. Davis (19989), "Perceived Usefulness, Perceived Ease Of Use And User Acceptance Of Information Technology", *MIS Quarterly*, Vol. 13, No. 3, pp. 319-340.

7. Delone W H and Mclean E R (1992), "Information System Success: The Quest For Dependent Variable", *Information Systems Research*, Vol. 3, No. 1, pp. 60-95.

8. Li E, Mcleod Jr. R and Rogers (2001), "MKISs In Fortune 500 Companies: A Longitudinal Analysis Of 1980, 1990, And 2000, Information And Management,38", pp. 307-322 (Online) http://Www.cob. calpoly.edu/~Eli/Pdf/I&M-38-5.pdf. Retrieved on 10/2/2012.

9. Goulding J (2010), "Identity And Access Management For The Cloud: Ca's Strategy And Vision', Ca's Solution For Cloud Security, CA Technologies. Canada", (Online) (Cited On Oct 12,2010) Available From <Url:Http://Csrc.nist.gov/>

10. Grance Timothy and Peter Mell (2011), "The Nist Definition Of Cloud Computing", National Institute Of Standards And Technology: Information Technology, P3,Online Http://Csrc.nist.gov/Publications/ Nistpubs/800-145/Sp800-145.pdf Accessed on 12 January 2012.

11. Harmon Robert R (2003), MKIS, *Encyclopedia of Information Systems*, Vol. 3, Elsevier Science (Usa), pp. 137-151.

12. Hurwitz J., Bloor R, Kaufman M and Halper F (2009), "Comparing Public, Private, And Hybrid Cloud Computing Options", John Wiley & Sons, Inc. (Online) (Cited On Aug 16, 2010) Available From Url:Http:// Www.dummies.com

13. Jiang J J, Klein G, Motwani J and Balloun J

(xxxx), "An Investiga-tion Of Marketing Managers' Dissatisfaction With Marketing Information Systems", *International Journal Of Information.*

14. James A O'brien (1998), "Management Information System: A Managerial End User Perspective", Galgatia Publications Private Ltd.,N.d.

15. Jobber D and Fahy J (2006), *Foundations Of Marketing*, The Mcgraw-hill Companies, New York, Ny.

16. Krishnan M, MayuramS and Venkatram R (1998), "An Empirical Analysis Of Customer Satisfaction For Intranet Marketing Systems", *Decision Support Systems,* Vol. 24, pp. 45-54, as Cited In Ronald L Hess, Ronald S Rubin, Lawrence A.

17. West Jr. (2004), "Geographic Information Systems As A Marketing Information System Technology", Decision Support Systems, Vol. 38, pp. 197- 212, Online Http://Www.fatih.edu.tr/~Mcadams/Geo491/Gis1.pdf

18. Mell P and Granee T (2009), "The Nist Definition of Cloud Computing', National Institute of 78 Standard and Technological Laboratory", Version 15 (Online) (Cited On Aug 25,2010) Available At <Url: Http://Www.newinnovationsguide.com/Nist_Cloud_Definition.pdf>

19. Kotler P (1997), *Marketing Management: Analysis, Planning, And control,* 9th Ed., Prentice-Hall, Upper Saddle River, NJ.

20. Ringle C M, Wende S, Will S (2000), "Smartpls 2.0 (M3) Beta", Hamburg 2005, Http://Www.smartpls.de.a.c. Burns, R F Bush, Marketing Research, 3rd Ed., Prentice-hall, Upper Saddle River, NJ.

21. Ronald L Hessa, Ronald S Rubinb, Lawrence A West Jr.c(2004), *Geographic Information Systems as a Marketing Information System Technology*, Vol. 38(2), pp. 197-212.

22. Shaker Tasmin Ismail (2011), "The Role of Marketing Information System On Decision Making "An Applied Study On Royal Jordanian Air Lines (Rja)", *International Journal of Business and Social Science,* Vol. 2, No. 3, pp. 175-185.

23. Venkatesh and Devis (2000), As Quoted In Http://En.wikipedia.org/Wiki/Technology_Acceptance_Model#Citerefdavis1989 Retrieved On 17/2/2012.

24. Wetzels M Odekerken-schroder G and Oppen (2009), "Using Pls Path Modeling For Assessing Hierarchical Construct Models: Guidelines And Empirical Illustration", *Misquaterly*, Vol. 33, No. 1, pp. 177-195.

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