

Impact of Technological & Individual context variables on E-commerce Implementation in Medium sized Automobile enterprises of India

Prof. Girish Bagale Dr.Hema Date

PhD Scholar, SBMAssociate Professor-IT
SVKM'S NMIMS University, Mumbai, NITIE Mumbai

Abstract

Collected data was analysed using advanced multivariate statistical software of Structural Equation Modelling (SmartPLS). The analysis involved three iteration processes where several of the factors were deleted in order to make the model acceptable. The result of the analysis found that R^2 value of the model is 0.361 which indicates that the developed model has a substantial impact on E-commerce Implementation predication under Technological & Individual context variables. We found Technological context (Relative advantage & Complexity) Individual context (Manager/Owner's IS Knowledge & Manager/Owner's Innovativeness) variables have a strong effect on E-commerce adoption & Implementation in automobile medium enterprises.

Keywords: E-commerce, Micro, Small and Medium Enterprises (MSME), Partial Least Square-Structural Equation Modelling (PLS-SEM) & Information & Communication Technology (ICT)

1. Introduction

1.1 Micro, Small and Medium Enterprises (MSME):

Micro, Small and Medium Enterprises (MSME) sector, credited with generating the highest rate of employment after agriculture, account for a major share in industrial production and exports. This sector accounts for 37.33 per cent of the total manufacturing output; 40 per cent of India's total exports and contributes 7.04 percent in India's Gross Domestic Product (GDP). It employs about 106 million persons in over 46 million units across the country. There are over 6000 products ranging from traditional to high-tech items, which are being manufactured by the MSMEs in India. The total number of MSMEs operating in India significantly increased 207 per cent between 2000-01 and 2009-10 and the sector registered a sterling 21.52 per cent compounded annual growth in terms of production. The employment generating potential of the sector has also grown at an annual compounded rate of 11.74 per cent in the last decade. Nearly 50% of the MSMEs are owned by disadvantaged groups of society. 67 % of the MSMEs are in the manufacturing space. Manufacturing sector contributes around 15 percent in India's Gross Domestic Product (GDP) & in that MSME sector contributes 7.04 percent in India's Gross Domestic Product (GDP) (Annual Report, Ministry of MSMEs, GOI, 2015-16)

MSMEs are increasingly seeing the benefits arising from E-commerce as expanded geographical coverage giving them a larger potential market into which they can sell their products and services. E-commerce improves an MSME's ability to compete with larger organizations and operate on a global scale. They additionally see E-commerce as a tool for providing value effective ways in which for MSME's to plug their business, launch new product, improve communications, gathering data and establishing potential business partners. The web permits small businesses to enter the domain of larger business and compete with them. Moreover, the utilization of e-commerce permits small businesses to attain equivalent efficiencies as large businesses.

2. Literature Review

2.1. Theoretical Framework

By reviewing pertinent studies in this area; we found that very few studies were done in B2B, Indian & MSME sub-sector specific context. This study try to fill this gap of research. We also found that Innovation Diffusion Theory framework has consistent empirical support in literature & used as theoretical framework to develop conceptual model for research.

The innovation diffusion theory or diffusion of innovation (DOI) focuses on the perceived characteristics of innovations, postulating the five determinations of technology adoption, i.e., relative

advantage, complexity, compatibility, trial ability and observability (Rogers, 1995). This theory has been used in previous research to explain IT adoption in general (Kaynak, Tatoglu and Kula,2005) and e-commerce adoption in particular (Wongpinunwatanaand & Lertwongsatien,2003). Premkumar's (2003) study showed that relative advantage, compatibility and complexity are consistently related to innovation adoption.

2.2 Identification of Research variables for this study

Electronic Commerce has technical components, similar to other IT innovations, but Electronic Commerce also has inter-organizational elements which distinguish it from other types of innovations. By keeping the objectives of this study; we have identified following research variables form pertinent studies

2.2.1 Technological context Research variables

The organizational is the arena in which an organization conducts its business and in the specific context of e-commerce adoption in SMEs it includes relative advantage, complexity, compatibility, Owner/Manager's IS Knowledge & Owner/Manager's Innovativeness

1. Relative advantage:

Relative advantage is the degree to which an innovation is seen as superior to existing practice (Rogers, 1995). In the literature, Relative Advantages has been identified as an important factor effecting implementation of e-commerce in SMEs. Relative Advantages are the benefits that are offered by e-commerce in comparison to the traditional way of doing business. Relative Advantages of e-commerce include increased sales, improved communication with customers, suppliers and employees and easier order tracking (Baldwin, Lymer and Johnson,2000). Importance of perceived benefits in effecting e-commerce adoption has been emphasized in the literature by a large number of researchers (Mehrtens, Cragg and Mills, 2001; Kutlu, and Ozturan,2008; Grandon, and Pearson,2004; Beatty, 1998). It has positive association with E-Commerce implementation. Drawing from this discussion above, this study therefore posits that:

H1: There is a significant relationship between relative advantageand degree of E-Commerce Adoption & Implementation.

2. Compatibility:

Compatibility refers to the degree to which an innovation is perceived as consistent with the existing socio-cultural values, past experiences, and previously introduced ideas and need of adopters (Rogers, 1995). In the context of this study Compatibility refers to the degree to which e-commerce applications are compatible with the current practices of the company such as value chain relations and firm's processes. In the literature, compatibility is observed to be affecting the adoption of innovation (Sparling, Toleman and Cater-Steel, 2007), the rate of adoption of innovation (Rogers, 1995)and adoption of e-commerce technologies(Kendall et al.,2001)positively. In addition, compatibility with current business practice is a significant factor effecting adoption of e-commerce technologies (Kendall et al.,2001, Al-Qirim, 2007). Drawing from this discussion above, this study therefore posits that:

H2: There is a significant relationship between compatibility and degree of E-Commerce Adoption & Implementation.

3. Complexity:

Complexity is the degree to which an innovation is perceived as relatively difficult to understand and use (Rogers, 1995). Complexity has a negative association with E-Commerce implementation(Kuanand Chau, 2001;Zhu et. al.,2006;Soares-Aguiar and Palma-Dos-Reis, 2008;Liu, 2008;Wang et. al., 2010 &Bagale,2014).Drawing from this discussion above, this study therefore posits that:

H3: There is a significant relationship between complexity and degree of E-Commerce

Adoption & Implementation.

2.2.2 Individual context Research variables

For this study; we had identified following individual context variables

1. Owner/Manager's IS Knowledge

Lack of internal expertise can be a factor delaying the innovation (Thong, 1999). In the literature, previous IT experience has been observed to be an important factor effecting success of the IT adoption. Findings from Palvia and Palvia (1999) and Chong -Pervan (2001) indicate experience of owner are very important factors in the success of IT adoption. When a company owner who actually has great influential power on top management explains the role of IT in achieving his/her vision, attitudes of managers will be affected and the level of priority of IT related issues in all decisions will increase. Drawing from this discussion above, this study therefore posits that:

H5: There is a significant relationship between Manager's IS Knowledge and degree of E-Commerce Adoption & Implementation.

2. Owner/Manager's Innovativeness:

Owner/Manager's Innovativeness refers Openness to the new system for experiment particularly e-commerce. As owner/manager is ready to try new things or to try new ways of doing things are more prone to implement e-commerce in their organisation. Owner/Manager's Innovativeness had positive association with E-Commerce implementation. (Thong, J.Y.L. (1999), , Sandy Chong,2005, Zhu et.al,2006a, Li, Y.H. (2008), Ada Scupola,2009, Pallavi Upadhyaya, P Mohanan,2009, Le Van Huy 2012, Bagale, 2014, Rita Rahayua & John Daya,2015). Drawing from this discussion above, this study therefore posits that:

H6: There is a significant relationship between Manager's Innovativeness and degree of E-Commerce Adoption & Implementation.

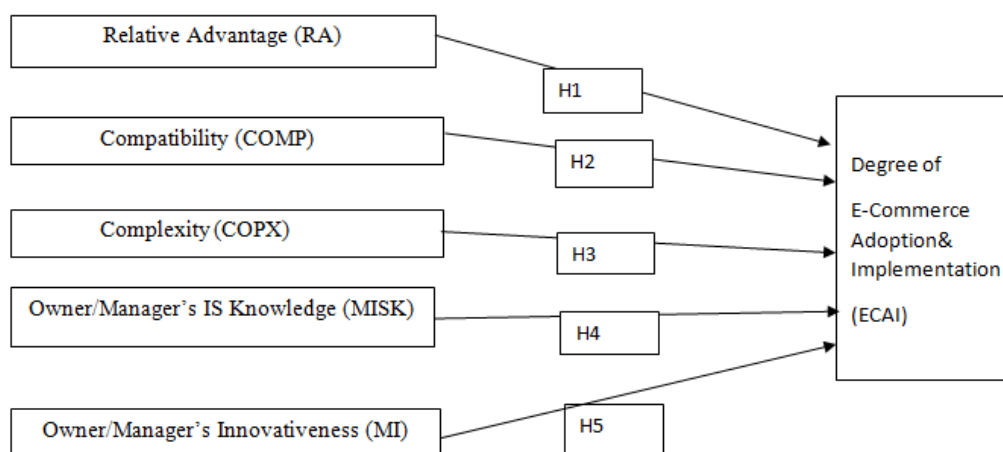
2.3. Objectives of the study

This study has following objectives

1. To study relationship between Technological & Individual context variables with the degree of E-commerce Implementation at enterprise level.
2. To analyse the extent of influence between Technological & Individual context variables on the degree of E-commerce Implementation at enterprise level

2.4 Research model (refer fig.2.2):

Fig. no.2.2 Conceptual/Research Model



Independent Variables Dependent Variable Source: Author

4. Research Design and Methodology:

The present research used exploratory research design using survey method. The target population for the study was Maharashtra state's automobile sector-medium enterprises. List was compiled from government & non-governments agencies. Out of 104 list of compiled automobile sector-medium enterprises; 82 were randomly selected & contacted over telephone to participate in survey. Out of 82 enterprises contacted; 56 enterprises agreed to participate in the survey. This resulted in the response rate of 68 per cent. Based on their consent to participate in the study, a personal visit was made to these firms and interview with the owner/manager was conducted. In six cases, the questionnaire was mailed through email and telephonic interview with owner/manager was conducted. Prior research formed the basis upon which the research instruments were formulated and operationalized. However, some modifications were done were necessary in order to suit the research objectives. All the measurement items were measured on a five-point Likert-type scales that was anchored by 1= strongly disagree to 5= strongly agree to express the degree of agreement.

5. Data Analysis & Results

5.1 Profile of Respondents

Table 5.1 Demographic Profile of respondent

S. No.	Heading	Details/ Heading	Automobile/Metal (n=56)	
			Freq.	(%)
1	Work title	Owner/Proprietor	13	23.21
		VP/ Director/MD	9	16.07
		IT Head/CIO	1	1.79
		Business Manager	13	23.21
		Accountant	3	5.35
		Other	17	30.36
2	Gender	Male	52	92.86
		Female	4	7.14
3	Age	Less than 20 years	0	0
		21-30 years	18	32.14
		31-40 years	23	41.07
		41- 50 years	11	19.64
		51-60 years	4	7.14
		61 years & above	0	0
4	Education	Primary education	1	1.79
		Secondary education	1	1.79
		Bachelor's degree	23	41.07
		Post-graduate	29	51.79
		Other	2	3.57

Source: Survey data

5.2 Partial Least Square (PLS) -Structural Equation Modelling (SEM) Approach:

A SEM approach was used as a data analysis approach. In particular the Smart PLS software was used to assess the measurement and structural models. According to Chin & Newsted (1999) a measurement model is a linkage between the latent variables and their manifest variables while the structural model captures the hypothesized causal relationships among the research constructs. Smart PLS is a component based SEM technique that was developed from regression and path analysis (Chinomona & Surujal, 2012). Smart PLS has advantages over covariance based SEM techniques such as AMOS in

that, it has the ability to model latent constructs that are uncontaminated by measurement error under conditions of non-normality. In addition to that, Smart PLS can handle complex predictive models in small-to-medium sample sizes. As a result of this quality, Smart PLS was found appropriate in case of the current study sample which is relatively small (56). In this respect, In order to check the statistical significance of the relationships, bootstrapping re sampling method was used.

5.3.1. Measurement Model Evaluation:

Measurement model evaluation is aimed to evaluate the consistency and validity of the manifest variables. Manifest variables with outer loading 0.7 or higher are considered highly satisfactory (Henseler et. al., 2009 & O. Gotz et. al., 2010). While loading value of 0.5 is regarded as acceptable, the manifest variables with loading value of less than 0.5 should be dropped (Chin, 1998; Hair et al., 2010). For this study the cut-off value taken for outer loading is 0.5. Second parameter for consistency evaluations is constructed reliability where it is evaluated by two measures, that is, Cronbach's alpha and Composite Reliability (CR). Cronbach's alpha and CR indicate how well a set of manifest variables appraises a single latent construct. Hair et al., (2011) suggested that value of cronbach alpha should be higher than 0.7 and for composite reliability, the value of 0.7 is suggested as "modest".

Convergent validity is carried out by Average Variance Extracted (AVE) test on variables (Fornell & Larcker, 1981). It determines the amount of variance captured by latent variable from its relative manifest variables due to measurement errors. Hair et al. (2011) argued that a minimum 50% of the variance from manifest variable should be captured by latent variables. This implies that AVE value of the construct should be greater than 0.5. Discriminant validity is carried out to confirm that the manifest variable in any construct is relevant to the designated latent variable where its cross-loading value in LV is higher than that in any other constructs (Chin, 1998).

Based on the above criteria, measurement model is evaluated by iterative process to discard the weak manifest variables from the developed model. Hence, a total of 3 iterations were involved in this study where each of the iterations was assessed based on the criteria and resulted in discarding 4 manifest variables. Table 5.2 provided below, provides the reliability and validity indicators of the measurement model of final iterations only.

Table 5.2: Results of measurements model evaluation

Construct Indicators	Final iteration			
	loading	AVE	CR	Alpha
ECAI1	0.635	0.537	0.872	0.816
ECAI2	0.844			
ECAI3	0.826			
ECAI4	0.651			
ECAI5	0.769			
RA1	0.637	0.640	0.873	0.825
RA2	0.756			
RA3	0.806			
COMP1	0.807	0.786	0.917	0.818
COMP2	0.812			
COMP3	0.671			
COMP4	0.589			
COMP5	0.687			
COPX1	0.867	0.577	0.871	0.821
COPX2	0.912			
COPX3	0.876			
MISK1	0.778	0.625	0.866	0.787
MISK2	0.793			

MI1	0.909	0.515	0.755	0.725
MI2	0.575			
MI3	0.840			
MI4	0.692			

Source: Smart PLS analysis results

Note: ECAI= E-commerce adoption & Implementation; RA=Relative advantage;
 COMP=Compatibility; COPX=Complexity, MISK= Manager/Owner's IS Knowledge &
 MI=Manager/Owner's Innovativeness

Once the iteration process completed, the final model is checked for discriminant validity based on cross loading values generated from the final iteration as shown in Table 5.2. Cross loading of all the manifest variables has higher values on their relative latent variable as compared with other constructs as in the Table 5.2. This verifies that the manifest variables in each construct represent the assigned latent variable testifying the discriminant validity of the model.

Discriminant validity was assessed the inter-construct correlation matrix which was expected to have cross-loading values that are less than 0.85 (Chin, 1998). The composite reliability should be greater than 0.7 (convergent validity), while the inter-construct correlations should be less than the square-root of the AVE (discriminant validity). Drawing from Table 5.2 provided above, all the research variables exceed these criteria, with CR being 0.7, hence confirming that the research instruments are reliable. In addition to that, the square-root of the lowest AVE is 0.717 and is greater than the highest inter-construct correlation value (0.621). This confirms too the existence of discriminant validity (refer Table 5.3).

Table 5.3: Inter-constructs correlation Matrix

Research Variables	FR	TMS	TR	OR	MISK	MI	ECAI
Relative advantage (RA)	1						
Compatibility (COMP)	0.539	1					
Complexity (COPX)	0.592	0.576	1				
Manager/Owner's IS Knowledge (MISK)	0.567	0.532	0.517	0.601	1		
Manager/Owner's Innovativeness (MI)	0.512	0.498	0.506	0.516	0.554	1	
E-commerce adoption & Implementation (ECAI)	0.621	0.592	0.512	0.501	0.613	0.605	1

Source: Smart PLS analysis results

5.3.2. Path/Structural Model Assessment:

Structural model assesses relationship between exogenous and endogenous latent variables through evaluating R^2 value, that is, coefficient of determination (Hair et al., 2012) and also f^2 value, that is, path coefficients of the model (Chin, 1998). R^2 corresponds to the degree of explained variance of endogenous latent variables while f^2 indicates the strength of an effect from variables to endogenous latent variables (Cohen 1988). According to Cohen et al. (2003) for a good model, the value of R^2 of endogenous latent variable should be more than 0.26. Since R^2 value for the developed model is 0.361 which is higher than the suggested value, the model is considered to have substantial degree of explained variance E-commerce adoption & Implementation by identified research variables. Next step is assessing the path coefficient of all latent variables (paths) by comparing f^2 values among all the paths. The highest f^2 value symbolizes the strongest effect of predictor (exogenous) latent variable towards the dependent (endogenous) latent variable. However, f^2 value has to be tested for its significance level through t -value test. The test is achieved by performing nonparametric bootstrapping technique (Chin, 1998). Bootstrapping technique computes t -value by creating prespecified number of samples. Hair et al. (2011) suggested that acceptable t -values for a two-tailed test are 1.65

(significance level = 10 percent), 1.96 (significance level = 5 percent) and 2.58 (significance level = 1 percent).

In this study, bootstrapping generated 5000 samples and these samples are used to compute *t*-values as presented in Table 5.4. Results from Table 5.4 demonstrate that all the paths attained *t*-value are higher than the cut-off point for a significance level of 1 percent, that is, 2.58. This implies that; the paths (H1, H3, H4 & H6) in the model have a strong effect on E-commerce adoption & Implementation. The highest β value is 0.520 for Manager/Owner's IS Knowledge. This is the most significant construct which influences critically the-commerce adoption & Implementation in Automobile medium enterprises.

Table 5.4: Path/Structural modelling results

Hypothesis	Posited Hypothetical Associations	Path coefficient (β)	$ t $ -value	Significance Level	Decision on proposed Hypothesis	R ²
H1	RA → ECAI	0.434	3.387	***	Supported	0.361
H2	COMP → ECAI	0.016	0.136	NS	Not Supported	
H3	COPX → ECAI	-0.306	2.029	***	Supported	
H4	MISK → ECAI	0.520	4.049	***	Supported	
H5	MI → ECAI	0.355	2.143	**	Supported	

Source: Smart PLS analysis results

Notes: NS=Not significance & Not Supported, *P< 0.10, **P< 0.05, ***P< 0.01

ECAI= E-commerce adoption & Implementation; RA= Relative advantage;

COMP= Compatibility; COPX= Complexity; MISK= Manager/Owner's IS Knowledge &

MI= Manager/Owner's Innovativeness

Table 5.4 above provide support for the posited four hypotheses, that is, H1, H3, H4 & H5. The Path coefficient for H1, H3, H4 & H5 are 0.434, -0.306, 0.520 & 0.355 respectively. Overall, R² for model is 0.361 indicate that the research model explains at most 36.1% of the difference in the dependent constructs. Tenenhaus, Vinzi, Chatelin & Lauro (2005) provides a statistical formula to assess the global goodness-of-fit (GoF) of a research model as provided below:

$$GoF = \sqrt{AVE * R^2}$$

The calculated global goodness of fit (GoF) is 0.42. Since this calculate value exceeds the threshold of GoF>0.36 suggested by Wetzels, Odekerken-Schröder & van Oppen (2009), the study confirms the existence of the data's goodness of fit to the research model.

5.4 Discussion of results and Implications of the study:

The results in table 5.4 provide support for four hypotheses, that is, H1, H3, H4 & H5. Hypothesis 1 shows that there is a positive & significant relationship between Relative advantage & E-commerce adoption & Implementation (0.434). This finding is consistent with previous studies (Mehrtens, Cragg and Mills, 2001; Kutlu, and Ozturan, 2008; Grandon, and Pearson, 2004; Beatty, 1998). Higher Relative advantage leads to E-commerce adoption & Implementation in enterprises. Hypothesis 3 shows that there is a negative & significant relationship between Complexity & E-commerce adoption & Implementation (-0.306). This finding is consistent with previous studies (Kuan and Chau, 2001; Zhu et. al., 2006; Soares-Aguiar and Palma-Dos-Reis, 2008; Liu, 2008; Wang et. al., 2010 & Bagale, 2014). Higher Complexity leads to lower the rate of E-commerce adoption & Implementation in enterprises. Hypothesis 4 shows that there is a positive & significant relationship between Manager/Owner's IS Knowledge & E-commerce adoption & Implementation (0.520). This finding is consistent with consistent with previous studies (Thong, J.Y.L. 1999, Sandy Chong, 2005, Zhu et. al., 2006a, Li, Y.H. (2008), Ada Scupola, 2009, Pallavi Upadhyaya, P Mohanan, 2009, Le Van Huy 2012, Rita Rahayua & John Daya, 2015). Higher Manager/Owner's IS Knowledge leads to E-commerce adoption & Implementation in enterprises. Hypothesis 5 shows that there is a positive & significant relationship between Manager/Owner's Innovativeness & E-commerce adoption & Implementation (0.355). This finding is consistent with consistent with previous studies Consistent

with previous studies,(Sandy Chong,2005, Zhu et.al,2006a, Li, Y.H. (2008), Ada Scupola,2009, Le Van Huy 2012, Rita Rahayua & John Daya,2015). Higher Manager/Owner's Innovativeness leads to E-commerce adoption & Implementation in enterprises. Individual context's both variables; we found positive & significant relationship.

For Hypothesis 2(Compatibility),there is no significant relationship. It means that automobile medium enterprises for their E-commerce adoption & Implementation; Compatibility has playing very minimal role.

6. Conclusion

This study highlighted important factors of Technological& individual context's variables which has profound impact on E-commerce adoption & Implementation in automobile medium enterprises. These factors are grouped and modelled in Smart PLS software where it was analysed for assessing the effect on E-commerce adoption & Implementation. Major conclusions drawn from this study are as follows.

(i) Relative advantage; Complexity; Manager/Owner's IS Knowledge & Manager/Owner's Innovativeness factors have a strong effect on E-commerce adoption &Implementation in automobile medium enterprises.

(ii) R^2 value of the model is more than 0.361 and classifieds a good model where it has substantial degree of explained variance of E-commerce adoption & Implementation.

(iii) Most significant category of influencing variable affecting E-commerce adoption & Implementation in automobile medium enterprises is Manager/Owner's IS Knowledge.

References

Ada Scupola,(2009), "SMEs e-commerce adoption : perspective from Denmark & Australia" Journal of Enterprise

Information Management vol. 22 (1-2), pp1-16.

Amitrajit Sarkar(2008) "E-commerce Adoption and Implementation in SMEs: An analysis ofactors" in the

proceeding of 21st Annual conference of the national advisory committee on computing Qualification 5 (NACCQ 2008), New Zealand, pp309-319.

Al-Qirim, N.,(2007) "The adoption of e-commerce communications and applications technologies in small businesses in New Zealand", Electronic Commerce Research Applications, 6: 462-473.

Bagale G.S.(2014), "Determinants of E-Commerce in Indian MSME Sector: A Conceptual Research Model

Based on TOE Framework" Universal Journal of Management 2(3): 105-115.

Baldwin, A., A. Lymer and R. Johnson,(2000)"Business Impacts of the Internet for Small and Medium-Sized

Enterprises In: E-Commerce and V-Business: Business Models for Global success, Hunt, B. and S. Barnes

(Eds.), Butterworth-Heinemann, New York, pp: 103-120.

Beatty, R., (1998)" An empirical investigation into the salient factors used by organisations in the adoption of

Web site technology", Mississippi State University, DBA.

C. Fornell and D. F. Larcker,(1981), "Evaluating structural equation models with unobservable variables and



measurement error," *Journal of Marketing Research*, vol. 18, no. 1, pp. 39–50.

Chinomona, R. & Surujlal, J. (2012). The influence of student internship work experience on their self-improvement and professionalism in Sport Management. *African Journal for Physical, Health Education,*

Recreation and Dance (AJPHERD), 18, 4(2), 885-899.

Chin, W. W. & Newsted, P. R. (1999). Structural equation modelling analysis with small samples using partial

least squares. In Rick Hoyle (Ed). *Statistical Strategies for Small Sample Research*. Thousand Oaks, CA:

Sage. pp. 307-341.

Chong, Sandy, and Pervan, G., "Factors Influencing the Extent of Deployment of Electronic Commerce for

Small and Medium-sized Enterprises, *Journal of Electronic Commerce in Organizations* 5(1): 1-29, 2007.

Government of India,(2016), Ministry of MSME Annual Reports, 2013-16. Retrieved from <http://msme.gov.in/>

Grandon, E. and J.M. Pearson,(2004) "E-commerce adoption: Perceptions of managers/owners of small and medium sized firms in Chile", *Communication Association of Information System.*, 13: 81-102.

Jeniffer L. Gibbs & Kenneth I. Kraemer(2004), A cross country investigation of the determinants of scope of

E-commerce use:An institutional approach; *electronic markets* vol.14, No.02, pp 124-137.

J. F. Hair, C. M. Ringle, and M. Sarstedt (2011), "PLS-SEM: indeed a silver bullet," *Journal of Marketing*

Theory and Practice, vol. 19,no. 2, pp. 139–151.

J. Henseler, C. M. Ringle, and R. R. Sinkovics (2009), "The use of partial least squares path modelling in

international marketing,"*Advances in International Marketing*, vol. 20, pp. 277–319.

J. F. Hair, C. B. William, J. B. Barry, and R. E. Anderson(2010), *Multivariate Data Analysis*, PrenticeHall,

Englewood Cliffs, NJ,USA, 2010.

J. Cohen(1988), *Statistical Power Analysis for the Behavioral Sciences*, Lawrence Erlbaum Associates,

Hillsdale, NJ, USA, 2nd edition.

J. Cohen, P. Cohen, S. G. West, and L. S. Aiken(2003), *Applied Multiple Regression/Correlation Analysis for*

the Behavioral Sciences,Lawrence Erlbaum Associates, Mahwah, NJ, USA, 3rd edition, The Scientific

World Journal 9

Kaynak, E., E. Tatoglu and V. Kula,(2005) "An analysis of the factors affecting the adoption of electronic commerce by SMEs: Evidence from an emerging market", *International Market Review*, 22: 623-640.



- Kendall, J.D., L.L. Tung, K.H. Chua, C.H.D. Ng and S.M. Tan,(2001), “ Receptivity of Singapore's SMEs to electronic commerce adoption”, *Journal of Strategic Information System*, 10: 223-242.
- Kuan, K.K.Y. and Chau, P.Y.K.,(2001), “A perception-based model for EDI adoption in small businesses using a technology-organization-environment framework”, *Information & Management*, Vol. 38, No. 8, pp 507-521.
- Kutlu, B. and M. Ozturan,(2008), “The usage and adoption of IT among SMEs in Turkey: An exploratory and longitudinal study”, *Journal of Information Technology Management*, 19: 12-24.
- Li, Y.H. ,(2008), "An empirical investigation on the determinants of e-procurement adoption in chinese manufacturing enterprises", *International Conference on Management Science &Engineering (15th)*, California, USA, Vols I and II, Conference Proceedings, pp 32-37.
- Liu, M.,(2008), "Determinants of e-commerce development: An empirical study by firms in Shaanxi, China", *4th International Conference on Wireless Communications, Networking and Mobile Computing*, Dalian, China, October, Vols 1-31, pp 9177-9180.
- Liu, M.,(2008) “Success in electronic commerce implementation: A cross-country study of small and medium-sized enterprises”, *Journal Entrepreneurship Information Management*, 21: 468-492,
- Mehrtens, J., P.B. Cragg and A.M. Mills,(2001), “A model of Internet adoption by SMEs”, *Information Management*, 39: 165-176.
- O. Gotz, K. Liehr-Gobbers, and M. Krafft(2010), “Evaluation of structural equation models using the Partial Least Squares (PLS) approach,” in *Handbook of Partial Least Squares*, V. E.Vinzi, W. W. Chin, J. Henseler, and H. Wang, Eds., Springer Handbooks of Computational Statistics, pp. 47–82, 2010.
- Pallavi Upadhyaya, P Mohanan(2009), ‘Electronic marketplace adoption a case study of manufacturing SMEs’ , *The IUP Journal of mangement research* Vol.8, no.6.
- Palvia, P.C. and S.C. Palvia, (1999), “An examination of the IT satisfaction of small business users”, *Information Management*, Vol. 35, pp 127-137.
- Premkumar, G. ,(2003) “A meta-analysis of research on information technology implementation in small business”, *Journal of Organizational Computing and Electronic Commerce*, Vol. 13, No. 2, pp. 91-121.
- Rita Rahayua & John Daya (2015), *Determinant Factors of E-commerce Adoption by SMEs in*



Developing

Country: Evidence from Indonesia, World Conference on Technology, Innovation and Entrepreneurship;

Procedia - Social and Behavioral Sciences, pp142 – 150.

Rogers, E.M.(1995) , “Diffusion of Innovations”, 4th ed., The Free Press, New York, NY.

Sandy Chong(2005), "Determination of satisfaction of electronic commerce implementation: Some evidence

from small one medium sized entrepreneur, ECIS 2005 proceedings paper 16.

Scupola, A., (2003), “The Adoption of Internet Commerce by SMEs in the South of Italy: An Environmental,

Technological and Organizational Perspective,” Journal of Global Information Technology Management,

Vol. 6, No.1, pp. 51-71.

Soares-Aguiar, A. and Palma-Dos-Reis, A.,(2008), “Why do firms adopt e-procurement systems? Using logistic

regression to empirically test a conceptual model”, IEEE Transactions on Engineering Management, Vol.

55, No. 1, pp 120-133.

Sparling, L., M. Toleman and A. Cater-Steel,(2007) “SME adoption of E-commerce in the central Okanagan

region of Canada”, proceedings of the 18th Australasian Conference on Information Systems.

Tenenhaus, M., Vinzi, V. E., Chatelin, Y. M. & Lauro, C. (2005). PLS Path Modeling. *Computational Statistics*

& *Data Analysis*, 48(1), 159–205.

Thong, J.Y.L.(1999) ,“An integrated model of information systems adoption in small business”, Journal of

Management Information Systems, Vol.15, Issue 4, pp. 187-214.

Tornatzky, L.G. and Fleischer, M.(1990), “The Processes of Technological Innovation”, Lexington Books,

Lexington.

W. W. Chin(1998), “The partial least squares approach to structural equation modeling,” in *Modern Methods for*

Business Research,G. A. Marcoulides, Ed., pp. 295–336, Erlbaum, Mahwah, NJ,USA.

Wetzels, M., Odekerken-Schröder, G. & Van Oppen, C. (2009). Using PLS path modelling for assessing

hierarchical construct models: guidelines and empirical illustration. *Management Information Systems*

Quarterly, 33(1), 177-195.

Wang, Y.M., Wang, Y.S. and Yang, Y.F.(2010) , “Understanding the determinants of RFID adoption in the

manufacturing industry”, *Technological Forecasting and Social Change*, Vol. 77, pp. 803-815.



Wongpinunwatana, N. and C. Lertwongsatien,(2003) “ E-commerce adoption in Thailand: An empirical study of Small and Medium Enterprises (SMEs)”, *Journal of Global Information Technology Management*, 6:67-82.

Zhu, K., Kraemer, K.L. and Xu, S., (2006b), “The process of innovation assimilation by firms in different countries: A technology diffusion perspective on e-business”, *Management Science*, Vol. 52, No. 10, pp 1557-1576.

Zhu, K., Xu S. and J. Dedrick,(2003) “Assessing drivers of e-business value: Results of a cross-country study”, *Proceedings of the 24th International Conference on Information Systems*, December 14-17, 2003, Seattle, Washington, USA.

Zhu, K., K.L. Kraemer and Xu S., (2002), “A cross-country study of electronic business adoption using the technology-organization-environment framework”, *Proceedings of the 23th International Conference on Information Systems*, December 15-18, 2002, Barcelona, Spain, pp: 337-348.

Zhu, K., Dong, S.T., Xu, S.X. and Kraemer, K.L., (2006a), “Innovation diffusion in global contexts: Determinants of post-adoption digital transformation of European companies”, *European Journal of Information Systems*, Vol. 15, No. 6, pp 601-616.