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RESEARCH PAPER

A study on adoption of e-commerce practices among the Indian farmers with specific reference to North Gujarat region

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ABSTRACT

Across the world, there is a continuation of the impressive growth of retail e-commerce. Since the e-commerce sector in country like India is rapidly growing, changes can be seen over a year. Many players from country as well as international economy have been attracted towards e-commerce business. In the year 2015, estimated size of retail e-commerce sales in the world is 994.5 US$ billions while same in country like India is only 22 US$ billions which reveals lesser contribution even having second largest populated economy in the world. In order to enhance the e-commerce market in the country, it is necessary to involve people from different sections of society. One of them is rural India especially farmers who transacts for millions of transactions in agricultural sector. Therefore, it is very imperative to study the factors influencing adoption of e-commerce practices by farmers in India. E-commerce jaints like *Alibaba.com*, Amazone, Flipkart, Snapdeal and other local players have started many practices which are useful and beneficial to Indian farmers. In this study, data was collected from 310 farmers of Mehsana and Banaskantha districts of north region of Gujarat State. Data was analyzed using multiple regression technique of data analysis. The results of the study revealed that perceived usefulness, perceived ease of use, self efficacy, trust and technical skill and resources highly influence attitude of farmers for adoption of e-commerce practices which in turn affect intension of farmers towards adoption of e-commerce practices. Among all, technical skill and available resources to farmers is prime concern to adoption.

KEY WORDS : Adoption, e-commerce practices, Intention, Trust, Technical skill, Resources

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E-commerce sale has been increased continuously as online retailers continued expanding to new geographies and physical retailers entered new markets through e-commerce. From the following Table A, it has proved that global retail sales are set to increase. A.T. Kearney's third Global Retail E-Commerce Index finds a market still growing fast (*http://www.atkearney.com*).

It has been observed that the e-commerce sector in India has grown by 34 per cent (CAGR) since the

Table A : Global e-commerce sales	
	Figure in US$ billions
Year	Sales
2013	694.8
2014	839.8
2015E	994.5
2016E	1155.7
2017E	1328.0
2018E	1506.0

Source: Euromonitor

year 2009 to touch 16.4 billion USD in the year 2014. It is expected that sales will be in the range of 22 billion

Table B : E-commerce sales in India	
Year	Figure in US$ billions
	Sales
2009	3.8
2010	5.3
2011	7
2012	9.5
2013	12.6
2014	16.4
2015E	21.3

Source: IAMAI, CRISIL, Gartner, PwC analysis

USD in the year 2015.

With the entry of e-commerce giants such as Amazon and Alibaba, the competition is expected to increase.

When we study the e-commerce market share of India towards global share, we find still India contributes very little to it. It is very necessary to enhance the e-commerce market in India. In order to increase the share for e-commerce, non-users should be converted and must be motivated to indulge in e-commerce business. E-commerce players should stimulate other categories of users towards e-commerce practices. In India, one of the giant and attractive consumer categories is farmer.

India has 127 different agro climatic zones, immense biodiversity and natural resources. India is one of the biggest food grain and oilseed producers in the world. Small farms produce 41 per cent of India's total grain and over half of total fruits and vegetables. It provides employment to 62.5 per cent work force in the country. Export earnings are 14.7 per cent while it contributes 18 per cent to GDP (*http://technode.com*).

India is one of the world's oldest agricultural societies. At the same time, it has one of the fastest growing e-commerce sectors in the world. It's no surprise that Indian agriculture and e-commerce are coming together in a big manner.

There are two side of development. On one side, from selling agricultural products via online retailing channels, internet massive has begun to sell agricultural production tools online. Further, on second side, it is revealed that the market for farm production resources including seeds, fertilizers, pesticides and machinery, is also eye-catching.

Recently in India, many players have stated e-commerce practices for farmers. *Snapdeal.com*, India's largest online market place has launched 'The Agri Store', a comprehensive online store offering access to farming and agriculture products for farmers across India. The Agri store offers hundreds of products across categories like – irrigation tools, farming tools and seeds. Another website where farmer can trade online is *www.theorganic.life*. There are many other ventures which work in this direction but many questions are unanswered like do farmers ready to adopt this new channel of shopping?, what are the challenges to be faced? What influence them to adopt e-commerce practices? This study focuses on such issues.

It has been defined that adoption is the attitude, intention or the behaviour of the users' acceptance of utilization of internet as a new media of shopping after considering different factors. In the recent past, the study on the adoption of internet has become one of the hottest topics in educational and professional environment and TAM is the prime model of adoption research. Technology acceptance model is based on the fundamental of various theories like rational behaviour theory, the innovation diffusion theory and the cognitive structure theory. The TAM primarily focuses on the relation among the cognition, emotion factors and the usage of technology for explaining, judging and predicting the attitude and behaviour of the information technology *i.e.* internet adoption (Davis, 1989).

It is proposed in the model that the perceived usefulness and ease of use are the two important influencing factors, while the usage intention is the core of the TAM. On other hand, It considers that the behaviour intention influences the behaviour same as the behaviour intention is influenced by the perceived usefulness and attitude. Further, the attitude is influenced by both the perceived usefulness and ease of use. This

relational structure is shown in the below Fig A.

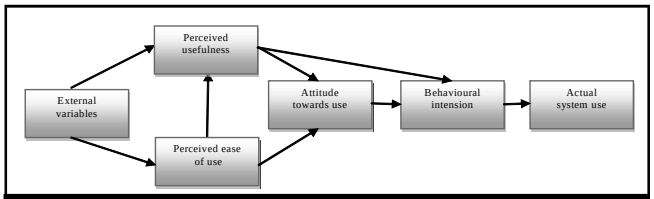

Fig. A: Technology acceptance model

TAM is believed as the clearest, sturdiest and the most explanatory study model which is highly used in the research of adoption of new technology like internet with good explanatory power and utility. Wu and Wang (2005) proposed the acceptance and use behaviour of internet technology by considering use of the TAM. Based on the TAM, Luarn and Lin (2005) mentioned the users' acceptance behaviour of technology services. Further, Boadi (2007) studied on adoption of information technology by Ghana's farmers. Zhang *et al.* (2007) also used TAM and focused that it is effectively implemented as the good explanatory power in country like China. Deng *et al.* (2007) incorporated TAM with the externality theory and researched influencing factors of the use behaviour of internet technology. Based on the TAM, Huang *et al.* (2008) proposed the adoption model of internet content service. However, the potential of technology like e-commerce practices is not fully utilized in the agricultural sector of India (Mittal, 2006). Helen (2003) focused on the attitude, perception and experiences of farmers regarding the use of internet related to farming purposes. He also emphasized many influences on adoption of technology by the farmers. Technical skill and resources include several aspect-equipment resources, knowledge expertise and financial resources, etc. which belong to farmers while influencing factors of Indian farmers adoption of e-commerce practices. If these conditions were not available, farmers may not adopt or use e-commerce practices (Luarn and Lin, 2005). Beck *et al.* (2008) studied in the process of individual adoption and proposed that perceived usefulness and perceived ease of use was not only determined by individual perception, but trust also determined by individual perception which is considered as one of the factors in this study. Patil *et al.* (2008) also proposed that trust and skill to operate system immensely influence adoption of technical practices.

The studies show that, by involving the nature of the certain practice and the environment and joining appropriate external variables, the updated TAM can explored and explain the adoption method of new technology by farmers here. Further, practical use of TAM can be verified and tested by deploying the perceived usefulness and ease of use, the behavioural intention and their relation. Therefore, in this study, TAM is used as the basic model which includes taking the perceived usefulness, ease of use, attitude as the main factors that influence the farmer intension to use new e-commerce practice. Moreover, two other established external factors *i.e.* trust and technical skill and resources have been added to the basic model in this study.

METHODOLOGY

Following are the objectives of the study.

- To study the factors that influences the farmer's intention to adopt e-commerce practices
- To study the perceived usefulness of farmer towards attitude of adoption of e-commerce practices
- To study the perceived ease of use of farmer towards attitude of adoption of e-commerce practices
- To study the self efficacy of farmer towards attitude of adoption of e-commerce practices
- To study the trust of farmer towards attitude of adoption of e-commerce practices
- To study the technical skill and resources of farmer towards attitude of adoption of e-commerce practices
- To study the attitude of farmer towards intension to adopt e-commerce practices.

Researcher has developed following hypothesis :

H_1: Perceived usefulness has a positive influence on farmer's attitude for adoption of e-commerce practices

H_2: Perceived ease of use has a positive influence on farmer's attitude for adoption of e-commerce practices

H_3: Self-efficacy has a positive influence on farmer's attitude for adoption of e-commerce practices

H_4: Trust has a positive influence on farmer's attitude for adoption of e-commerce practices

H_5: Technical skill and resources have a positive influence on farmer's attitude for adoption of e-commerce practices

H_6: Attitude of farmer has a positive influence on intension to adopt e-commerce practices.

The present study will collect relevant primary data with the help of structured questionnaire. Statements in the instrument represented each groups of items measuring a particular dimension. Considering the fact that e-commerce practices among farmer is at its immaturity stage in our country, and a very few farmers have explored e-commerce practices, it was decided to target even those farmers who had never used the system. Since the researcher was interested in the concept of intention, inexperienced users of the e-commerce practices did not disturb the result of this study.

A quantitative study, involving the administration of a survey was conducted in order to empirically validate the identified factors of intention to adopt e-commerce practices. In this study, researcher wanted to generalize the results to the inexperienced farmers' population, so the samples of this study had been selected by convenience sampling method. Likert five point scales ranging from "strongly disagree" to "strongly agree" were used as a basis of questions. Respondents were asked to give their perception of the factors on a 5–point Likert scale (1= Strongly Disagree, 2=disagree, 3=Neutral, 4=Agree and 5= Strongly agree) and a total of 310 useable responses were collected and analyzed. The data were analyzed by using SPSS 20.0 software. As per the requirements of the study reliability test conducted and only those dimensions has been used for further analysis which having Cronbach's alpha above 0.700.

Gujarat as a state is divided under five geographical areas *i.e.* North Gujarat, Middle Gujarat, South Gujarat, Saurashtra and Kutch region. Further, North Gujarat region is divided into districts like Mehsana, Banaskantha, Sabarkantha, Aravalli, Patan and Gandhinagar. In this research study, samples had been drawn from farmers who residing in rural areas of two major districts of north region of the state *i.e.* Mehsana and Banaskantha. As the purpose of the study was exploration, sample was deemed fit as they would represent the population of entire state particularly and country as a whole. Also nature of such activities is not likely to vary across different farmers. The collected data was processed and analyzed in accordance with the objectives and requirement of the study. In study, the identified factors were analyzed with the help of regression analysis.

ANALYSIS AND DISCUSSION

In order to prove the internal reliability of the model used, the researcher has performed Cronbach's Alpha Test of Reliability. Applying this test, specified whether the items pertaining to each dimension are internally consistent and whether they can be used to measure the same construct or dimension of adoption of e-commerce practices. According to Nunnally (1978) Cronbach's alpha should be 0.700 or above. But, some study also consider 0.600 acceptable (Kenova and Jonasson, 2006). However, here only those dimensions are considered which have Cronbach's Alpha 0.700 or above.

Table 1 : Composite reliability

Construct	(Cronbach's Alpha)
Perceived usefulness	0.741
Perceived ease of use	0.796
Self efficacy	0.862
Trust	0.883
Technical skill and resources	0.756
Attitude	0.858
Intention	0.887

(Source: Primary survey)

The Kaiser-Meyer-Olkin measure of sampling adequacy tests whether the partial correlations among variables are small. High values (close to 1.0) generally indicate that a factor analyses may be useful with the data. If the value is less than 0.50, the results of the factor analysis probably won't be very useful. Bartlett's test of sphericity tests the hypothesis that correlation matrix is an identity matrix, which would indicate that variables are unrelated and, therefore, unsuitable for structure detection. Small values (less than 0.05) of the significance level indicate that a factor analysis may be useful with data. Table 2 indicates that in the present test the Kaiser-Meyer-Olkin (KMO) measure was 0.834. Bartlett's sphericity test indicating Chi-square =

Table 2 : KMO and bartlett's test

Kaiser-meyer-olkin measure of sampling adequacy		0.834
Bartlett's test of sphericity	Approx. Chi-square	1028.539
	df	120
	Sig.	0.000

(Source: Primary survey)

1028.539, df 120 with a significance of 0.000.

KMO measure of sampling adequacy test is significant and Bartlett's test of sphericity also found significant (approx. Chi-square = 1028.539, df = 120, significance = 0.000). This indicates that the data set was fit to perform further study.

In oder to analyse the collected data, researcher had followed multiple regression for five factors and then simple regression to establish their relationship.

Muliple regression analysis :

The model summary Table 3 reports the strength of the relationship between the model and the dependent variable. R indicates correlation between the observed and predicted value of the dependent variable. Larger value of R indicates stronger relationship and also indicates that model fit the data well. R square is the proportion of variation in the dependent variable explained by regression model. Higher value of R Square (more than 0.700) indicates that model having good predictive ability. The result of regression analysis based on five independent variables indicate positive relationship (R=0.656) and statistically significant relationship (P<0.000) with dependent variable of attitude of farmers towards adoption of e-commerce practices. The independent variables accounted for 43.00 per cent (R^2 = 0.430) of variance in dependent variable.

The ANOVA Table 4 tests the acceptability of the model from a statistical perspective. The regression row displays information about the variation accounted for by the model. The Residual row displays information about the variation that is not accounted for by the model. The regression and residual sum of squares is not equal which indicates that about approximately 43 per cent of the variation in predictors is explained by the model. The significance value of the F-statistic is less than 0.05,

Table 3 : Model summary

Model	R	R square	Adjusted R square	Std. error of the estimate
1	0.656[a]	0.430	0.403	0.69709

Predictors: (Constant), Perceived usefulness, Perceived ease of use, Self-efficacy, Trust, Technical skill and resources

(Source: Primary survey)

Table 4 : ANOVA

Model		Sum of squares	df	Mean square	F	Sig.
1.	Regression	38.136	5	7.627	15.696	0.000[a]
	Residual	50.537	104	0.486		
	Total	88.673	109			

(Source: Primary survey)

Table 5 : Co-efficient

Model		Standardized co-efficients	t	Sig.	Collinearity statistics	
		Beta			Tolerance	VIF
1	(Constant)		2.706	0.008		
	Perceived usefulness	0.218	2.230	0.028	0.571	1.751
	Perceived ease of use	-0.029	-0.301	0.004	0.596	1.677
	Self-efficacy	0.312	3.121	0.002	0.539	1.854
	Trust	-0.047	-0.463	0.014	0.532	1.878
	Technical skill and resources	0.314	3.267	0.001	0.592	1.690

Dependent variable: Attitude towards adoption of e-commerce practices

(Source: Primary survey)

Table 6 : Model summary

Model	R	R square	Adjusted R square	Std. error of the estimate
1	0.658[a]	.512	.505	.75171

Predictors: (Constant), attitude of farmers

(Source: Primary survey)

which means that the variation explained by the model is not due to chance.

In order to identify constant of propensity to attitude towards adoption of e-commerce practice among farmers simultaneous multiple regression was analyzed. From the co-efficient Table 5, it could be observed that five factors were found to be significant with R^2=0.43, F=15.696, p<0.05. Technical skill and resources with largest beta co-efficient (Beta = 0.314) was the most significant independent variable and highest predictive ability followed by self-efficacy (Beta = 0.312) and Perceived usefulness (Beta = 0.218), respectively. Further, perceived ease of use and trust had negative predictive ability with (Beta =- 0.029) and (Beta = -0.047), respectively.

Linear regression analysis :

The result of regression analysis indicates positive relationship (R=0.658) and statistically significant relationship (P<0.000) with dependent variable of intension of farmers towards adoption of e-commerce practices. The independent variables accounted for 51.00 per cent (R^2 = 0.512) of variance in dependent variable.

The regression and residual sum of squares is not equal which indicates that about approximately 51 per cent of the variation in predictors is explained by the model. The significance value of the F-statistic is less than 0.05, which means that the variation explained by the model is not due to chance.

In order to identify constant of propensity to intension of farmers to adopt e-commerce practice, linear regression was analyzed. From the co-efficient Table 8, it could be observed that factor was found to be significant with R^2=0.51, F=48.926, p<0.05. Attitude of farmers towards adoption of e-commerce practices was significant independent variable with (Beta = 0.558) value.

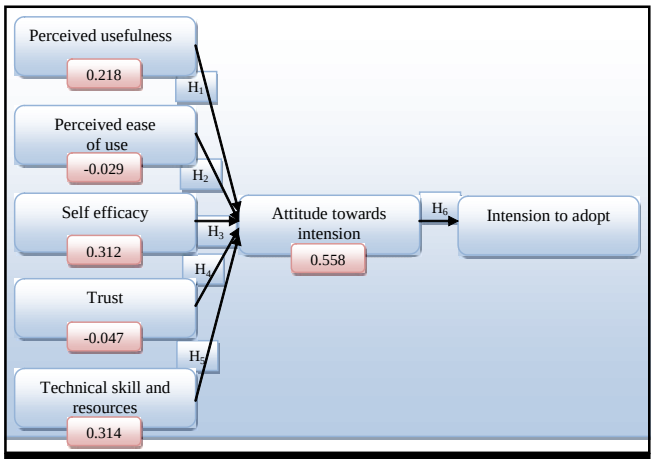

Fig. 1 : Evaluated research model

Implication of the study :

From the results of the study, researcher has given some implications. First and foremost important aspect pertaining to implication is that awareness regarding e-commerce practices should be created among the rural farmers. The benefits, convenience and other advantages regarding price, time reduction, quick transaction, inputs comparison, availability of produce within large geographical area etc. which farmers gain should be conveyed to them. Further, it is central of the process that technical skill to use the system should be developed among the farmers who are unfamiliar to the new one. Another lacking point is about availability of resources

Table 7 : ANOVA

Model		Sum of squares	df	Mean square	F	Sig.
1	Regression	27.646	1	27.646	48.926	0.000[a]
	Residual	61.027	108	.565		
	Total	88.673	109			

(Source: Primary survey)

Table 8 : Co-efficient

Model		Standardized co-efficients	t	Sig.	Collinearity statistics	
		Beta			Tolerance	VIF
1	(Constant)		4.875	0.008		
	Attitude towards adoption	0.558	6.995	0.001	0.572	1.480

Dependent variable: Intension of farmers to adopt e-commerce practice

(Source: Primary survey)

and needed infrastructure. In this direction, Government and e-commerce players should come out and provide required resource at subsidized rate to the farmers. In the Digital India Mission, by tie up with companies like Google and others, internet connectivity should be availed with comparatively higher speed in rural India also. Moreover, e-commerce process should be made easy to use and easy to access and trust regarding system and procedure should be created among the farmers.

Conclusion :

It is fact that agricultural turnover in India runs into billions of dollars. In such a scenario, e-commerce can provide platform to the Indian farmers to become entrepreneurs. On one hand, fueled with the power of needed information and access to millions of customers, farmers enjoy "fair prices" for their produce and on the other hand they can have a benefit of cheaper and easy available farm inputs and agricultural tools and machines.

In this study, it is reveals that technical skill and resources, self-efficacy and perceived usefulness play a vital role in the adoption of e-commerce practices by Indian farmers.

Adoption of e-commerce practices is time consuming process. Such mission could take long time to accomplish. In India, rural e-commerce concept is still at a beginning stage. But there are green shoots coming up slowly but surely.

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