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Investors' Adoption of Internet Stock Trading: A Study

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Abstract

The purpose of this paper was to examine whether investors who adopted Internet stock trading perceived differently from those of non-adopters. The primary data based on 299 investors (149 adopters and 150 non-adopters) were analyzed using advanced multivariate techniques like factor analysis and discriminant analysis besides percentages, means, and Z-test. Results indicated that attitude dimensions and demographic variables contributed significantly in classifying investors as adopters or non-adopters in Internet trading. As regards attitude dimensions, 'variety of financial products and safety' contributed significantly in discriminating between adopters and non-adopters of Internet trading followed by the factor such as 'convenience and transparency'. As far as the demographics were concerned, the mature/older, experienced, and businessmen investors were less likely to use Internet stock trading as compared to young, inexperienced, and non-businessmen investors.

Keywords: **Internet stock trading; Investors; Attitude; Demographic variables; Discriminant analysis; India.**

INTRODUCTION

Technological advances have influenced and facilitated the operations of business transactions. The recent technological advancement is the Internet technology that has transformed the entire business marketplace (Burt and Sparks, 2003). With the help of the Internet, we can communicate interactively and instantly over vast distances, receive a wide array of information, and conduct business from remote without human

assistance. Personal investing is one of the areas facilitated by Internet. The do-it-yourself investing originated in 1970s as a result of the deregulation of the brokerage industry (Konana and Balasubramanian, 2005). However, due to the IT revolution, the on-line approach has helped individual investors to have better control on their investments (Looney and Chatterjee, 2002). With the proliferation of the Internet, more banks and stock brokerage firms are offering on-line financial services. Investors can gain access to various kinds of information on financial planning, e.g., real-time stock prices, portfolio management, etc. Increasingly, traders are attracted toward the on-line investing for advice and information (Farrell, 1999). The trade through Internet is executed and confirmed instantly (Wong, 2000).

SIGNIFICANCE AND OBJECTIVES OF THE STUDY

Internet stock trading in India is a new phenomenon. Indian Stock Markets' Regulator, the Securities and Exchange Board of India (SEBI), approved the Internet trading on January 25, 2000 (AFP, 2000). Though still in its nascent stage, internet trading has grown steadily due to positive attitude of retail investors, reduction in the cost of a personal computer, availability of reliable Internet connectivity, and sophistication of Internet trading products. As of November 2009, there are as many as 345 Internet-based trading members in the Indian capital market having 23, 78,456 registered clients for Web based access (NSE, 2009). The growth of Internet trading in India is, however, restricted by the low diffusion of technology, limited technology-based investors, insufficient banking interface, and the high cost of infrastructure (Australian Securities and Investment Commission, 2001).

While some investors are early technology adopters, others are slow in technology adoption. It is worth mentioning here that, in a recent study, adopters prefer using Internet to conventional means of trading (Teo *et al*., 2000). Hence, there is need to bring out the factors accountable for inter-group differences.

Main objective of the study is to assess the differences in perceptions between adopters and non-adopters of Internet stock trading. To achieve the main objective, the following are set as sub-objectives:

- To investigate whether demographics such as age, income, occupation, trading experience influence the adoption of Internet trading by the investors; and
- to examine whether attitude factors affect the adoption of Internet trading by the investors.

LITERATURE REVIEW

Adoption of the Internet might be an indicator of changes in the society and adopters and non-adopters might be differentiated according to the demographics (Al-Ashban and Burney, 2001; Karjaluoto *et al.,* 2002; Sathye, 1999) and attitude towards the use of Internet for trading. In recent studies, demographic variables such as age, educational level, and income contributed significantly in discriminating between innovators and early adopters from others (LaBay and Kinnear, 1981; Gatignon and Robertson, 1985; Martinez *et al.,* 1998). Doherty *et al.* (2003) and (Akinci *et al.*, 2004) found that male and young customers were most likely to adopt the internet. The young, educated, and affluent embraced the advent of personal computer as the new wave in digital technology (Lin, 1998; Atkin *et al.*, 1998; Karjaluoto *et al.*, 2002; Mattila *et al.*, 2003;

Sathye, 1999). Another study observed that age and education of the respondents did not discriminate between Internet users and the non-users of e-banking (Sohail and Shanmugham, 2003).

Attitude is defined as an individual's degree to respond in a favourable or unfavourable way with respect to a psychological object (Ajzen and Fisherbein, 2000). In the field of Internet stock trading, the more positive the attitude an individual had towards the object, the more likely was the behavioural intention to adopt the same (Gopi and Ramayah, 2007). Many studies had shown the significant effect of the attitude towards intention to adopt the innovation (Mathieson, 1991; Lu *et al.*, 2003; Shih and Fang, 2004; Ramayah *et al.*, 2003; Teo and Pok, 2003; Ramayah *et al.*, 2004; Eri, 2004; Ramayah *et al.*, 2005; Ramayah and Suki, 2006). Another study revealed that attitude and social factors significantly influenced the investors' intention towards adopting Internet stock trading (Lee and Ho, 2003). Majer (1997) attempted to examine 42 investors' opinion on issues ranging from Internet security to their willingness to adopt an Internet-based stock exchange in Canada. It was concluded that Internet stock exchanges would soon catch a valuable niche market in the area of electronic commerce.

Gharavi *et al.* (2004) argued that the acceptance of an innovation was affected as much by the complexity of the interactions between the stock broking firms and technology in Australia. Loh and Ong (1998), based on 151 responses, examined the impact of users' evaluation and their beliefs and attitudes, as well as their usage behaviour on adoption and acceptance of a new innovation in Singapore. The study revealed that users' concerns, expectations, perceived ease of use, and the real value added of a new system as well as their trading behaviour were crucial determinants to the ultimate adoption of Internet stock trading. Teo *et al.* (2000) examined the attitude of 208 adopters and 222 non-adopters towards Internet stock trading in Singapore. It was observed that 78.4 percent of the Internet stock trading respondents preferred using Internet to conventional means of trading. It was also observed that adopters were more confident of the security of Internet stock trading than non-adopters. Lau *et al.* (2001) found that perceived usefulness, perceived ease of use, and compatibility significantly affected the attitude towards the use of on-line trading. Besides, on-line trading was likely to improve the process of placing orders.

A study by Jamal and Ahmed (2007) found that factors such as consumers' attitude towards on-line products and services, culture related factors, and facilitating conditions significantly influenced consumers' adoption of on-line transactions. Cha *et al.* (2006) identified the diffusion factors of Internet-based financial services. It was observed that perceived efficiency, system reliability, customer service, and personal characteristics were significantly positive in explaining the degree of e-finance usage. Sohail and Shanmugham (2003) found three major factors affecting the adoption of Internet banking services, namely, Internet accessibility, awareness of e-banking, and attitude towards change in Malaysia.

Features of the website were found to influence consumers' perceptions of web site quality (Song and Zinkhan, 2003). Dennis *et al.* (1992) observed a number of dimensions that consumers used in judging website quality, i.e., design (e.g., organization, quality, appearance, and aesthetics), content (e.g., information, content quality, and specific content), entertainment, ease of use (e.g., navigation and usability), reliability, and interactivity (Dennis *et al.,* 1992). Consumers preferred websites that had provision of queries and feedback (Gupta *et al.*, 2008). Sharma (2004) found the linkage

between trust, website quality, and on-line shopping resistance.

On the basis of the objectives of the study and literature review, the following hypotheses *(H)* were proposed :

H1 Age of the investors discriminates significantly between adopters and non-adopters of Internet stock trading.

H2 Stock trading experience of the investors discriminates significantly between adopters and non-adopters of Internet stock trading.

H3 Education level of the investors discriminates significantly between adopters and non-adopters of Internet stock trading.

H4 Occupation of the investors discriminates significantly between adopters and non-adopters of Internet stock trading.

H5 Income of the investors discriminates significantly between adopters and non-adopters of Internet stock trading.

H6 Convenience and transparency of the system discriminates significantly between adopters and non-adopters of internet stock trading.

H7 Variety and safety of the system discriminates significantly between adopters and non-adopters of Internet stock trading.

H8 Website-customization and awareness discriminates significantly between adopters and non-adopters of Internet stock trading.

RESEARCH METHODOLOGY

The instrument

The study was based on primary data generated by using a well-structured, non-disguised and pre-tested questionnaire. The questionnaire was divided into two major parts: demographics and 7-point attitudinal Likert Scale (1 = strongly disagreed; 7 = strongly agreed). The scale comprised of 20 statements that were designed by consulting relevant literature (Bagchi, 2002; K-Mailer Universe, 2002; Lim, 1997; Priyadarshi, 2000; Sharenet Company Ltd, 2003; Patel, 2001) and on-line brokers, investors, and financial securities analysts.

The sample

Random sampling was used for data collection. Survey was conducted mainly in North India. Mail response was very poor despite two reminders. To complete the survey, researchers paid personal visits to the respondents. In all, 400 respondents (200 adopters and non-adopters each) were contacted and served the questionnaires personally in North India. However, filled up and usable questionnaires from 299 respondents (149 adopters and 150 non-adopters) could be collected. So, the response rate of the survey was as high as 74.75 per cent. The profile of sampled adopters and non-adopters is shown in Table I.

Statistical tools

To analyze the data, multivariate statistical techniques, viz., factor analysis and discriminant analysis were used besides Z-test. For bringing out the factors discriminating between two groups, discriminant analysis was employed. The dependent

variable was categorized as adopters and non-adopters of internet trading. The independent variables included two sets of dimensions. Those were: (i) demographic dimensions, viz., age, income, education, occupation, and stock trading experience, and (ii) attitude dimensions.

Table I. Demographic characteristics of sampled adopters and non-adopters

Demographics	No. of adopters	No. of non-adopters
Sample	149 (49.83)	150 (50.17)
Age groups		
▪ Less than 21 years	8(5.37)	Nil
▪ 21 - 30 years	58(38.93)	38(25.33)
▪ 31 - 40 years	39 (26.17)	47(31.33)
▪ 41 - 50 years	17(11.41)	32(21.34)
▪ 51 years and above	27(18.12)	33(22.00)
Education		
▪ Undergraduate	16(10.74)	9(6.00)
▪ Graduate	47(31.54)	62(41.33)
▪ Postgraduate	50(33.56)	50(33.33)
▪ Professional	36(24.16)	29(19.33)
Monthly family income (Rs.)		
▪ Less than 15,000	32(21.48)	46(30.67)
▪ 15,000 – 25,000	53(35.57)	48(32.00)
▪ 25,000 – 35,000	27(18.12)	20(13.33)
▪ 35,000 – 45,000	15(10.07)	10(6.67)
▪ 45,000 or above	22(14.76)	26(17.33)
Occupation		
▪ Salaried employee	74(49.67)	55(36.67)
▪ Businessman	29(19.46)	48(32.00)
▪ Professional	17(11.41)	19(12.67)
▪ Retired	19(12.75)	26(17.33)
▪ Student	10(6.71)	2(1.33)

Stock trading experience		
▪ Less than 1 year	40(26.85)	8(5.33)
▪ 1 - 3 years	39(26.17)	30(20.00)
▪ 3 - 5 years	11(7.38)	21(14.00)
▪ 5 -10 years	33(22.15)	30(20.00)
▪ 10 years or above	26(17.45)	61(40.67)

Figures in parentheses show percentages.

Needless to mention, attitude dimensions were derived through a sequential two-step procedure of Z-test and factor analysis. Initially, Z-test was conducted to identify attitude items which aided in discriminating between the two groups. The resulting significant items were then subjected to factor analysis to derive the attitude dimensions.

Reliability

The research instrument was tested for reliability using Cronbach's coefficient alpha. The Cronbach's **a**lpha values for all factors ranged from 0.61 to 0.88 (Table III) that indicated reliability of the sub-scales measuring the attitude of investors (Hair *et al.*, 2005). The data, therefore, was found reliable. The composite alpha for the entire scale was as high as 0.89.

EMPIRICS AND ANALYSIS

Results

This section presents the empirics and analysis. As already mentioned, sequential two-step procedure of Z-test and factor analysis was used to identify the attitude dimensions used as independent variables in discriminant analysis. Results of Z-test conducted on 20 attitude items are reported in Table II. It was found that significant differences existed between the two groups of investors with regard to 15 of the 20 attitude items. Thus, five items, which did not contribute significantly for classifying the respondents as adopters or non-adopters, were dropped from subsequent analysis.

In order to provide a more parsimonious interpretation of the results, 15 significant attitude items were then subjected to factor analysis using *Principal Component Method* coupled with *varimax rotation.* The data was also examined with the help of *Kaiser-Meyer-Olkin* (KMO) measure of sampling adequacy and *Bartlett's Test of Sphericity* (Table III) and was found appropriate for factor analysis. The following two criteria were used for identifying factors. First, it was decided to delete any item that did not have at least ± 0.30 loading value. This criterion was consistent with suggestion made by Harman (1976). And second, it was decided that a factor must be defined by at least two items. Three dimensions/factors were extracted. Table III reports the so generated three factors, loading for all statements, item-wise mean scores for two groups, percentage of variance explained, and alpha values of factors. The three factors had eigen values ranging from 1.056 to 6.137 explaining 58.62% of the total variance. The derived factors (attitude dimensions) are explained below.

F_1 *Convenience and transparency* - This factor explained 40.91% of the total variance. Adopters in comparison to non-adopters perceived more strongly Internet trading as

convenient and transparent channel of trading. Earlier studies on the impact of the World Wide Web on the stock trading activities of individual investors in USA**,** found that Internet trading provided convenience and transparency in terms of free access to timely news and data (Lim, 1996, 1997).

F_2 *Site-customization and awareness* - This dimension accounted for 10.67% of the total variance. Adopters in comparison to non-adopters believed relatively less strongly that website-display were customized to investors' preferences and enabled them to trade on global basis. In a recent study, website-customization was considered as an important feature of Internet trading by Internet brokers (Sandhu and Singh, 2005). However, it was also felt that the on-line trading firms, the stock exchanges, and the SEBI should be proactive in spreading awareness about Internet trading. The level of knowledge about an innovation had a positive relation with the intention to adopt the innovation (Rogers, 1995; Luchetti and Sterlacchini, 2004).

Table II. Difference between adopters and non-adopters' attitude towards Internet trading

Label	Statement	Adopters (WAS)	Non-adopters (WAS)	Z-value
	Internet trading			
S1	enables investors to punch their orders directly to the web server of the exchange, thereby reducing the transaction time to almost nil.	5.83	5.36	2.905***
S2	firms charge high commission.	4.77	4.51	1.437
S3	leads to excessive delay in updating investors' personal portfolio and account status.	6.37	6.30	0.627
S4	is more convenient.	6.24	5.60	4.114***
S5	enhances market quality through improved liquidity, by increasing quote continuity and market depth.	6.01	5.55	2.909***
S6@	is not safe by information technology act, 2000.	5.11	4.56	3.874***
S7	is a vastly democratic medium, which brings individual investor at par with large institutional player.	5.66	5.81	-0.907
S8	is more transparent.	6.20	5.87	2.516**
S9@	fails to provide information and price on a real-time basis so as to act accordingly.	6.23	5.97	2.279**
S10	leads to paperless trading through integration of the bank, the broker and the depository.	6.42	6.15	2.543**
S11	allows the investor to specify and customize the securities and volume one would like to trade.	6.13	5.87	2.399**
S12	offers value added services in the form of firm reports, portfolio valuation, research news, mutual fund data *etc*.	6.07	5.83	2.091**
S13	offers a broad range of financial products, such as equity, futures and options, mutual funds, initial public offerings *etc*.	6.09	5.79	2.742***
S14@	lacks active participation of the on-line trading firms, the stock	6.15	6.33	-1.701*

	exchanges and the SEBI to spread its awareness.			
S15	site-display is customized to investor preferences.	6.04	6.25	-1.797*
S16	websites provide educational and other guidance material to understand the risks of investing in the share market.	6.30	5.96	3.295***
S17@	lacks the government support in setting up developmental facilities in India.	2.99	2.79	1.155
S18	is independent of geographical restrictions/barriers.	6.13	6.26	-0.983
S19@	increases settlement risks.	6.07	5.85	1.761*
S20@	leads to excessive delay in order execution and its confirmation.	6.07	5.73	2.284**

Note: * Significant ($p < 0.10$); ** highly significant ($p < 0.05$); *** Very highly significant ($p < 0.01$); WAS = Weighted average score

@ These items were worded negatively to reduce the bias due to tendency of respondents to reply in affirmative during data collection. They were, however, reverse coded for the purpose of data analysis and thus, interpreted accordingly.

Table III. Factor analytic results of investors' attitude towards Internet trading and mean scores

Factors	Loadings	Mean	
		Adopters	Non-adopters
F_1 Convenience and transparency *(Eigen value = 6.137; Alpha = 0.8789; Variance explained = 40.91%)*			
Internet trading			
is more convenient.	0.801	6.24	5.60
is more transparent.	0.703	6.20	5.87
@fails to provide information and price on a real-time basis so as to act accordingly.	0.699	5.23	5.97
enables investors to punch their orders directly to the web server of the exchange, thereby reducing the transaction time to almost nil.	0.692	5.83	5.36
@leads to excessive delay in order execution and its confirmation.	0.691	6.07	5.73
enhances market quality through improved liquidity, by increasing quote continuity and market depth.	0.662	6.01	5.55
leads to paperless trading through integration of the bank, the broker and the depository.	0.567	6.42	6.15
allows the investor to specify and customize the securities and volume one would like to trade.	0.544	6.13	5.87
@increases settlement risks.	0.513	6.07	5.85
F_2 Site-customization and awareness *(Eigen value = 1.600; Alpha = 0.7525; Variance explained = 10.67%)*			

Internet trading			
site-display is customized to investor preferences.	0.831	6.04	6.25
@lacks active participation of the on-line trading firms, the stock exchanges and the SEBI to spread its awareness.	0.779	6.15	6.33
websites provide educational and other guidance material to understand the risks of investing in the share market.	0.603	6.30	5.96
F_3 Variety and safety *(Eigen value = 1.056; Aplha = 0.6135; Variance explained = 07.04%)*			
Internet trading			
offers value added services in the form of firm reports, portfolio valuation, research news, mutual fund data *etc*.	0.724	6.07	5.83
@is not safe by Information Technology Act, 2000.	0.634	5.11	4.56
offers a broad range of financial products, such as equity, futures and options, mutual funds, initial public offerings *etc*.	0.615	6.09	5.79
Kaiser-Meyer-Olkin (KMO) = 0.91; Bartlett's test of sphericity: χ^2 = 1832.62; (p < 0.001); Total variance explained = 58.62%; Overall alpha = 0.888			

Note: @ = Same as Table 2

F_3 *Variety and safety* - Adopters believed more strongly than non-adopters that Internet trading offered variety of products and services. These products were equity, futures and options, mutual funds, initial public offerings, and like. Further, Internet was considered as a safe channel of trading. This dimension was estimated to explain 7.04% of the total variance. Investors preferred access to a variety of stocks and other means of executing trades (Majer, 1997).

The attitude dimensions so derived above were then used as independent variables in discriminant analysis in terms of factor scores computed using SPSS package. Here factor scores were composite scores estimated for each respondent on each of the derived factors (Hair *et al.*, 2003).

Discriminant analytic results

In order to identify which of the factors (demographic and attitude dimensions) were significant in discriminating between adopters and non-adopters, simultaneous discriminant analysis was used. It is worth pointing out that while the attitude dimensions were metric, the demographic dimensions were non-metric. Therefore, the latter were converted into dummy variables to make the data fit for discriminant analysis as reported in Table IV (Hair *et al.,* 2005, pp. 83-85). The various statistics related to this analysis (viz., Wilks' Lambda, F-ratio, discriminant loadings), frequency percentages for demographics and group means for attitude dimensions are reported in Table V. Column 2 of this Table showed significant test for equality of group means (adopters versus non-adopters) for each variable on the basis of Wilks' Lambda. While large values indicated that group means were not different, small values indicated that group means were

different (Hair *et al.,* 2005). It was observed that group means differed significantly for five variables, i.e., X_2, X_6, X_8, X_9 and X_{11}.

Here, it was important to point out that even though Wilks' Lambda might be statistically significant, yet it did not provide enough information about the effectiveness of discriminant function in classification. In other words, it would not be meaningful to interpret the results if the discriminant function estimate was not statistically significant which was judged on the basis of a chi-square transformation of the Wilks' Lambda statistic (Malhotra, 2004). In testing for significance of discriminant function, it might be noted that the Wilks' Lambda associated with the function was worked out as 0.828, which transformed to a chi-square value of 55.179 with 11 degrees of freedom. This was found highly significant at 0.000 probability level (see Table V).

Further, the researcher should focus on making substantive interpretations of the findings only if the discrininant function is statistically significant and the classification accuracy is acceptable (Hair *et al.,* 2003). In this paper, the discriminant function was already found to be highly statistically significant at 0.000 probability level. Hence the next step would be to check if the classification accuracy was acceptable.

Table VI showed that the overall percentage of the respondents classified correctly was estimated as high as 67.2%. However, even though hit ratio was high, it must be compared with the chance probability to assess its true effectiveness. When the groups were equal in size, the percentage of chance classification was computed by dividing 1 by the number of groups. Further, classification accuracy should be at least 25 per cent greater than that obtained by chance (Malhotra, 2004). In the present study, with two groups of equal size (Table VI), the chance accuracy was estimated as 50% [= (1 / 2)]. The classification accuracy should, therefore, be at least 62.50% [=50% + ¼(50%)]. Since the estimated classification accuracy was 67.2% and was greater than 62.50%, the model was regarded as acceptable. Further, chance probability was compared with the percentage correctly classified in the validation sample, i.e. 63.9%. The estimated classification accuracy in the validation sample was 63.9%. It was also estimated to be greater than 62.5% and therefore, the validity of the two-group discriminant model was judged as satisfactory.

Further, the *canonical (discriminant)* loadings were reported in column 5 (Table V). Needless to mention, the greater the magnitude of discriminant loading, more important the corresponding predictor was (Malhotra, 2004). Generally, any variable exhibiting loading ±0.30 or higher was considered significant (Hair *et al.*, 2005).

Thus, it was observed from column 5 of Table V that attitude dimensions in comparison to demographics contributed significantly in classifying investors as adopters or non-adopters of Internet trading. As regards attitude dimensions, 'variety and safety' contributed significantly in discriminating between adopters and non-adopters of Internet trading followed by 'convenience and transparency'. So, H6 and H7 were accepted. The dimension 'website customization and awareness' did not contribute significantly in discriminating between adopters and non-adopters of internet stock trading. Hence, H8 was rejected. As far as the demographics were concerned, inexperienced, comparatively young, and non-businessmen investors were more likely to use Internet-based trading as compared to experienced, aged, and businessmen investors. Therefore, H1, H2 and H4 were accepted. However, education and income level of investors did not discriminate significantly between adopters and non-adopters of Internet stock trading.

So, H3 and H5 were rejected. Summary of hypotheses and findings may be seen through Table VII.

Table IV. Conversion of demographic variables into dummy variables (adopters and non-adopters)

Variable	Categories	Dummy variable label	Levels
• Age	Below 31 years[a]	-	
	31-40 years	X_1	1, if between 31-40 years 0, otherwise
	Above 40 years	X_2	1, if above 40 years 0, otherwise
• Income	Below Rs. 15,000[a]	-	
	Rs. 15,000 – 25,000	X_3	1, if between Rs. 15,000–25,000 0, otherwise
	Above Rs. 25,000	X_4	1, if above Rs. 25,000 0, otherwise
• Education	Undergraduate/graduate[a]	-	
	Postgraduate/professional	X_5	1, if postgraduate/professional 0, otherwise
• Occupation	Salaried employee[a]	-	
	Businessman	X_6	1, if businessman 0, otherwise
	Professional/retired/student	X_7	1,if professional/retired/student 0, otherwise
• Trading experience	Upto 5 years[a]	-	
	Above 5 years	X_8	1, if above 5 years 0, otherwise

Note - a: comparison group for dummy variables

Table V. Discriminant analytic results for discriminating between adopters and non-adopters

Demographic dimensions		***Variable (1)***	Wilks' Lambda (2)	F-Ratio (3)	Significance level (4)	Discriminant loadings[b] (5)	Adopters[c] (6)	Non-adopters[c] (7)
• *Age*	–	***Below 31 years***[a]					63.5	36.5
	X_1	31– 40 years	0.997	0.968	0.326	–0.125	45.3	54.7
	X_2	Above 40 years	0.979	6.235	0.013	–0.317	40.4	59.6
• *Income*	–	Below Rs. 15,000[a]					41.0	59.0
	X_3	Rs. 15,000 – 25,000	0.999	0.424	0.516	0.083	52.5	47.5
	X_4	Above Rs. 25,000	0.997	0.979	0.323	0.126	53.3	46.7
• Education	–	Undergraduate/ graduate[a]					47.0	53.0
	X_5	Postgraduate/ professional	0.997	0.768	0.382	0.111	52.1	47.9
• Occupation	–	Salaried employee[a]					57.4	42.6
	X_6	Businessman	0.979	6.231	0.013	–0.317	37.7	62.3
	X_7	Professional/retired /student	1.000	0.007	0.932	–0.011	49.5	50.5
• Trading experience	–	Up to 5 years[a]					81.0	19.0
	X_8	Above 5 years	0.956	13.797	0.000	–0.472	47.0	53.0
Attitude dimensions							Group means[d]	
• Convenience & transparency	X_9		0.962	11.719	0.001	0.435	0.195	-0.194
• Site-customization			0.991	2.823	0.094	-0.214	0.097	0.096

and awareness	X_{10}						
• Variety and safety	X_{11}	0.943	17.979	0.000	0.539	0.239	-0.238

Wilks' Lambda = 0.828; Chi square = 55.179; df = 11; Significance level = 0.000

a : Comparison group for dummy codes ; b : Discriminant loadings ; c : For ease of interpretation, frequency percentages are reported so that they add up to 100% row- wise ; and d : Group means for attitude dimensions.

Table VI. Classification accuracy results (adopters versus non-adopters)

		Predicted		Total
		Adopters	Non-adopters	
Observed /original	Adopters	99 (66.4)	50 (33.6)	149 (100.0)
	Non-adopters	48 (32.0)	102 (68.0)	150 (100.0)
Cross-validated	Adopters	94 (63.1)	55 (36.9)	149 (100.0)
	Non-adopters	53 (35.3)	97 (64.7)	150 (100.0)

Note: Figures in parentheses represent percentages; Analysis sample (Hit Ratio) = 67.2%; Validation sample (Hit Ratio) = 63.9%

Table VII. Summary of hypotheses and findings

Hypothesis	Discriminate significantly	Results	Hypothesis Rejected / Accepted
H1	Yes	Age discriminated significantly between adopters and non-adopters	Accepted
H2	Yes	Experience discriminated significantly between adopters and non-adopters	Accepted
H3	No	Education did not discriminate significantly between adopters and non-adopters	Rejected
H4	Yes	Occupation discriminated significantly between adopters and non-adopters	Accepted
H5	No	Income did not discriminate significantly between adopters and non-adopters	Rejected
H6	Yes	Convenience and transparency discriminated significantly between adopters and non-adopters	Accepted
H7	Yes	Variety and safety discriminated significantly between adopters and non-adopters	Accepted
H8	No	Website-customization and awareness did not discriminate significantly between adopters and non-adopters	Rejected

Discriminant analytic results helped to develop the characteristic profile for each group by describing each group in terms of group means for the predictor variables. If the important predictors are identified, then a comparison of the group means on these variables can assist in understanding the inter-group differences (Malhotra, 2004). Columns 6 and 7 of Table V indicated that most of the investors (81%) having trading experience below 5 years were adopters of Internet trading. On the other hand, as high as 53% investors having trading experience above 5 years were non-adopters, i.e. those who traded through offline brokers. 63.5% of the investors aged below 30 years, were adopters of Internet trading system. Whereas, most of the investors (59.6%) aged above 40 years were non-adopters of Internet trading. Most of the salaried respondents (57.4%) were trading through Internet channel. On the other hand, most of the businessmen (62.3%) were trading through traditional brokers.

As far as the attitude dimensions were concerned, the mean scores on 'variety and safety' showed that adopters ($\overline{x}$ =0.239) believed more strongly than non-adopters ($\overline{x}$ =–0.238) that Internet trading offered variety of financial products and services, and was found as a safe channel of trading. Adopters also strongly perceived Internet trading as a convenient and transparent channel of trading ($\overline{x}$ = 0.195) as compared to non-adopters ($\overline{x}$ =–0.194). Further, on the dimension 'website customization and awareness', adopters ($\overline{x}$ = 0.097) and non-adopters ($\overline{x}$ = 0.096) of Internet stock trading did not differ.

DISCUSSION

The results of discriminant analysis revealed that, out of eight factors considered in the study, five factors were found significant in discriminating between adopters and non-adopters of internet trading. Attitude dimensions in comparison to demographics contributed significantly in classifying investors as adopters or non-adopters of Internet stock trading. The positive relationship of attitude with the intention to use the internet was supported with the earlier studies (Taylor and Todd, 1995; Ajzen, 1991, 2002; Ma'ruf *et al.,* 2003; May, 2005; Ing-Long and Jian-Liang, 2005; Jen-Ruei *et al.,* 2006).

As regards attitude dimensions, 'variety and safety' contributed significantly in discriminating between adopters and non-adopters of Internet trading followed by 'convenience and transparency'. In another research, nine factors associated with users' perception of on-line shopping were extracted (Velido *et al.*, 2000). Among those nine factors the risk perception of users was demonstrated to be the main discriminator between people buying on-line and those not buying on-line (Velido *et al.*, 2000). Adopters in comparison to non-adopters were more confident of the security of Internet stock trading in Singapore (Teo *et al.,* 2000). An obstacle to electronic commerce adoption had been the lack of security and privacy over the Internet (Bhimani, 1996; Cockburn and Wilson, 1996; Quelch and Klein, 1996). This had led many to view Internet commerce as a risky undertaking. Thus, it was expected that only investors who perceived using Internet trading as low risk undertaking would be adopting it. A study on the impact of Internet on financial services found Internet as a convenient and efficient channel for doing stock trading transactions (Birch and Young, 1997). Another study found that comparatively older adults and wealthier individuals sought convenience rather than risk minimization during purchase transactions (Donthu and Garcia, 1999).

Further, in this study, adopters and non-adopters of Internet stock trading perceived

equally and positively the issue of website customization and awareness'. Wolfinbarger and Gilly (2002) observed that the website design quality was an important issue in customer satisfaction. Ho and Wu (1999) further found that homepage presentation was a major issue of customer satisfaction. Bakos (2001) brought out that the lower search costs in digital markets would make it easier for the buyers to find low cost sellers. Cost effectiveness was the key reason for the shoppers to buy on-line, followed by convenience and ease of purchase (Verdict Research Ltd., 2000). Another study revealed that reliability, customer services, and security were the other important factors affecting on-line shopping (Shergill and Chen, 2005). For Indian customers, website design is major issue to decide their level of satisfaction (Singh, 2008).

As far as the demographics were concerned, inexperienced, young, and non-businessmen investors were more likely to use Internet-based trading as compared to experienced, aged, and businessmen investors. In a study on consumers' adoption of Internet banking in Hong Kong, demographic factors in contrast to psychological ones were found strongly associated with adoption of Internet banking (Wan *et al.,* 2005).

The probability of Internet use was expected to decline with the age of the computer operator. Older individuals were expected to be more experienced in any profession and thus, value the information that could be attained from the Internet less than the younger ones who had less experience (Gloy and Akridge, 2000). Also, older people had less time to retirement, thus less time to experience the benefits of their investment (Darroch, 2001). Finally, younger people are likely to have relatively more exposure to computers and the Internet and are more confident in their abilities to benefit from them.

It may, therefore, be inferred that the older, mature and experienced equity investors are not on-line today and are not 'tech-positive'; hence, unlikely to move to on-line trading, which is a major barrier to the growth of Internet trading in India. Young and less experienced investors of trading shares are more adaptable to the latest Internet technology in stock market as compared to older and experienced investors who are less likely to shift from existing trading method due to lack of knowledge and awareness about Internet trading. Researches on the adoption of new technology indicated that those who adopted new communication technologies were more upscale and younger than non-adopters (Atkin, 1993; Atkin and LaRose, 1994; Dutton et al., 1987; Garramone et al., 1986; James et al., 1995; Lin, 1998; Rogers, 1995).

MANAGERIAL IMPLICATIONS, LIMITATIONS, AND FUTURE RESEARCH DIRECTION

The results are of great significance for the stockbrokers, the Stock Exchanges and the SEBI for the policy formulation that may enhance the adoption level of Internet trading among the investors. The findings also provide researchers and practitioners with better understanding of the potential of Internet stock trading which may aid stockbrokers and policy makers in devising more effective strategies to encourage internet stock trading. Information provided by the relevant factors can influence the behaviour intention towards Internet stock trading. Brokers should employ incentives programs for the adoption of Internet stock trading to further motivate the non-adopters to use the same. Incentives such as certain amount of free transactions, free opening of trading account, and increase in credit limits are just a few devices that can be used to encourage internet stock trading in India. It may, therefore, be suggested that there is need to

improve the Internet and computer penetration level. For this, government should encourage especially non-Net based investors to use computer and Internet for share market transactions as well as for other tasks. They should be given incentives like free computer education and IT facilities, value-added services, broad range of financial products, *etc*.

As Internet trading services are still relatively new in India, this study may not be able to measure the actual usage behaviour relating to such services. Further, a few respondents might not have experience and knowledge about some features of Net trading, so they might have given a neutral response in such cases. Small survey is another limitation of the study that might have affected the generalization of the results.

The present study covered only individual investors. It may further be extended to Internet brokers and Non-Net brokers. Besides, future studies may also be carried out to include other regions of India, more demographic variables, and contextual variables. Rather, future studies can be conducted cross-culturally to give inclusive, comparative, and more generalised results.

CONCLUSION

Results of this study clearly indicated that attitude dimensions and demographic variables contributed significantly in classifying investors as adopters or non-adopters of Internet stock trading. As regards attitude dimensions, 'variety of financial products and safety' contributed significantly in discriminating between adopters and non-adopters of net trading followed by the factor such as 'convenience and transparency'. As far as the demographics were concerned, the mature/older, experienced, and businessmen investors were less likely to use Internet-based trading as compared to young, inexperienced, and non-businessmen investors.

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