

CHAPTER 4

DATA ANALYSIS AND MODEL TESTING

Previous chapter discussed the research model, methodology and hypotheses developed for the study. The results of the survey conducted as part of the research study is presented and analyzed in this chapter. Descriptive statistics of the survey respondents are presented first. Then, reliability and validity of the survey questionnaire is analyzed. Finally, hypotheses and research model are tested using regression techniques.

4.1 Descriptive analysis

As discussed in Chapter 4, a survey was undertaken using web and paper based techniques. After discarding incomplete and vague responses 266 responses were taken for final analysis. Table 5.1 presents the demographics related age, gender, marital status, educational qualification and the profession of respondents. The respondents comprised of 205 males (77.07%) and 61 females (22.93%). The higher percentage of male respondents indicates that access to new technologies like internet or internet banking is

adopted more by males than females. The gender pattern of a previous study conducted on E-commerce was 85% males and 15% females (IOAI, 2005). Around 80% of the total respondents' fall in the age group 21-35 years. This indicates that internet adoption among youngsters is high. More than fifty percent of the respondents are married. Educational level of respondents was high - 28.57 % of the respondents had a graduate degree, 33% post graduate degree and 35% professional qualifications like ACA, ACWA or ACS. Since using internet requires specific skills higher educational level among respondents was expected. Nearly 50% of the respondents responded as "Professional" to the question regarding their profession. Nine percent of the respondents were students, and nearly 30% were employed in various capacities. All these are indicated in Table 5.1. Table 5.2 gives details of the industry in which the respondents worked. Majority of the respondents were working in service industry- 29% of the respondents worked in banking, finance or insurance sectors, 22.5% in computer related business. Around 67% of respondents worked in the "private" sector. Monthly income of 43% of respondents were more than Rs. 25000 and 10%, earned between Rs. 20000 - Rs.25000 in a month. From the demographic details of

the respondents it can be seen that internet adoption is more among youngsters falling in the age group of 21-35 years. They are educated, work in service industry and earn more than Rs. 20000 month.

Variables		All Respondents		Males		Females	
		Frequency	Percent	Frequency	Percent	Frequency	Percent
Gender	Male	205	77.07	205	100	-	-
	Female	61	22.93	-	-	61	100
Age	Below 15 years	0	0.00%	0	0.00%	0	0.00%
	16-20	3	1.13%	1	0.49%	2	3.28%
	21-25	59	22.18%	30	14.63%	29	47.54%
	26-30	87	32.71%	71	34.63%	16	26.23%
	31-35	67	25.19%	61	29.76%	6	9.84%
	36-40	20	7.52%	16	7.80%	4	6.56%
	41-45	13	4.89%	12	5.85%	1	1.64%
	46-50	10	3.76%	8	3.90%	2	3.28%
	51-55	3	1.13%	2	0.98%	1	1.64%
	56-60	2	0.75%	2	0.98%	0	0.00%
	61 or above	2	0.75%	2	0.98%	0	0.00%
Marital Status	No answer	2	0.75%	2	0.98%	0	0.00%
	Rather not say	1	0.38%	1	0.49%	0	0.00%
	Married	139	52.26%	108	52.68%	31	50.82%

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	Single	122	45.86%	92	44.88%	30	49.18%
	Separated	1	0.38%	1	0.49%	0	0.00%
	Divorced	0	0.00%	0	0.00%	0	0.00%
	Widowed	1	0.38%	1	0.49%	0	0.00%
Educational Qualification	Primary School	0	0.00%	0	0.00%	0	0.00%
	Secondary School	1	0.38%	1	0.49%	0	0.00%
	Bachelor's Degree	76	28.57%	64	31.22%	12	19.67%
	Master's Degree	88	33.08%	66	32.20%	22	36.07%
	Doctorate Degree (PhD)	3	1.13%	3	1.46%	0	0.00%
	ACA,ACW A,ACS	93	34.96%	66	32.20%	27	44.26%
	Other	5	1.88%	5	2.44%	0	0.00%
Profession	Student	23	8.65%	14	6.83%	9	14.75%
	Professional	134	50.38%	105	51.22%	29	47.54%
	Academic	9	3.38%	6	2.93%	3	4.92%
	Self-employed	14	5.26%	13	6.34%	1	1.64%
	Executive - Junior	22	8.27%	16	7.80%	6	9.84%
	Executive – Senior	24	9.02%	20	9.76%	4	6.56%
	Manager	34	12.78%	30	14.63%	4	6.56%
	Housewife	2	0.75%	0	0.00%	2	3.28%
	Retiree	1	0.38%	1	0.49%	0	0.00%
	Other	3	1.13%	0	0.00%	3	4.92%

Table 4.1: Demographic details of survey participants

Variables		All Respondents		Males		Females	
		Frequ ency	Percent	Frequ ency	Percent	Frequ ency	Percent
Indust ry	Banking/Finance/ Insurance	77	28.95%	58	28.29%	19	31.15%
	Business services	11	4.14%	10	4.88%	1	1.64%
	Communications	6	2.26%	4	1.95%	2	3.28%
	Utility/Transport	7	2.63%	7	3.41%	0	0.00%
	Computer related	60	22.56%	52	25.37%	8	13.11%
	Consulting	17	6.39%	15	7.32%	2	3.28%
	Education	12	4.51%	7	3.41%	5	8.20%
	Engineering/R&D	12	4.51%	10	4.88%	2	3.28%
	Government	4	1.50%	3	1.46%	1	1.64%
	Health care/medical	1	0.38%	1	0.49%	0	0.00%
	Manufacturing	8	3.01%	6	2.93%	2	3.28%
	Outsourcing/Service s	8	3.01%	6	2.93%	2	3.28%
	Retail/wholesale	5	1.88%	5	2.44%	0	0.00%
	Other	38	14.29%	21	10.24%	17	27.87%
Orga nizati on Type	No answer	16	6.02%	9	4.39%	7	11.48%
	Public sector	24	9.02%	19	9.27%	5	8.20%
	Private sector	179	67.29%	150	73.17%	29	47.54%
	Not-for-profit sector	3	1.13%	3	1.46%	0	0.00%
	Other	44	16.54%	24	11.71%	20	32.79%
Mont hly Incom e (Rs)	Rather not say	58	21.80%	37	18.05%	21	34.43%
	Under 5000	1	0.38%	1	0.49%	0	0.00%
	5000-10000	16	6.02%	13	6.34%	3	4.92%
	10000-15000	25	9.40%	20	9.76%	5	8.20%
	15000-20000	24	9.02%	20	9.76%	4	6.56%
	20000-25000	27	10.15%	22	10.73%	5	8.20%
	25000 and above	115	43.23%	92	44.88%	23	37.70%

Table 4.2: Sample Details – Industry, Organization Type and
Monthly Income

4.1.1 Internet Usage and Banking Habits

In the survey it was decided to gather the internet usage and banking habits of the respondents. In this section the results of the

same are discussed. Table 4.3 gives details of the internet usage among the respondents. From the table it is evident that most of the respondents were having good exposure to internet- more 75% of the respondents were using internet for more than 4 years. Nearly 70% the respondents have access to internet from their home or office. Among the respondents, 43% were accessing internet from Cybercafes and 10.5% through their mobile phones. It was seen that respondents also accessed internet frequently- 72.5% of the respondents accessed internet on a daily basis and 19.5%, at least once in a week. It could be noted that respondents spend fairly good time while they accessed net - 47% used net for 0-5 hours in a week, 24%, for 5-15 hours in a week, 10%, for 15-25 hours a week and 10%, were heavy net users with more than 45 hours net usage in a week. More than half of the respondents were accessing net through a high speed broad band connection. In the case of operating systems and browser used for net access Microsoft Corp's OSs like Windows -XP, 2000, 98, 95 etc and Internet Explorer had absolute majority with 98% and 86.5% respectively. Firefox browser was used by 11% of the respondents.

The popular services used by respondents were as follows: E-mail (95%), World Wide Web (88%), Instant Messenger (45%), Voice Chat (29%), FTP (20%) and Video Conferencing (13.5%). With regards to activities done using net: 50% of the respondents had ordered some product or service through net, 65% had participated in an online chat or discussion, 46% had changed the browser “start-up” page, 42% had used net phony service (Refer Table 4.4). Books topped with 31% response among the products or services bought online, followed by Railway Tickets (29.7%) and Airline Tickets (25.5%) (Refer Table 4.5). It is interesting to note that the response rates for white goods like home tool & products and home appliances was quite low viz. 3.76% and 6.39% respectively.

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Variables		All Respondents		Males		Females	
		Frequency	Percent	Frequency	Percent	Frequency	Percent
Internet Usage	Less than 6 months	8	3.01%	7	3.41%	1	1.64%
	6 to 12 months	7	2.63%	6	2.93%	1	1.64%
	1 to 3 years	40	15.04%	20	9.76%	20	32.79%
	4 to 6 years	98	36.84%	74	36.10%	24	39.34%
	7 years or more	113	42.48%	98	47.80%	15	24.59%
Place of access	Home	186	69.92%	139	67.80%	47	77.05%
	Work	177	66.54%	150	73.17%	27	44.26%
	School	16	6.02%	9	4.39%	7	11.48%
	Cybercafe	115	43.23%	91	44.39%	24	39.34%
	Mobile	28	10.53%	24	11.71%	4	6.56%
	Other	11	4.14%	11	5.37%	0	0.00%
Frequency of web access	Daily	193	72.56%	152	74.15%	41	67.21%
	Weekly	52	19.55%	38	18.54%	14	22.95%
	Monthly	15	5.64%	9	4.39%	6	9.84%
	Less than once a month	6	2.26%	6	2.93%	0	0.00%
Weekly net usage	0-5 hrs	125	46.99%	90	43.90%	35	57.38%
	5-15 hrs	63	23.68%	51	24.88%	12	19.67%
	15-25 hrs	28	10.53%	22	10.73%	6	9.84%
	25-35 hrs	9	3.38%	7	3.41%	2	3.28%
	35-45 hrs	12	4.51%	8	3.90%	4	6.56%
	45 hrs and above	29	10.90%	27	13.17%	2	3.28%
Net access mode	No answer	7	2.63%	3	1.46%	4	6.56%
	28.8 Kbps	7	2.63%	4	1.95%	3	4.92%
	33.6 Kbps	7	2.63%	4	1.95%	3	4.92%
	56 Kbps	32	12.03%	25	12.20%	7	11.48%
	128 Kbps	26	9.77%	21	10.24%	5	8.20%
	Broadband	144	54.14%	118	57.56%	26	42.62%
	Not aware of the speed	43	16.17%	30	14.63%	13	21.31%

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Operating System	Windows – XP, 2000, 98, 95 etc	261	98.12%	201	98.05%	60	98.36%
	Macintosh	1	0.38%	1	0.49%	0	0.00%
	Unix/Linux	3	1.13%	3	1.46%	0	0.00%
	Other	1	0.38%	0	0.00%	1	1.64%
Browser used	Internet Explorer	230	86.47%	176	85.85%	54	88.52%
	Netscape Navigator	1	0.38%	1	0.49%	0	0.00%
	FireFox	31	11.65%	26	12.68%	5	8.20%
	Opera	3	1.13%	2	0.98%	1	1.64%
	Other	1	0.38%	0	0.00%	1	1.64%
Services Used	WWW	234	87.97%	183	89.27%	51	83.61%
	E-mail	253	95.11%	195	95.12%	58	95.08%
	FTP	54	20.30%	49	23.90%	5	8.20%
	IRC	6	2.26%	6	2.93%	0	0.00%
	Instant Messenger	120	45.11%	92	44.88%	28	45.90%
	Voice Chat	77	28.95%	55	26.83%	22	36.07%
	Video Conferencing	36	13.53%	30	14.63%	6	9.84%
	Telnet	21	7.89%	19	9.27%	2	3.28%
	P2P Network	24	9.02%	23	11.22%	1	1.64%

Table 4.3: Internet Usage Stats

Which of the following have you done?	All Respondents		Males		Females	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
ordered a product/service from a business, government or educational entity by filling out a form on the web	132	49.62%	110	53.66%	22	36.07%
made a purchase online for more than Rs 1000	95	35.71%	84	40.98%	11	18.03%
created a web page	71	26.69%	57	27.80%	14	22.95%
customized a webpage for yourself (e.g. MyYahoo, CNN Custom News)	67	25.19%	54	26.34%	13	21.31%
changed your browser's "startup" or "home" page	124	46.62%	108	52.68%	16	26.23%
changed your "cookie" preferences	109	40.98%	95	46.34%	14	22.95%
participated in an online chat or discussion (not including email)	174	65.41%	132	64.39%	42	68.85%
listened to a radio broadcast online	85	31.95%	74	36.10%	11	18.03%
made a telephone call online	113	42.48%	94	45.85%	19	31.15%
used a nationwide online directory to find an address or telephone number	99	37.22%	81	39.51%	18	29.51%
taken a seminar or class about the Web or Internet	45	16.92%	39	19.02%	6	9.84%

Table 4.4: Internet browsing activities/capabilities

Products and services bought online	All Respondents		Males		Females	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Books	83	31.20%	66	32.20%	17	27.87%
Apparel Accessories	32	12.03%	25	12.20%	7	11.48%
Computers & Peripherals	42	15.79%	35	17.07%	7	11.48%
Movies	21	7.89%	17	8.29%	4	6.56%
Home Tools & Products	10	3.76%	7	3.41%	3	4.92%
Jewelry	8	3.01%	7	3.41%	1	1.64%
Sporting Goods	13	4.89%	11	5.37%	2	3.28%
Electronic Gadgets	31	11.65%	25	12.20%	6	9.84%
Apparel	15	5.64%	14	6.83%	1	1.64%
Airline Tickets	68	25.56%	58	28.29%	10	16.39%
Hotel Booking	40	15.04%	34	16.59%	6	9.84%
Home Appliances	17	6.39%	13	6.34%	4	6.56%
Movie Tickets	35	13.16%	30	14.63%	5	8.20%
Railway Tickets	79	29.70%	67	32.68%	12	19.67%
Gifts	29	10.90%	26	12.68%	3	4.92%
Music	21	7.89%	18	8.78%	3	4.92%
Magazines	30	11.28%	28	13.66%	2	3.28%
Toys	11	4.14%	10	4.88%	1	1.64%

Table 4.5: Products and Services bought Online

More than 54% of the respondents revealed that they were feeling “Very Comfortable” while using computers in general (Table 4.6). Similarly nearly 49%, of the respondents felt “Very Comfortable” while using Internet (Table 4.7) and half of the respondents were “Somewhat satisfied” with their internet usage skills (Table 4.8).

How comfortable do you feel using computers, in general?	All Respondents		Males		Females	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Very uncomfortable	49	18.42%	40	19.51%	9	14.75%
Somewhat uncomfortable	5	1.88%	5	2.44%	0	0.00%
Neither comfortable nor uncomfortable	10	3.76%	5	2.44%	5	8.20%
Somewhat comfortable	56	21.05%	42	20.49%	14	22.95%
Very comfortable	146	54.89%	113	55.12%	33	54.10%

Table 4.6: Comfort level of using Computers

How comfortable do you feel using the Internet?	All Respondents		Males		Females	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Very uncomfortable	51	19.17%	41	20.00%	10	16.39%
Somewhat uncomfortable	8	3.01%	7	3.41%	1	1.64%
Neither comfortable nor uncomfortable	10	3.76%	4	1.95%	6	9.84%
Somewhat comfortable	68	25.56%	51	24.88%	17	27.87%
Very comfortable	129	48.50%	102	49.76%	27	44.26%

Table 4.7: Comfort level of using Internet

How satisfied are you with your current skills for using the Internet?	All Respondents		Males		Females	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Very unsatisfied - I can't do most things I would like to do	19	7.14%	18	8.78%	1	1.64%
Somewhat unsatisfied - I can't do many things I would like to do	20	7.52%	14	6.83%	6	9.84%
Neither satisfied nor unsatisfied	15	5.64%	11	5.37%	4	6.56%
Somewhat satisfied - I can do most things I want to do	134	50.38%	98	47.80%	36	59.02%
Very satisfied - I can do everything that I want to do	78	29.32%	64	31.22%	14	22.95%

Table 4.8: Satisfaction level of Internet usage Skills

Responses of the respondents with respect to banking section of the survey are discussed below (Table 4.9). More the 69% of the respondents have banking relationships with 2 – 4 banks. State Bank of India (35%) and State Bank of Travancore (25%) had maximum customer patronage among the public sector banks. New generation banks which gave customers more options and facilities also enjoyed good patronage among the respondents as seen from the figures of ICICI Bank (35%) and HDFC Bank (30%). Private sector banks with regional focus also had high customer acceptance level; Federal Bank (30%) and South Indian Bank (10%) came top in this group. Foreign Banks like Citibank and Standard Chartered Bank had less than ten percent of customer patronage.

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Variables		All Respondents		Males		Females	
		Frequ ency	Percent	Frequ ency	Percent	Frequ ency	Percent
How many banks are you a client of ?	1	51	19.17%	36	17.56%	15	24.59%
	2	90	33.83%	61	29.76%	29	47.54%
	3	62	23.31%	51	24.88%	11	18.03%
	4	35	13.16%	33	16.10%	2	3.28%
	5	19	7.14%	16	7.80%	3	4.92%
	6	5	1.88%	4	1.95%	1	1.64%
	7	1	0.38%	1	0.49%	0	0.00%
	8+	3	1.13%	3	1.46%	0	0.00%
Which of the following banks do you patronise?	State Bank of India	93	34.96%	75	36.59%	18	29.51%
	State Bank of Travancore	67	25.19%	43	20.98%	24	39.34%
	Federal Bank	80	30.08%	63	30.73%	17	27.87%
	ICICI Bank	94	35.34%	79	38.54%	15	24.59%
	HDFC Bank	78	29.32%	62	30.24%	16	26.23%
	IDBI Bank	4	1.50%	4	1.95%	0	0.00%
	Vijaya Bank	7	2.63%	6	2.93%	1	1.64%
	ING Vysya	9	3.38%	6	2.93%	3	4.92%
	Catholic Sryan Bank	14	5.26%	13	6.34%	1	1.64%
	South Indian Bank	27	10.15%	23	11.22%	4	6.56%
	Punjab National Bank	5	1.88%	4	1.95%	1	1.64%
	Centurion Bank	7	2.63%	5	2.44%	2	3.28%
	Oriental Bank of Commerce	0	0.00%	0	0.00%	0	0.00%
	Citibank	26	9.77%	23	11.22%	3	4.92%
	Standard Chartered Bank	20	7.52%	16	7.80%	4	6.56%
Other	125	46.99%	101	49.27%	24	39.34%	

Table 4.9: Banking Stats

Table 4.10 shows the frequency of usage of various banking services by the respondents in a month. As seen from the table usage of ATM channel is the highest among the respondents, over 80% of the respondents visited ATM more than once in a month. The high acceptance level of ATM might be the reason for lower usage of branch banking among the respondents. Only half of the respondents visited their bank's branch for conducting banking operations in a month. Lower branch banking could be also due the type of respondents in this survey – majority of respondents were employed professionals and there were only few number of business people among the respondents. Majority of the respondents (54%) were not using Internet Banking even once in a month, 19%, “1 to 3 times” and 11%, “3 to 8 times” in a month. Nearly 10% of the respondents used internet banking over 12 times in a month. There exists considerable gender disparity among participants in the case of internet banking usage – 72% of the female respondents were not using internet banking even once in a month. The usage level of other channels Phone (Tele) banking and Mobile Banking were very less among the survey participants. More than eighty percent of the respondents were not using these services even once a month.

Frequency of Use of Banking services in a Month		All Respondents		Males		Females	
		Frequ ency	Percent	Freq uency		Frequ ency	Percent
Branch Counter	Nil	135	50.75%	106	51.71%	29	47.54%
	1 to 3 times	91	34.21%	66	32.20%	25	40.98%
	3 to 8 times	26	9.77%	22	10.73%	4	6.56%
	8 to 12 times	5	1.88%	5	2.44%	0	0.00%
	Over 12 times	9	3.38%	6	2.93%	3	4.92%
ATM	Nil	46	17.29%	30	14.63%	16	26.23%
	1 to 3 times	64	24.06%	46	22.44%	18	29.51%
	3 to 8 times	73	27.44%	58	28.29%	15	24.59%
	8 to 12 times	37	13.91%	33	16.10%	4	6.56%
	Over 12 times	46	17.29%	38	18.54%	8	13.11%
Internet Banking	Nil	145	54.51%	101	49.27%	44	72.13%
	1 to 3 times	51	19.17%	42	20.49%	9	14.75%
	3 to 8 times	29	10.90%	25	12.20%	4	6.56%
	8 to 12 times	16	6.02%	13	6.34%	3	4.92%
	Over 12 times	25	9.40%	24	11.71%	1	1.64%
Phone (Tele) Banking	Nil	212	79.70%	161	78.54%	51	83.61%
	1 to 3 times	39	14.66%	32	15.61%	7	11.48%
	3 to 8 times	11	4.14%	9	4.39%	2	3.28%
	8 to 12 times	2	0.75%	1	0.49%	1	1.64%
	Over 12 times	2	0.75%	2	0.98%	0	0.00%
Mobile Banking	Nil	235	88.35%	177	86.34%	58	95.08%
	1 to 3 times	14	5.26%	12	5.85%	2	3.28%
	3 to 8 times	9	3.38%	8	3.90%	1	1.64%
	8 to 12 times	4	1.50%	4	1.95%	0	0.00%
	Over 12 times	4	1.50%	4	1.95%	0	0.00%

Table 4.10: Frequency of Banking Channel Usage

4.2 Survey Instrument Validation

Validation of the instrument used for the survey is necessary before applying any statistical test for testing the research model. Different validities and what they test in a survey instrument are given in Table 4.11. Straub (1989) and Straub et al., (2004) provides excellent guidelines for conducting instrument validation in positivistic studies in MIS. In their guidelines for research validities, the authors observes that checking for construct validity, reliability (internal consistency and statistical conclusion validity) should be considered mandatory. Content validity of the survey instrument in this study is ensured by:

- Extensive literature review
- A customer elicitation study using an open questionnaire to understand the customer concerns.
- Using items which were validated in previous studies

Construct validity and reliability of the instrument was checked by using factor analysis and calculation of Cronbach's alpha. Techniques used for testing the validity are discussed in the following paragraphs.

Validity	Questions raised by the validity
Content Validity	Are instrument measures drawn from all possible measures of the properties under investigation?
Construct Validity	Do measures show stability across methodologies? That is, are the data a reflection of true scores or artifacts of the kind of instrument chosen?
Reliability	Do measures show stability across the units of observation? That is, could measurement error be so high as to discredit the findings?
Internal Validity	Are there untested rival hypotheses for the observed effects?
Statistical Validity	Do the variables demonstrate Conclusion relationships not explainable by chance or some other standard of comparison?

Table 4.11: Instrument Validation - Questions Answered by the Validities (Adopted from Straub, 1989)

4.2.1 Reliability Testing

Reliability is the extent to which an experiment, test, or any measuring procedure yields the same result on repeated trials. Internal consistency is the extent to which tests or procedures assess the same characteristic, skill or quality. It is a measure of

the precision between the observers or of the measuring instruments used in a study. An important measure of the reliability of a psychometric instrument is Cronbach's alpha. Cronbach's alpha will generally increase when the correlations between the items increase. Cronbach's alpha of 0.60/0.07 or more and 0.95 is considered as best figures for optimum internal consistency of the instrument (Straub et al., Nunnally 1967). The Cronbach's alpha coefficients of the constructs used in this study are presented in Tables 4.12 to Tables 4.18.

Item	Mean	Std. Deviation	Cronbach's Alpha if Item Deleted	Cronbach's Alpha
PU1	5.78	1.484	.912	.920
PU2	5.01	1.588	.909	
PU3	5.11	1.527	.907	
PU4	5.30	1.474	.907	
PU5	5.17	1.546	.915	
PU6	5.92	1.454	.912	
PU7	4.76	1.606	.920	
PU8	5.91	1.314	.910	
PU9	6.00	1.244	.912	
PU10	5.80	1.382	.911	

Sample Size (N) = 266 No. of Items = 10

Table 4.12: Reliability for construct *Perceived Usefulness*

Item	Mean	Std. Deviation	Cronbach's Alpha if Item Deleted	Cronbach's Alpha
PEOU1	5.55	1.461	.731	.782
PEOU2	5.72	1.329	.722	
PEOU3	5.69	1.410	.715	
PEOU4	5.60	1.403	.725	
PEOU5	5.27	1.470	.722	
PEOU6	5.27	1.476	.747	
PEOU7	4.18	1.771	.830	
PEOU8	3.92	1.815	.835	

Sample Size (N) = 266 No. of Items = 8

Table 4.13: Reliability for construct *Perceived Ease of Use*

Item	Mean	Std. Deviation	Cronbach's Alpha if Item Deleted	Cronbach's Alpha
CA1	5.58	1.439	.905	.913
CA2	5.32	1.639	.910	
CA3	6.25	1.368	.899	
CA4	5.96	1.408	.900	
CA5	6.01	1.406	.897	
CA6	6.18	1.397	.898	
CA7	5.27	1.911	.923	
CA8	5.93	1.569	.900	
CA9	5.46	1.593	.903	
CA10	5.60	1.578	.908	

Sample Size (N) = 266 No. of Items = 10

Table 4.14: Reliability for construct *Consumer Awareness*

Item	Mean	Std. Deviation	Cronbach's Alpha if Item Deleted	Cronbach's Alpha
SC1	4.05	1.838	.818	.831
SC2	3.90	1.731	.805	
SC3	4.14	1.701	.796	
SC4	4.96	1.525	.855	
SC5	3.87	1.586	.799	
SC6	4.10	1.531	.804	
SC7	4.34	1.502	.805	
SC8	4.01	1.655	.813	
SC9	3.97	1.687	.826	
SC10	4.64	1.805	.823	

Sample Size (N) = 266 No. of Items = 10

Table 4.15: Reliability for construct *Consumer Security Concerns*

Item	Mean	Std. Deviation	Cronbach's Alpha if Item Deleted	Cronbach's Alpha
QF1	4.90	1.451	.663	.743
QF2	4.79	1.556	.629	
QF3	4.65	1.555	.812	
QF4	4.80	1.407	.606	

Sample Size (N) = 266 No. of Items = 4

Table 4.16: Reliability for construct *Quality of Facilities*

Item	Mean	Std. Deviation	Cronbach's Alpha if Item Deleted	Cronbach's Alpha
SN1	4.74	1.532	.715	.769
SN2	4.82	1.672	.663	
SN3	4.69	1.584	.689	
SN4	4.62	1.588	.694	
SN5	3.72	1.660	.842	

Sample Size (N) = 266 No. of Items = 5

Table 4.17: Reliability for construct *Subjective Norms*

Item	Mean	Std. Deviation	Cronbach's Alpha if Item Deleted	Cronbach's Alpha
TP1	4.88	1.663	.747	.798
TP2	5.04	1.508	.735	
TP3	4.67	1.631	.755	
TP4	4.63	1.547	.754	
TP5	4.86	1.497	.742	
TP6	4.15	1.807	.809	
TP7	3.60	1.778	.842	

Sample Size (N) = 266 No. of Items = 7

Table 4.18: Reliability for construct *Trust & Privacy*

As seen from the tables the Cronbach's alpha coefficient for all the constructs were above .70 which is a satisfactory figure for the current study. Cronbach's alpha for constructs like Perceived Usefulness and Consumer Awareness is quite high. Cronbach's alpha for constructs *Perceived Usefulness* and *Perceived Ease of Use* in previous studies were higher than .90. But in the current

study, the alpha for construct *Perceived Ease of Use* was only .782 and it could be seen from the Table 4.13 that deleting items PEOU7 and PEOU8 from the construct resulted in better alpha coefficient figure. The item PEOU7 was worded “Lack of clarity in procedures related to online banking worries me” and item PEOU8 “Lack of personal relations while using online banking worries me”, on close examination it could be noted that the above items doesn’t actually form a part of the construct measuring Ease of Use of internet banking. It was decided to drop these items from further analysis. Similarly other constructs which gave alpha coefficient of less than .80 were analyzed and the items which caused the decrease in alpha coefficient were dropped. Accordingly, the following items were dropped from instrument: “I feel slow penetration of internet in India is hampering online banking usage.” (QF3), “There are individual/groups discouraging online banking adoption.”(SN5) and “I believe bank may take advantage of my weakness/problems” (TP7). All the dropped items were statements which were controversial in nature. Constructs like *Perceived Usefulness*, *Perceived Ease of Use*, *Security Concern* and *Trust and Privacy* were tested for reliability in previous studies, findings of alpha coefficient in the current study matched with those conducted earlier. The

construct *Consumer Awareness* gave an alpha coefficient of .913; this construct was intended to measure consumer's response on precaution to be taken while using internet banking. High Cronbach's alpha figure shows that respondents were giving similar responses; the mean for each of the items in that construct was 5 or higher which corresponds to "Slightly Agree" in the Likert Scale. It is evident that respondents were sufficiently educated on the precaution that should be taken while using internet banking facility. This construct was freshly developed for this study and results of the survey shows that it is having high internal consistency reliability. Table 4.19 gives the Cronbach's alpha coefficients of the constructs used in final statistical analysis.

Construct	No. of Items (Initial)	No. of Items (Deleted)	Items Dropped	Cronbach's Alpha (Initial)	Cronbach's Alpha (Deleted)
PU	10	10	-	.920	.920
PEOU	8	6	PEOU7,PEOU8	.782	.922
CA	10	10	-	.913	.913
SC	10	10	-	.831	.831
QF	4	3	QF3	.743	.812
SN	5	4	SN5	.769	.842
TP	7	6	TP7	.798	.842

Table 4.19: Cronbach's Alpha of the Constructs.

4.2.2 Construct Validity

Construct validity seeks agreement between a theoretical concept and a specific measuring device or procedure. Construct validity of the survey instrument was tested using factor analysis. Factors were extracted from the survey responses using Principal Component extraction method with Varimax rotation. Factors with Eigen values above 1 and loading of at least 0.40 is accepted as desired results of PCA (Hair et al., 1992; Straub, 1989). Table 4.21 gives results of the factor analysis of survey responses, for better reading of the results factor loadings below 0.40 are suppressed in the table. The Bartlett's test of sphericity confirmed that the variables within factors are correlated. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy is 0.915 which is higher than the commonly accepted threshold limit of 0.60 (Table 4.20). Therefore factor analysis of the data is appropriate.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.915
Bartlett's Test of Sphericity	Approx. Chi-Square	9199.407
	df	1176
	Sig.	.000

Table 4.20: KMO and Bartlett's Test

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	Component								
	1	2	3	4	5	6	7	8	9
PU1	0.482					0.513			
PU2						0.702			
PU3	0.422					0.707			
PU4	0.449					0.651			
PU5	0.589								
PU6	0.490								
PU7			0.585						
PU8	0.598								
PU9	0.642								
PU10	0.720								
PEOU1	0.669								
PEOU2	0.733								
PEOU3	0.719								
PEOU4	0.721								
PEOU5	0.780								
PEOU6	0.693								
CA1		0.623							
CA2		0.585							
CA3		0.792							
CA4		0.782							
CA5		0.819							
CA6		0.815							
CA7		0.530							
CA8		0.798							
CA9		0.727							
CA10		0.600							
SC1							0.744		
SC2							0.730		
SC3				0.527			0.647		
SC4			0.552						-0.401
SC5				0.744					
SC6				0.704					
SC7				0.693					
SC8				0.705					
SC9				0.611					
SC10				0.625					
QF1							0.647		
QF2							0.710		
QF4							0.700		
SN1					0.651				
SN2					0.787				
SN3					0.781				
SN4					0.777				
TP1			0.603						
TP2			0.714						
TP3			0.660						

TP4			0.668						
TP5			0.717						
TP6									0.616
Eigen Value	7.039	6.652	4.130	3.668	3.054	2.775	2.307	2.040	1.270
% of Variance	14.365	13.575	8.428	7.486	6.232	5.664	4.707	4.163	2.592
Cumulative %	14.365	27.941	36.368	43.854	50.086	55.750	60.457	64.620	67.212

Rotated Component Matrix(a)

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a Rotation converged in 9 iterations.

Table 4.21: Component Matrix of Factor Analysis

Factor analysis resulted in extraction of 9 factors with Eigen value of above 1, together these factors explained for 67.21 percent of the variance of the variables. Factor 1 contains factor loadings from items of constructs *Perceived Usefulness* and *Perceived Ease of Use*. All the items in the construct *Perceived Ease of Use* loaded in factor 1 with high factor loading. Factor 1 also contained 8 items of construct *Perceived Usefulness* with factor loading above 0.40, indicating relationship between the construct *Perceived Ease of Use* and *Perceived Usefulness* as hypothesized in the research model. The items of constructs which loaded with *Perceived Ease of Use* indicate that respondents feel that internet banking is *useful* due to its *ease of use*. Factor 1 accounts for 14.365 percent of the total variance explained by the factor analysis.

Factor 2 gets loaded with items in the *Customer Awareness* construct. All the items in the construct gets loaded in factor 2 with high factor loadings. Five items which relate to “trust” in the construct *Trust and Privacy* gets loaded in factor 3. Two items from constructs *Perceived Usefulness* and *Consumer Security Construct* also get loaded in factor 3. The items “Online banking is reliable” (PU7) and “Advances in internet security technology provide for safer Internet Banking” (SC4) is related to the items in construct *Trust & Privacy*. Therefore loading of items PU7 and SC4 in construct *Trust and Privacy* could be accepted. The item TP6 which deals with misuse of confidential information is loaded separately in factor 9 along with negative factor loading of item SC4. Item TP6 states that “I believe that bank may use confidential information about me to its advantage” contradicts to item SC4 and consequently the resultant factor loadings could be explained satisfactorily.

Factor 4 contains seven items from the construct *Consumer Security Concern*. First three items of the construct namely SC1, SC2 and SC3 get loaded separately in factor 8. It was also noted earlier that item SC4 was loaded in factor 3 along with items of construct *Trust & Privacy*. Cross loading of factors indicates that

participants of survey have mixed feeling on the construct *Consumer Security Concern*. The construct's ability to represent as a single entity is questioned and items could be dropped from further analysis due to inadequate validity. But it should be noted that the construct which measures concerns of security among consumers is bound to get such volatile reactions. The items which loaded separately also got high factor loadings indicating that customers see the items as important and related. Considering all these it was decided to keep these items also in the next phase of statistical analysis.

The items in constructs *Subjective Norms* and *Quality of Facilities* got loaded cleanly in factor 5 and 7 respectively. The factors extracted and factor loadings of extracted factors fall in line with the research model proposed in this study. Therefore, it could be concluded that there is construct validity for the instrument used for study and is fit for further statistical analysis based on it.

4.3 Hypotheses Testing

Hypotheses formulated as a part of this research was tested using linear regression analysis. Linear regression analysis is a useful statistical technique for analyzing relationship between dependent

and independent variables. It is widely used in information research and is considered as a reliable “first generation” method (Gefen et al., 2000).

For testing the hypotheses a series of linear analysis was performed on the variables. Independent variables *Perceived Usefulness, Perceived Ease of Use, Consumer Awareness, Consumer Security Concerns, Quality of Facilities, Subjective Norms and Trust and Privacy* were regressed separately with *Internet Banking Use* as dependent variable to test hypotheses H1, H2a, H3, H4, H5, H6, H7. To test hypothesis H2a independent variable *Perceived Ease of Use* was regressed with *Perceived Usefulness* as dependent variable. For carrying out regression analysis construct index was calculated by averaging items in the construct. For example, to develop the construct index for *Perceived Usefulness* response scores of items PU1 to PU10 were added and divided by 10. Items deleted from the instrument were omitted while generating the construct index. Averaging items enhances flexibility of scale without affecting the statistical properties of the scores. The results of the regression analysis are given in Table 4.22. Hypotheses are considered supported when path coefficient (β) are significant with a p-value of less than 0.05 level.

Hypothesis	Dependent Variable	Independent Variable	β	t-value	p-value
H1	Internet Banking Use	Perceived Usefulness	.422	7.560	.000
H2a	Internet Banking Use	Perceived Ease of Use	.371	6.497	.000
H2b	Perceived Usefulness	Perceived Ease of Use	.698	15.821	.000
H3	Internet Banking Use	Consumer Awareness	.246	4.124	.000
H4	Internet Banking Use	Consumer Security Concerns	-.186	-3.083	.002
H5	Internet Banking Use	Quality of Facilities	.286	4.855	.000
H6	Internet Banking Use	Subjective Norms	.231	3.861	.000
H7	Internet Banking Use	Trust & Privacy	.303	5.172	.000

Table 4.22: Results of Hypotheses Testing (Regression Analysis)

4.3.1 Discussion of hypothesis testing

Hypothesis H1, that *Perceived Usefulness (PU)* has a positive effect on the customer acceptance of online banking is accepted ($\beta = .422$, $t = 7.560$ and $p < .001$). The result is expected and is a confirmation of Technology Acceptance Model postulate (Davis, 1989). Previous studies on internet banking also came with same findings (Pikkarainnes et al., 2004, Chan, 2001, Tan & Leo, 2000). It means

that if a customer perceives internet banking as a useful service then he/she could start using it more.

Hypothesis 2a, that *Perceived Ease of Use (PEOU)* has a positive effect on the customer acceptance of online banking is accepted ($\beta = .371$, $t = 6.497$ and $p < .001$). Again this result confirms that TAM model could be used to explain internet banking adoption among customers. From a practical viewpoint we could expect adoption of internet banking to increase when more and more customers feel that it is easy to use.

Hypothesis 2b, that *Perceived Ease of Use (PEOU)* has a positive effect on the perceived usefulness of online banking is accepted ($\beta = .698$, $t = 15.821$ and $p < .001$). This hypothesis was framed to test the postulate of TAM model and expected it was found supporting. Therefore, the perception of ease of use of internet banking service should increase perception of usefulness among customers which in turn should result more usage of the service.

Hypothesis 3, that *Perceived consumer awareness (CA)* has a positive effect on the customer acceptance of online banking is accepted ($\beta = .246$, $t = 4.124$ and $p < .001$). The awareness level of precautions to be taken while conducting internet banking

transactions was found to be high among the survey respondents. The relationship between the variables are positive indicating that when consumers are aware of the precaution to be taken while doing internet banking transactions they will be inclined to accept that banking channel.

Hypothesis 4, that Perceived consumer security concerns (SC) has a negative effect on the customer acceptance of online banking is accepted ($\beta = -.186$, $t = -3.083$ and $p < .002$). The negative relationship between the variables Internet Banking Use and Consumer Security Concerns indicates that concerns about security of internet banking services are hampering acceptance of that channel among customers.

Hypothesis 5, *Perceived quality of facilities for accessing bank site has a positive effect on the customer acceptance of online banking* is accepted ($\beta = .286$, $t = 4.855$ and $p < .001$). Confirmation of this hypothesis holds great significance in the context of developing countries like India. Acceptance of internet banking among Indian customers is bound to increase when the quality of infrastructure in the country is improved.

Hypothesis 6, that *The beliefs associated with subjective norms are significantly related to an individual's intention to adopt Internet banking* is accepted ($\beta = .231$, $t = 3.861$ and $p < .001$). This hypothesis is based on the construct of the Theory of Reasoned Action (TRA) (Fishbein and Ajzen, 1975). Hypothesis is found to be supporting indicating that customers are influenced by their peer group while taking decisions on adopting new technology like internet banking. As the number of people using this channel increase they could influence their friends or relatives in adopting internet banking.

Hypothesis 7, that *Perceived trust and privacy on the bank has a positive effect on the customer acceptance of online banking* is accepted ($\beta = .303$, $t = 5.172$ and $p < .001$). Trust is an important factor affecting any product or service (Gefen et al., 2003, Gefen, 2002). Customers tend to accept internet banking more when they trust their bank and have full confidence in their internet banking infrastructure.

4.4 Research Model Testing

The research model proposed by the study was tested using multiple regression analysis. Multiple regression analysis gives the

amount of variance (R^2) accounted for in the dependent variable from a set of independent variables. To test the research model all the developed constructs were taken as independent variables and was regressed with *Internet Banking Use* as dependent variable. Table 4.23 presents the results of the multiple regression analysis. The Variance Inflation Factor (VIF) of independent variables is in the range of 1.526 to 3.267 indicating non-presence of multicollinearity among the independent variables (Kleinbaum et al., 1988) (Table 4.23). Overall research model is statistically significant ($F= 10.264$ and $p < 0.001$) and all the independent variables together explain for 21.8% ($R^2 = 0.218$) variance on the dependent variable (*Internet Banking Use*). But out of the independent variables β coefficient of only *Perceived Usefulness* ($\beta = 0.290$, $t= 2.915$, $p = 0.004$) and *Consumer Security Concerns* ($\beta = -0.197$, $t = -3.290$, $p < .001$) are found to be statistically significant. The significant levels of other five independent variables are higher than the accepted level of $p < .005$. The β coefficient of five variables *Perceived Usefulness*, *Perceived Ease of Use*, *Consumer Awareness*, *Quality of Facilities* and *Subjective Norms* are found to be positive showing that they help acceptance of dependent variable *Internet Baking Use*. On the other hand, β coefficient of two

variables *Consumer Security Concerns* and *Trust and Privacy* are found to be negative indicating that these factors hinder acceptance of dependent variable *Internet Banking Use*. It is observed that effect of only *Perceived Usefulness* and *Consumer Security Concerns* variables in acceptance of internet banking could be statistically proved. Out of this effect of factor *Perceived Usefulness* is positive which is expected on the basis of Technology Acceptance Model postulates, customers would consider acceptance of internet banking channel if they find it as a *useful* service. Similarly, effect of factor *Consumer Security Concern* is negative indicating that customers are not using internet banking channel due to concerns regarding security of that channel. Even though the effect of other factors can not be statistically defended, the regression analysis results help in gaining insights into the influence and direction of effect they put on dependent variable internet banking usage. Full model fitting of such complex research model is not practical using first generation technique like multiple regression analysis in real world scenario. Therefore the results of multiple regression analysis could be taken as an indicator of relationship between the factors proposed in the research model

and how they influence the intension to use internet banking service.

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
.467(a)	.218	.197	1.390

a Predictors: (Constant), TP, SC, CA, SN, QF, PEOU, PU

ANOVA(b)

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	138.765	7	19.824	10.264	.000(a)
Residual	498.273	258	1.931		
Total	637.038	265			

a Predictors: (Constant), TP, SC, CA, SN, QF, PEOU, PU

b Dependent Variable: IBU

Coefficients (a)

	Unstandardized Coefficients		Standardized Coefficients B	T	Sig.	Collinearity Statistics	
	B	Std. Error				Tolerance	VIF
(Constant)	-1.289	.592		-2.178	.030		
PU	.403	.138	.290	2.915	.004	.306	3.267
PEOU	.113	.126	.088	.893	.373	.314	3.189
CA	.078	.100	.058	.778	.437	.550	1.819
SC	-.292	.089	-.197	-3.290	.001	.846	1.182
QF	.031	.091	.025	.345	.730	.560	1.784
SN	.072	.080	.061	.892	.373	.655	1.526
TP	-.040	.104	-.031	-.382	.703	.463	2.159

a Dependent Variable: IBU

Table 4.23: Research Model Testing (Multiple Regression Analysis)

4.5 Summary

In this chapter the data collected in the survey is presented and analyzed in the beginning. Before undertaking statistical analysis of data, validity of the survey instrument was tested using widely accepted techniques. Reliability of the survey instrument was tested by calculating the Cronbach's alpha for each research construct. Even though the Cronbach's alpha coefficient of every variable was above 0.70 without dropping any item, the researcher decided to drop 5 items for the survey instrument to improve the

alpha coefficient to above 0.80. The construct validity of survey instrument was tested by performing a Factor analysis using Principal Component Analysis method. Factor analysis produced satisfactory results, when 9 factors were extracted out of the factor analysis. After confirming construct validity, hypotheses formulated were tested using linear regression analysis. All the seven hypotheses developed were found to be supportive. Finally, to test the research model multiple regression analysis was conducted. Results of multiple regression analysis confirmed the existence of statistically significant effect of variables *Perceived Usefulness* and *Consumer Security Concerns* on *Internet Banking Use*. The results also showed the effect of other variables in the dependent variable.