DETERMINANTS OF INTERNET BANKING ADOPTION: AN EMPIRICAL EVIDENCES FROM INDIAN BANKING

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ABSTRACT

The objective of this study is to identify and understand the attitudinal, behavioural, cost, service quality and awareness factors that are significant in explaining intentions to adopt Internet banking services in India. This empirical investigation was undertaken through customers' survey to scrutinize that which factors are more important in adoption of internet banking in India. The modified scale was developed based on conceptual model of Internet Banking Acceptance to test hypothesis under study. Results of the study shows that, demographic characteristics, internet access, awareness, customer education, cost effectiveness and service quality were most important factors in adoption of internet banking.

Keywords: Adoption, Internet Banking, Awareness, Access, Cost Effectiveness, Customer Education, Service quality.

Introduction:

Advances in electronic banking technology have created new ways of handling banking transactions, especially via the online banking channel. A feature of the banking industry across the globe has been that it is increasingly becoming turbulent and competitive, characterized by an increasing trend towards internationalization, mergers, takeovers and consolidation of the banking industry (Kesseven et al , 2007). With the advancement of science and technology the modern businesses and service providers adopting technology to provided better products and services to their customers. Similarly, the banking industry also changed according to need of hours in the electronic era and almost all banks in the world including developing countries are adopting technological innovation in banking. Even, some banks from developed countries have implementing branchless banking system using virtual banking technology. Virtual banking is an e-banking model in which bank operates without the presence of physical branches. Basically virtual banking includes all non-traditional and electronic means of banking such as ATM, internet banking (IB), mobile banking, banking through credit cards and debit cards etc. However, in recent day's internet banking becoming more popular service because of it utility and connivance. Although, many researchers proved that, user group of the internet banking is very limited to highly educated, high income group peoples, businessmen, professional, service quality, availability of internet connectivity, cost effectiveness, awareness etc. Therefore, the present study was tried to find out major determinates of the internet banking adoption in Indian banking context.

1. Theoretical Base:

Various researchers have developed theories relating to technology adoption. Fishbein and Ajzen (1975) developed the Theory of Reasoned Action (TRA) in 1975 and postulated that an individual's behavioural intention is the immediate determinant of behaviour. Thereafter, Ajzen (1991) refined the TRA approach and presented new approach as 'The Theory of Planned Behaviour (TPB)' and mentioned that Perceived Behavioural Control is also one of the important construct to determine technology adoption behaviour. In 1990s, Davis (1986) has developed Technology Acceptance Model (TAM) which is most cited model; he argued that there is causal links between perceived usefulness, perceived ease of use, attitude towards using technology and technology adoption. However, Rogers (1995) mentioned that, adoption of technology is social acceptance process and background for technology acceptance can be created by social system through communication. Rogers describes five innovation attributes that help explain innovation adoption i.e. 'relative advantage, compatibility, complexity, trialability; and observability. However, Konana and Balasubramanian, (2005) identified a holistic framework incorporating complex social, psychological and economic elements as additional constructs that may be influential in internet service adoption.

2. Factors influencing the adoption of internet banking: A Review:

The literature suggests a number of factors that could enable or inhibit the adoption of information technology. Related literature evidenced that, the use of the internet as a new alternative channel for the distribution of financial services. Application of internet has become a competitive necessity instead of just a way to achieve competitive advantage with the advent of globalization and fiercer competition Gan et. al.(2006).

i. Demographic Characteristics:

Many studies have investigated the effects of the customers' demographic characteristics such as age, gender and educational level on their attitude towards different banking technologies and individual acceptance of new technology (Al-Somali et al 2008). Sohail and Shanmugham (2004) mentioned that

age, educational qualification, accessibility to the Internet, awareness of E-banking and customers' resistance to change were significantly affecting on adoption of e-banking in Malaysia. Gan et. al. (2006) mentioned that demographic variables (age, gender, marital status, ethnic background, educational qualification, employment, income, and area of residence) influence consumer decision making process in adoption of e-banking. Burke, (2002) concluded that there is a significant difference between the males and females in using various types of technology.

ii. Customer Education and Awareness:

Al-Alawi (2005) reported that the adoption of Online Banking influenced by many factors in Bahrain banking system, like ***age of customer, security concerns, willing to adopt online banking***, however, ***guidance*** for using IB is one of the important factor in adoption of IB. Li and Zhong (2005) studied the current trends in the Internet revolution that have set in motion in the Chinese banking sector and concluded that ***Internet accessibility, awareness, attitude towards change, ease of use and convenience*** are the major factors affecting the adoption of Internet bank services in China. Pikkarainen (2004) mentioned that ***information about using IB and its benefits*** influence the adoption of IB. Moreover, Sathye (1999) and Howcroft et al. (2002) posited that customers not to adopting IB due to ***low awareness*** of IB and Lichtenstein and Williamson (2006) mentioned that ***lack of internet confidence, inadequate knowledge and support*** are very important barrier in using internet banking

iii. Security and Assurance:

Mattila and Mattila (2005) claimed that security has been widely recognized as one of the main barriers to the adoption of IB in Finland and Khalfan et al. 2006 and Al-Sabbagh and Molla 2004 also mentioned that, security concerns have been one of the major issues in the e-banking adoption in the Omani banking industry. Abid and Noreen (2007) posited that Cash culture is still prevalent in Pakistan compared to the plastic money replacement that has been adopted in most of the developed countries. They also mentioned that the most important reasons are lack of trust, non-availability of infrastructure, security and service charges. Sathye (1999) mentioned that 73% of people avoided the adoption IB because they do not sure about safety and security of transactions over the internet and Al-Alawi (2005) also posited same arguments. Even many researchers argued that the lack of trust is a critical issue that needs addressing pertaining to the internet and E-commerce adoption.

iv. Service Quality:

Service quality of IB depends up on quality of banking service and quality of internet service provided by telecommunication department or service providers. Only banking institutions are not responsible for quality of IB services. Sathye (1999) mentioned that the quality of internet connection is also one of the more important factors in the adoption of IB. High quality of internet connection leads to adoption of IB. However, irregular and low speed internet connectivity adversely affects on adoption of IB. However, Parasuraman, Zeithaml & Malhotra in (2005) mentioned that efficiency fulfilment, system availability, privacy, responsiveness, compensation and contact are core dimensions of e-service quality. They provided E-S-QUAL and E-RecS-QUAL scales to assess service quality of e-services which is highly cited tool. Gan et. al. (2006) mentioned that service quality dimensions, perceived risk factors, user input factors, price factors and service product characteristics influence consumer decision making process in adoption of e-banking.

v. Cost Effectiveness:

Cost effectiveness is another important factor in the transition to the employment of online banking services; lower price for banking service and lower cost for internet access leads to adopting IB service. Generally customer are comparing new services with old one if they realized that the new service is more cost effective than old service they adopt new service. Li and Zhong (2005) mentioned that cost of computer and cost of internet access also one of the important aspects in adoption of internet banking services. Li & Worthington, (2004) and Sohail & Shanmugham, (2003) also posited that the cost of computers and internet connections are important elements in using IB. Zheng and Zhong (2005) also realized that costs for computer and internet access are major factors in adoption of IB. based on review and discussion so far have laid the foundation for the following null hypothesis:

H1= Demographics are not critical factors in adoption of internet banking (IB) services.
H2= There is no significant relationship between internet accessibility and adoption of IB
H3= There is no significant relationship between customers education and adoption of IB
H4= There is no significant relationship between **a**wareness and adoption of IB.
H5= There is no significant relationship between service quality of IB and adoption of IB
H6= There is no significant relationship between cost effectiveness of IB and adoption of IB

3. Conceptual Model of Internet Banking Acceptance:

Based on prior studies five important factors identified which influences adoption of internet banking. The framework postulates that a person's intention to adopt Internet banking is determined by five factors i.e. demographic factors, customer education and awareness, security and assurance, service quality and cost effectiveness (Figure 1). These dimensions includes i) demographic characteristics – gender, age, education, profession and level of income and area of residence. ii) Service quality dimensions- service availability, service fulfilment, innovativeness, perceived risk factor and easy to use. iii) Cost effectiveness- cost of PC/Cell phone, cost of internet access, cost of SMS/WAP/GPRS/3G service, service charges. iv) Awareness- awareness of internet, internet banking (IB), mobile banking, ATM service, use of credit card and debit card, POS terminals.

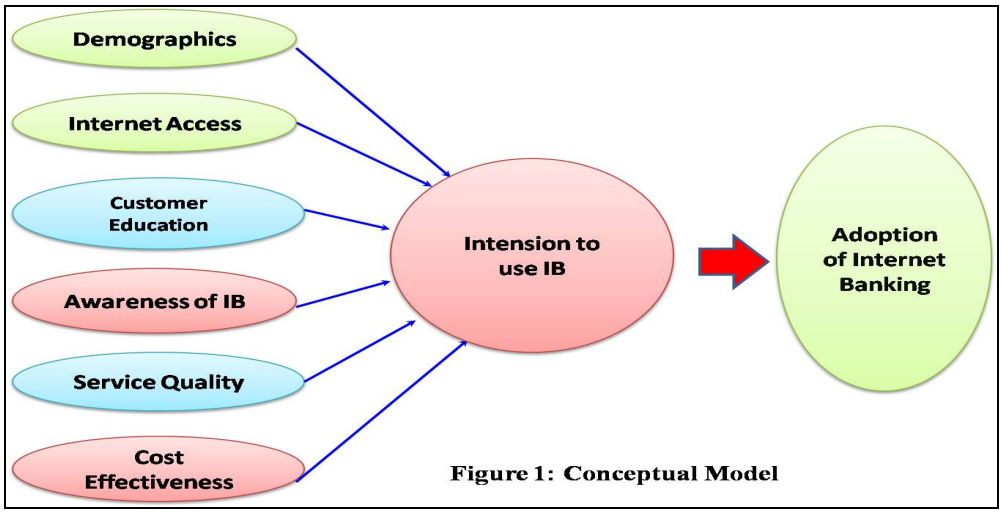


Figure 1: Conceptual Model

4. Data Collection and Analysis:

Data for this analysis was obtained through a customer survey of 250 respondents of public and private sector banks in Satara and Kolhapur city of Maharashtra. The respondents were selected using convenience and judgmental sampling method through vesting branches and prior discussion with branch

managers about major user group of e-banking services. Only existing e-bank customers were covered in this study. Branch visits were arranged different time of different days for avoid time bios. Required data were collected through questionnaire (Appendix-I) as well as short interview of the respondents. The questionnaire gathered information regarding demographic characteristics of the respondents and consumers' perception and view regarding to various aspects which influence decision to adopt internet banking. The questions were phrased in the form of statements scored on a 5-point Likert-type scale, where 1 = "strongly disagree," 3 = "neither disagree nor agree," 4 = 5 = "agree." and 5 = "strongly agree."

Prior final survey, pilot survey of 50 customers was conducted in Kolhapur city and checked internal reliability of the item used in the questionnaire. Each construct were tested for reliability by using a Cronbach's Alpha value of 0.70 as the cut-off point and only those items were selected which having Cronbach's Alpha value of 0.70 or more other items were eliminated from the scale. Final empirical data was collected through final survey and was analysed using Kruskal Wallis test, principal component analysis (PCA) with Varimax rotation method and person multiple correlations through SPSS 19.

5. Demographics and use of IB:

Table 1 shows descriptive information regarding to demographics of the respondents. It indicates that, about 88% are male users, 56% are customers of public sector banks, most of users were age group of below 25 years to 35 years, most of users are residing and working in the offices located about 3 to 5 and more than 5 kilometres from bank branches. Table 1 also shows that, most of users are belongs to 1 lakh to 8 lakh of annual income group and employees, businessmen and self employed. Most important fact relating to internet banking users was found in this data, there were only 22% users are fully IT Literate, 48.6% were semi IT Literate and 29.4% are not IT Literate properly but they are using internet banking services.

Table 1: Descriptive Statistics

Gender	**Frequency**	**Percent**	**Banks**	**Frequency**	**Percent**
Female	32	12.5	Public Banks	142	55.7
Male	223	87.5	Private Banks	113	44.3
Total	**255**	**100.0**	**Total**	**255**	**100.0**
Age Groups			**Education**		
Below 25	66	25.9	< High School	8	3.1
25-35	96	37.6	High School	11	4.3
36-50	73	28.6	Graduate	135	52.9
51-60	20	7.8	Post Graduate	101	39.6
Total	**255**	**100.0**	**Total**	**255**	**100.0**
Distance from Residence			**Distance from Office**		
1-3 Km	59	23.1	1-3 Km	68	26.7
3-5 Km	92	36.1	3-5 Km	80	31.4
> 5 Km	104	40.8	> 5 Km	107	42.0
Total	**255**	**100.0**	**Total**	**255**	**100.0**
Annual Income			**Profession**		
Dependents	5	2.0	Employee	66	25.9
<1 Lakh	65	25.5	Businessman	80	31.4
1 to 3 Lakh	48	18.8	Retired	8	3.1
3 to 8 Lakh	95	37.3	Student	23	9.0
8 to 15 Lakh	28	11.0	Self Employed	78	30.6
> 25 Lakh	14	1.5	**Total**	**255**	**100.0**

Total	**255**	**100.0**			
Level of IT Literacy					
Not IT Literate	75	29.4	Fully IT Literate	56	22.0
Semi IT Literate	124	48.6	**Total**	**255**	**100.0**

6. Reliability Statistics:

In the scale purification process reliability testing is necessary part; therefore reliability test was performed for testing reliability of the scale and in order to prove the internal reliability of the items used in the scale. Internal consistency was estimated by using Cronbach's alpha (Nunnally, 1978). The method is the most common measure of scale for reliability testing (Nunnally and Bernstein, (1994) and Garson, (2002). Only those items was selected which have Cronbach's alpha at least 0.700 or more (Table 2).

Table 2: Reliability Statistics (Cronbach's alpha)

Construct	Customer Education	Awareness of Internet Banking	Service Quality of IB	Internet Access	Cost Effectiveness
Items	3	3	5	3	3
Alpha	.856	.958	.756	.711	.845

7. Impact of Demographics characteristics on Adoption of IB (Testing of H1):

Many empirical researches evidences that demographic characteristic of the customers were influences use of internet banking service in various countries (Gan et. al. 2006; Burke, 2002; Al-Somali et al 2008 and Sohail and Shanmugham, 2004). Table3 reveals that use of internet banking varies by gender (χ = 4.428 df=1 sing.= 0.019) , age group wise (χ = 8.717 df=3 sing.= 0.049), educational level wise (χ = 7.980 df=3 sing.= 0.046), Annual Income wise (χ = 8.235 df=4 sing.= 0.032), profession wise (χ = 9.995 df=3 sing.= 0.040), distance from workplace (χ = 10.021 df=3 sing.= 0.047), and level of IT literacy (χ = 9.697 df=3 sing.= 0.024). However, Kruskal Wallis test shows that distance from residence not affects use of internet banking (χ = 8.335 df =3 sing. = 0.144). The present research also (Table 2) shows that gender, age, level of education, level of income, profession, level of IT literacy and distance of bank branch from office are important demographic factor which influencing adopting of internet banking. However, this data indicates that distance of bank branch from residence was not influencing adoption of internet banking.

H1(null) - Use of internet banking is not differed based on demographic characteristics of the user.
H1(alt) - Use of internet banking is differing based on demographic characteristics of the user.

Table 3: Test Statistics (Kruskal Wallis test) (N=255)

		Chi-Square	df	Sig.	Table Values	Decision
H1a	Gender	4.428	1	0.019	3.841	Reject Null
H1b	Age Groups	8.717	3	0.049	7.815	Reject Null
H1c	Education	7.98	3	0.046	7.815	Reject Null
H1d	Annual Income	8.235	4	0.032	9.488	Reject Null
H1e	Profession	9.995	4	0.040	9.488	Reject Null
H1f	Distance from Residence	8.355	4	0.144	9.488	**Accept Null**
H1g	Distance from Workplace	10.021	4	0.047	9.488	Reject Null
H1h	IT literacy	9.697	4	0.024	11.07	Reject Null
Test Variable: Use of Internet Banking						

8. Principal Component Analysis:

Before the principal component analysis Kaiser-Meyer-Olkin Measure of Sampling Adequacy and Bartlett's Test of Sphericity were performed through the SPSS. The K-M-O test and Bartlett's Test of Sphericity found that all extractions value are as per the expected values, therefore all items were used to further analysis. Item communalities also found good in the data set. Item communalities are considered "high" if they are all .8 or greater (Velicer and Fava, 1998) although this is unlikely to occur in the social sciences therefore low to moderate communalities of more than .50 is acceptable.

Table 4: KMO and Bartlett's Test

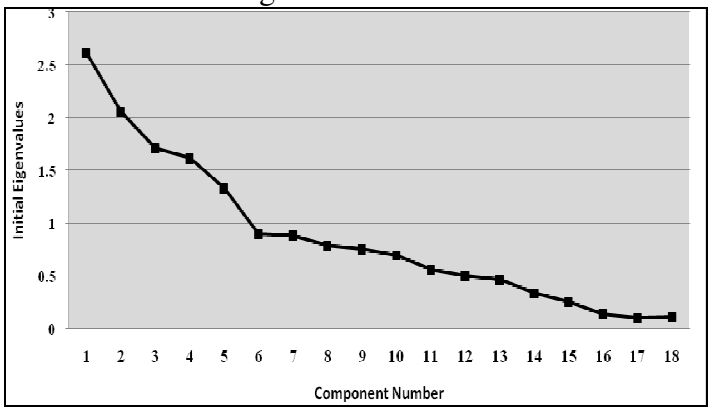
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.855
Bartlett's Test of Sphericity	Approx. Chi-Square	1757.007
	df	153
	Sig.	.000

Table 4 indicates (K-M-O test is significant because test value is greater than .700 at .855) and Bartlett's Test of Sphericity also found significant $\chi = 1757.007$ df= 153 $P < .001$.) it indicates that the data set was adequate to perform factor analysis. In the process of factor analysis of the scale, the *Varimax Rotation* technique was employed to examine the obtained factors and all items with loadings above .40.

Table 5: Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.912	43.956	43.956	2.617	25.396	25.396	2.021	24.396	24.396
2	2.121	11.783	55.739	2.059	17.112	42.508	1.873	16.912	41.308
3	1.791	9.948	65.687	1.711	13.067	55.575	1.664	14.067	55.375
4	1.323	7.350	73.037	1.616	11.606	67.181	1.652	11.906	67.281
5	1.299	4.996	78.034	1.335	10.851	78.032	1.623	10.725	78.006
6	.978	3.767	81.800						
7	.815	3.418	85.218						
8	.769	2.608	87.826						
9	.724	2.358	90.183						
10	.581	2.116	92.299						
11	.439	1.881	94.180						
12	.336	1.311	95.491						
13	.379	.996	96.486						
14	.249	.826	97.312						
15	.143	.795	98.107						
16	.131	.730	98.837						
17	.109	.608	99.445						

Figure 2 Scree Plot



18	.100	.555	100.000
Extraction Method: Principal Component Analysis.			

Table 5, labelled "Total Variance Explained," shows total variance of the observed variables is explained by each of the principal components. The first principal component explains the largest part of the total variance, this account to 24.39% of the total variance, second component explains 16.91% of the total variance, third component explains 14.06% of the total variance, fourth component explains 11.90% of the total variance and fifth component explains 10.72% of the total variance. A component that displays an eigenvalue greater than 1.00 is accounting for a greater amount of variance therefore, only those components are considered as principal components which having eigenvalue greater than 1.00. Here, first five components having eigenvalue more than 1.0 explains 78% of the total variance and remaining components explains 12% of the total variance. Figure 2 demonstrates this distribution of variance among the components graphically. Downward slope after the third or fourth principal component implying that out of eighteen variables by the first three or four are principal components.

Table 6 rotated solutions is shows rescaled factor loadings (correlations) to evaluate which variables load on each factor. Which indicates that, Customers Education was first factor (loading -.767, .783 and .628), Awareness of IB was second factor (loading .779, .845 and -.492), Service quality was tried factor (loading .748, .676, .825, .869 and .620), Internet Access was fourth factor (loading -.812, .841 and .689) and cost effectiveness was fifth factor (loading .790, .796 and .771)

Table 6: Rotated Component Matrix[a]

	Component					**Labeled as**
	1	2	3	4	5	
Education1	-.767					**Customer Education**
Education2	.783					
Education3	.628					
Awareness 1		.779				**Awareness of Internet Banking (IB)**
Awareness 2		.845				
Awareness 3		-.492				
Convenience			.748			**Service Quality of IB**
Fulfillment			.676			
Assurance			.825			
Easy to Use			.869			
Efficiency			.620			
Accessibility				-.812		**Internet Access**
Regularity				.841		
Speed				.689		
Hardware Cost					.790	**Cost Effectiveness**
Cost of Internet Access					.796	
Saving in Expenses					.771	
% of Variance	**24.396**	**16.912**	**14.067**	**11.906**	**10.725**	
Cumulative %	**24.396**	**41.308**	**55.375**	**67.281**	**78.006**	
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.						

9. Testing Hypothesis (H2 to H6):

Pearson Correlation test was performed to test hypothesis under the study. The Table 7 shows that all five factors are significantly correlated with use adoption of internet banking. It reveals that Internet Access (r= .780 p< .050), Awareness of IB (r= .705 p< .050), Customers Education (r= .726 p< .050), Cost Effectiveness of IB (r= .685 p< .050) and Service Quality of IB (r= .564 p< .050) are significantly correlated with use adoption of internet banking. Hence, this data set leads to accept H2, H3, H4, H5 and H6.

Table 7: Correlations (Pearson Correlation)

		Use of IB	Internet Access	Awareness	Customer Education	Cost Effectiveness	SQ
Use of IB	*r*	1	.780*	.705*	.726*	.685**	.564**
	Sig.		.001	.009	.008	.023	.031
	N	255	255	255	255	255	255
Results of Hypothesis Testing		**Accepted**	**Accepted**	**Accepted**	**Accepted**	**Accepted**	**Accepted**

*. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).

10. Policy Implications and Concluding Remarks:

The present study reveals that demographic characteristics are more important in adoption of internet banking service therefore banks needs to develop their intent banking services according to demographic characteristic and the needs of the possible customers as well existing customers for retain them and encourage to more use to internet banking services. This study also proved that, customers' education for using internet banking and their awareness regarding to internet banking should be increased. Because, these two aspects are more important in increase the level of adoption of internet banking in India. This study realized that, accessibility of internet and cost of hardware and internet connectivity also plays important role in internet banking adoption. Hence, the ministry of telecommunication and telecommunication service providers should think over it and try to reduce cost of internet access and hardware producing firms for reducing cost of Personal computers and laptop also, because, if PC/laptop and internet connectivity in chip price and regularly and good speed of internet connectivity with lowest price adoption of internet banking will be increase in India. However, it is note that only low cost of hardware and internet connectivity can't leads adoption of intent banking; banks should provide better quality of internet banking services to their customers.

Appendix-I

	Demographics	Gender, Age, Education, Annual Income, Profession, Distance from Residence, Distance from Workplace, Level of IT literacy
1	**Access**	Internet facilities are available easily at home, cyber café, office or workplace
2	**Regularity**	Internet connectivity is available regularly
3	**Speed**	Speed of internet connectivity is enough to perform internet banking
4	**Aware1**	I know what the benefits of internet banking are

5	**Aware2**	I know how to use internet banking service securely
6	**Aware3**	I feel that IT Act 2001 is enough to protect my bank account from frauds
7	**Aware4**	I have full confidence about using internet banking service
8	**Edu1**	Required information regarding internet banking is available in information broachers
9	**Edu2**	Bank employee provides all essential information regarding internet banking
10	**Edu3**	Online information regarding using internet banking services is available on website
11	**Hardware Cost**	I feel that cost of PC/Laptop is one of the barriers in using internet banking
12	**Cost for Access**	Cost of internet service reducing cost effectiveness of internet banking
13	**Saving**	Internet banking saves my money needed to visit bank branch
14	**Convenience**	I choose to use online banking because of the convenience.
15	**Fulfillment**	Internet banking allows you to perform all required banking transactions online
16	**Assurance**	I feel confident that any of my information or details would be secure and safe
17	**Easiness**	Internet banking makes it easier for me to conduct my banking transactions
18	**Efficiency**	Internet banking allows me to manage my finances more efficiently

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