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ELECTRONIC BANKING ADOPTION: WHAT ROLE DOES TECHNOLOGY ACTUALLY PLAY?

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In this information driven business domain, banks are adopting Information Technology (IT) to reap strategic as well as operational benefits. However, the extent of IT adoption may vary among banks. This paper intends to examine the adoption pattern of IT in providing informational, transactional and relationship building banking services by banking industry in India. The results reveal that banks are aggressively providing informational and transactional services, but they lack somewhere in maintaining relationship with the customers through electronic media. The banks have successfully replicated and improved traditional banking services over electronic media but they have yet to exploit full potential of IT in terms of new or advanced services.

Keywords: Electronic Banking, Technology, Customer Services, India

INTRODUCTION

Being personalised and informational service oriented industry, banks' primary aim is creation, maintenance, and satisfaction of customer-needed service (Bhattacharyay and Ghose, 1989). Although there is no panacea to stay competitive in this customer centric business of banks, e-banking as financial innovation (Liao and Chung, 2002; Stamoulis et al., 2002) has transformed banking institutions in many ways. They organize financial product development, delivery, and marketing via the Internet (Wu et al., 2006) loosening time-and-space restrictions or increasing just in time nature of banking services (Litch and Moch, 1999). E-Banking is a system that provides an electronic linkage enabling banks to offer their customers access to their respective accounts and the bank itself to prepare, manage, and control financial transactions through transferring information (Daniel, 1999; Pikkarainen et al., 2004). Electronic service delivery is based on interactive information flow between customers and service providers (Li and Suomi, 2007).

The success and effectiveness of any Information and Communication Technology (ICT) solution depends upon the way it is implemented or adopted (Berger, 2003). Adoption of ICT at the organizational level is a highly strategic decision that may result in multitude of financial innovations (Prescott and Van Slyke, 1997). However, the level of dependence on Information Systems (IS) and the potential for using IS for strategic purposes vary among organizations (McFarlan; McKenny and Pyburn, 1983). The environment within which banks operate is so turbulent that it may provide many opportunities as well as challenges for ICT adoption by the banking institutions. For instance, in India, with the entering of foreign banks along with innovative and world class services, there is increased level of sophistication among Indian customers and dire need for service quality. To face the challenge or exploit the opportunity created by the demands of customers for electronic services in the presence of global competition, the banking community is most likely to re-engineer its traditional business operations including its basic retail banking activities.

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REVIEW OF LITERATURE

With the diffusion of IT in the banking industry, technological leverage in terms of strategic and operational benefits has been asserted by numerous analysts all over the world (e.g., Buzzacchi et al., 1995; Dannenberg and Kellner, 1998; Berger, 2003; Kshirsagar 2003; Kumra and Mittal, 2004; Malhotra and Singh, 2007; and Rajput and Gupta, 2011).

Strategically, web based banking is essential for the banks to retain customers as well as its adoption gives the impression of a cutting edge bank to the public enhancing its reputation (Nath et al., 2001). Dannenberg and Kellner (1998) contended how internet can be used to cater the personalized financial needs of the customers while cutting down the competition. Operationally, e-Banking offers significant cost advantage to the banks (Prescott and Slyke, 1997; Jayawardhena and Foley, 2000; and Nitsure 2003). There are both supply-side and demand-side economies of scale that further strengthen each other in the network economy (Lee 2001). Moreover, banks are benefitted through the use of e-banking as it improves service quality and helps banks in diversifying their activities (Nath et al., 2001).

In the information defined area formally called as 'marketspace' (Rayport and Sviokla, 1995), the companies apply generic value adding activities to the virtual value chains. Companies generally apply information processes in three stages: visibility-ability to see physical operations more effectively through information, mirroring capability- substitute virtual activities for physical ones, and building new customer relationships. Basically, the banks provide services falling in three categories: Informational, Transactional, and Relationship support, each with varying level of sophistication (basic, intermediate, and advanced) as proposed by Diniz (1998). These levels are based on the interactivity of the service tool. At basic level, only traditional services are replicated on the electronic channel. At intermediate level, certain features of Information Technology (IT) are used to improve traditional services. However, at advanced level, business transformations occur through exploiting the possible advantages of IT and web. Customer relationship has been considered as an important dimension of IT adoption as Strategic IT deployment is essential for organizations to survive in this relationship centric culture to meet the needs of each individual relationship asset (Rayport and Sviokla, 1994, 1995; Chen and Ching, 2007; Sharma, 2012).

Organizations may employ technology in number of ways in the service encounter. As suggested by Froehle and Roth (2004), the different archetypes of technology's role in the customer interaction may be assistance, facilitation, mediation or service generation. These archetypes may represent different levels of technology use with service generation as the most technology intensive situation (Froehle, 2006). A bank adopts advanced technologies so that it can react to external and internal pressures posing critical challenges to its growth and survivability (Aladwani 2001). Consequently, the banks are providing e-banking services at varied levels of content, capability, and sophistication (Salehi and Alipour, 2010). Moreover, there are various regulatory, market, technological and organizational characteristics that determine the firm's adoption of new technologies (Hannan and McDowell, 1984; Teo et al., 1998; Daniel, 1999; and Corrocher, 2002).

The interplay of characteristics of demand has an immense bearing on the technology diffusion in banking and in shaping the banks behaviour towards e-banking inducements (Buzzacchi et al, 1995). However, customer usage of such e-services has some bearing on e-adoption patterns of banks (Agarwal and Prasad, 1998; Kumra and Mittal, 2004). Accordingly, the banks forecast and estimate the potential demand in terms of customers' ability and willingness to use technological services (Walker et al., 2002). In line with this, banks are getting engaged in IT strategic planning to create and maintain quality customer service that is consistent with their requirements (Bhattacharyay and Ghose, 1989; Walker and Cheung, 1998; Aladwani, 2001; Nath et al., 2001; and Rawani and Gupta, 2002).

OBJECTIVES OF THE STUDY

The competitive advantage of the banks through

electronic channels resides on the services provided but not the attraction of the medium employed (Furst et al., 2002). On reviewing the extant literature in the context of ICT in banking, a need was felt to explore the role played by technology in banking as being adopted and employed by banks in India. The specific objective of this study is:

- To determine the e-adoption pattern as prevailing in the Indian banking industry in terms of extent and content of e-banking services.

RESEARCH METHODOLOGY

For the aforesaid purpose a sample of 10 private and 10 public scheduled commercial banks was taken from three cities of Punjab i.e. Amritsar, Jalandhar, and Ludhiana. The banks were selected on the basis of maximum profitability (based on RBI publications, 2012) in India. As the objective of the study is to examine adoption patterns of e-banking services by banks, it is generally assumed and claimed by many researchers that there is positive relationship between e-adoption and profitability. In order to reduce this influence, 10 most profitable banks were selected from two categories of banks viz. public and private sector banks. IT manager (where available) or the senior most bank manager was approached for each bank. Secondary sources like bank websites, RBI publications, printed bank material, newspapers, etc. were also explored to get authentic information. The study is based on primary data that were collected from the selected respondents directly by administering a structured questionnaire, which was pre-tested to check its construct and content validity.

Bank size in terms of assets has been reported to be major determinant of technology adoption (Buzzacchi et al. 1995, Furst et al., 2000, and DeYoung et al., 2007). To examine the influence of bank size on bank adoption and offering of new technologies, the sampled banks have been classified on the basis of relative asset size. The classification slabs are only for comparison purpose, there are no industry defined asset slabs for bank size. Regarding the distribution of banks sample on the basis of size, 30% are banks with assets greater than 3 trillion, 35% are somewhere in between 3 trillion and 1 trillion and 35% of them with assets lower than 1 trillion.

For the purpose for classifying e-banking services, Diniz (1998) model has been employed with three levels based on the interactivity of the service tool with some modifications to fit in the Indian banking system as shown in Table 1. This framework has been constructed to capture e-adoption pattern in terms of both content and extent of these services. For filling this framework with complete list of e-banking services, secondary data (websites of different banks) as well as suggestions of experts under pilot study have been used. A scale (refer annexure) had been developed (having Cronbach's Alpha of 0.894) with 57 items as services offered by banks in the Indian Banking industry.

Table 1. Basic Framework For Classification of Banking Services

Informational delivery
Basic (Incremental)
Intermediate (Improvement)
Advanced (Transformation)
Transaction
Basic (Incremental)
Intermediate (Improvement)
Advanced (Transformation)
Customer Relationship
Basic (Incremental)
Intermediate (Improvement)
Advanced (Transformation)

Source: Diniz (1998)

Before applying statistical method for analysis (t-test), the data was examined for normality and homogeneity of variances, while Kolmogorov-Smirnov test and Shapiro Wilk have been used to check normality, Levene's test has been employed to check the assumption of homogeneity of variances. The tests indicated a normal distribution with homogeneity of variance. The independent sample t-test procedure has been used to examine the significance of the difference between two sample means (for two groups of banks: private and public) reflecting adoption pattern assuming the variable data to be normally distributed and homogeneity of variances.

RESULTS AND DISCUSSION

The provisioning of e-banking services by each selected bank was measured on the scale (3 for high, 2 for medium, 1 for low and 0 for not offered) and their weighted average scores were calculated for each e-service (given in annexure) and for each level of e-services (basic, intermediate and advanced) irrespective of categories as reported in table 2.

Table 2. Level Wise Average Scores of E-Banking Services Bank Group Wise

	Public	Private	All banks
Basic	2.23	2.39	2.31
Intermediate	1.97	2.12	2.05
Advanced	0.7	0.93	0.81
Overall	1.88	2.04	1.96

Source: Author's calculations based on primary data.

Table 2 documents that overall weighted average score of the e-banking services offered by all respondent banks is 1.96 which can be labelled as 'moderate level'. The basic as well as intermediate services are offered at higher level with the average scores of 2.31 and 2.05 respectively. However, advanced services which are altogether IT driven are offered by banks at lower level with average score of 0.81. Figure 1 shows the bank size wise representation of adoption pattern of e-banking services in terms of content (type) and extent (level). This table clearly reveals that even the bigger banks (assets > 3 trillion) don't have any differential adoption or provision of advanced services (refer figure 1).

It has been claimed by many researchers that private sector banks are very aggressive for IT adoption as compared to their public counterparts (Rawani and Gupta, 2002; Kumra and Mittal 2004; Mathur, 2007; and Alam et al., 2010). To check the existence of differences between public and private banks regarding adoption of e-services, further analysis has been conducted.

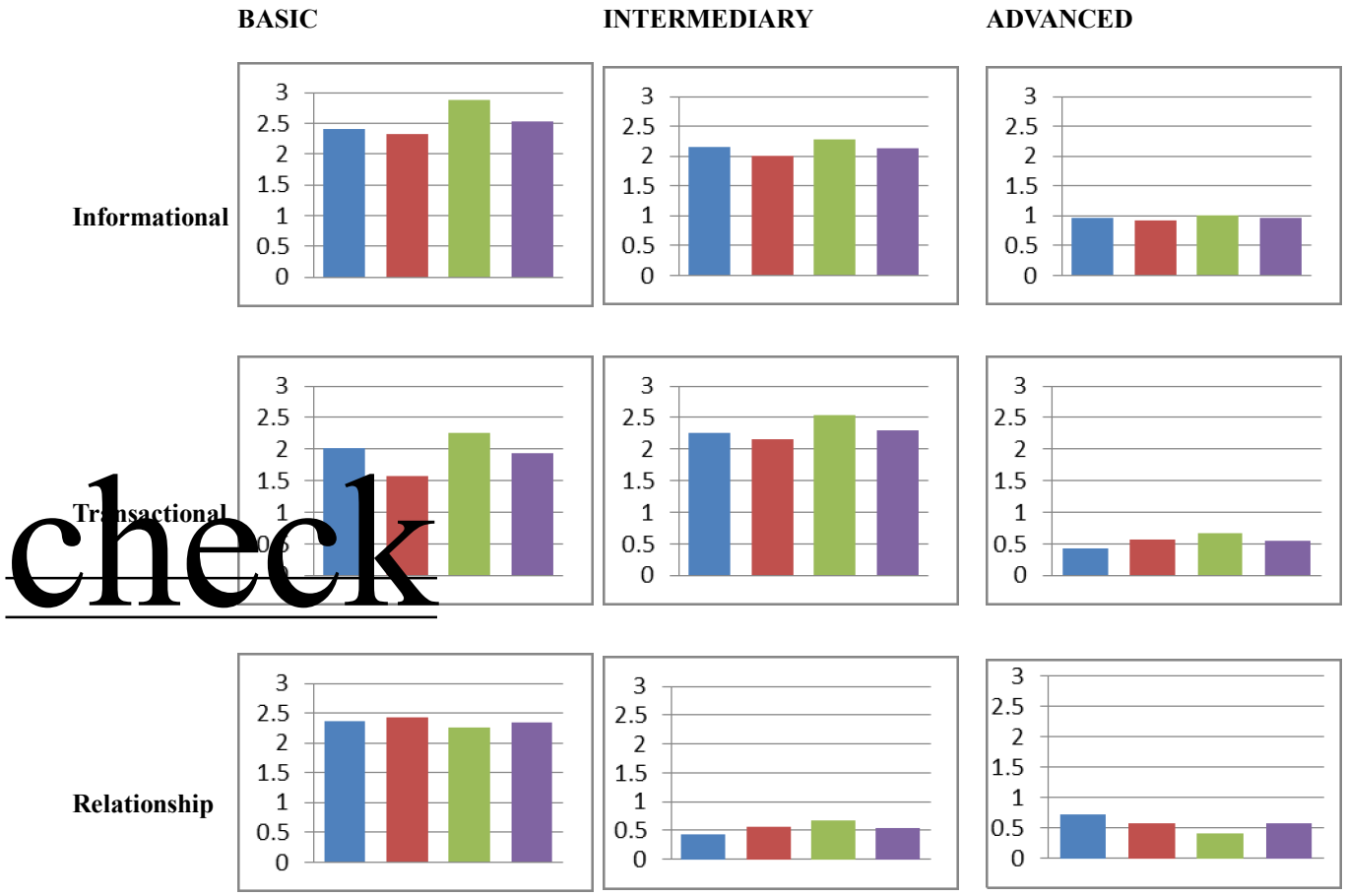
Results in table 2 indicates that the average scores of all electronic banking services are more for private sector banks. Despite different average scores for the private banks and public sector banks indicating different extent of services, the t-statistic values (Table 3) ($p > 0.05$) show that no statistically significant differences exist between the two categories of banks as so far as extent of e-banking services is concerned.

Table 3. Independent Samples Test Statistics

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Significance	t	Significance (2-tailed)
Basic	Equal variances assumed	1.390	.254	–.966	.347
Intermediate	Equal variances assumed	.114	.740	–1.002	.329
Advance	Equal variances assumed	.719	.408	–1.211	.242

Source: Author's calculations based on primary data

Figure 1. Distribution of Services Offered by Banks – Asset Wise



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All Sample **Assets > 3 trillion** **3 trillion < assets < 1 trillion** **Assets < 1trillion**

Source: Author's calculations based on primary and secondary data

Table 4. Category Wise and Level Wise Average Scores of E-Banking Services For The Two Bank Groups

				t-test for Equality of Means	
	Overall	Public	Private	T - statistic	Significance (2- tailed)
Informational	2.04	2.01	2.07	–.490	.630
Basic	2.53	2.59	2.47		
Intermediate	2.14	2.08	2.20		
Advanced	0.96	0.84	1.08		
Transactional	2.11	1.99	2.23	–1.272	.220
Basic	2.05	1.80	2.18		
Intermediate	2.24	2.19	2.19		
Advanced	0.55	0.40	0.70		
Customer Relationship	1.36	1.23	1.48	–1.569	.134
Basic	2.35	2.30	2.40		
Intermediate	1.27	1.10	1.44		
Advanced	0.58	0.50	0.65		

Source: Author's calculations based on primary data

On collapsing the categories of e-banking services and calculating the weighted average score for each category at different interactivity levels (Table 4), it has been observed that the overall informational services are offered by all the sampled banks at slightly higher than the moderate level (score 2.04). This reflects that the banks have actively employed the electronic channels as a medium for delivering information. As evident from table 3, bigger (assets > 3 trillion) banks are doing better than smaller banks on the informational delivery front at basic level. Bigger banks are better structured to provide special information like event information, newsletter and special offers. T statistic (Table 4) shows that there are no statistically significant differences for informational services between private and public banks.

The transactional services over the electronic channels are offered at the highest level (average score 2.11) among the three categories by all the sampled banks. Under this category as well, the basic weighted average score (WAS = 2.05) and intermediary services (WAS = 2.24) are provided at high level but advanced services (WAS = 0.55) including virtual cards, virtual wallets are provided by only few banks at low level. At this level too, bigger banks are doing better that smaller ones in providing services like stock trading, RD/FD transactions, etc. Private banks and public banks don't differ significantly for transactional services as well ($p>0.05$).

Regarding maintaining customer relationships through the electronic channels, the banks are not able to exploit the full potential of IT. Under this category, the banks provide electronic services at moderate level (average score 1.36) with no significant differences between private and public banks ($p>0.05$). The results are in tandem with the findings of Diniz (1998) who then contended that the US banks provided only informational and transactional service over the web. Certain services like personalised e-mails to the customers, complaint forms for the customers, demonstrations on 'how to' of different electronic products are provided by most of the banks. However, the banks are not able to develop personal touch with the customers like involvement of key customers in the development of new offerings, maintaining discussion groups or social groups of customers. As offered by some banks, financial 'advising through internet' is a personalised service to retain customers and develop good relationships with the customers (Dannenberg and Kellner, 1998). Studies from the extant literature (Nath et al, 2001; Abor, 2004; Yiu et al., 2007; and Kamakodi and Khan, 2008) also show that the customers perceive electronic channels as a threat to personal relationships that could otherwise be developed through employees of the bank branches.

As observed, there is no pattern of asset size influence on bank providing e-services under different categories. Bigger banks are better off but small banks (assets < 1 trillion) are marginally providing more services as compared to intermediate banks (assets between 1 trillion and 3 trillion). Bigger banks have resources to make investments in technology and small banks invest in technology to expand their banking business through this cost effective medium.

Interplay of Customer Usage and Extent of Services Provided by Banks

To examine the interplay of customer behaviour in terms of their e-services acceptance and bank adoption in terms of products offered, the estimated percentage of the bank branch's customers using each technology has been computed. For this purpose, three bank branches (total 60 branches) from three different cities were selected for each sample bank (total 20 banks) to lessen the impact of branch size or city. Bankers were asked to provide estimated percentage of their branch customers availing the identified products in the range 1-4 (1 for low and 4 for high).

Average customer proportion score has been calculated for each selected bank and each e-product. Bank average customer proportion was calculated as average of customer proportion of three branches of the bank. Table 5 reflects the average percent of customers availing e-banking services from the bank group wise. Overall, as perceived by bankers, the most frequent used e-banking service is debit card (with score 2.95) for ATM services or POS debits. The results are in agreement with Abor (2004) who contended that ATM services are most used electronic banking service.

Table 5. Average Percent Customers Availing Different Services From Banks

	Total Sample	Public Banks	Private Banks
Credit cards	1.17	1.37	0.97
ATM/Debit cards	2.95	2.63	3.27
Prepaid/Smart cards	0.83	0.77	0.9
Virtual products	0.85	0.73	0.97
Internet banking	2.08	1.7	2.47
Mobile banking	1.98	1.5	2.47
Phone banking	1.7	1.2	2.2
NEFT	2.48	2.33	2.63
ECS	2.25	1.9	2.6
RTGS	2.18	2.03	2.33
For entire construct	1.85	1.62	2.08

Average Score		**Percentage of Customers**
Less than 1	Low	Less than 25%
1-2	Moderate	25-50%
2-3	High	50-75%
3-4	Very high	More than 75%

Source: Author's calculations based on primary data.

Correlation analysis has been performed to check any association between proportion of customers using e-services and adoption of e-services at different level and different forms. As shown in Table 6, three items showed a significant positive correlation ($p<0.05$) with bank customers' usage: intermediate services, advance services and overall average adoption. Other items 'basic services', 'informational', 'transactional' and 'relationship' are found to have no significant association with customer usage.

Table 6. Correlation between Bank Average Customer Proportion Using E-Services and Bank Average Adoption of Various E-Services

	Pearson Correlation	Significance (2-tailed)	N
Basic	0.173	0.467	20
Intermediate	0.499*	0.025	20
Advance	0.518*	0.019	20
Informational	0.402	0.079	20
Transactional	0.423	0.063	20
Relationship	0.357	0.123	20
Overall average	0.447*	0.048	20

Source: Author's calculations based on primary data
* Significant correlation at the 0.05 level (2-tailed)

The contribution of customer existing usage towards bank adoption and offerings of advanced, intermediate and overall e-services to the customers has been further analyzed through regression analysis. Here, customer usage serves as independent variable and averages of services are taken as three different dependent variables, and three different regression analyses have been performed with the following hypotheses:

H_{01}: Customer existing e-service usage has no impact upon the provisioning of intermediate level of e-services offered by banks.

H_{02}: Customer existing e-service usage has no impact upon the provisioning of advanced level of e- services offered by banks.

H_{03}: Customer existing e-service usage has no impact upon the provisioning of overall e- services offered by banks.

Table 7. Regression Results: Customer Usage Independent Variable

Dependent Variable	Adjusted R Square	F- statistic (p value)	Beta	T- statistic (p value)
Overall average	0.155	4.489 (0.048)	0.447	2.119 (0.048)
Intermediate	0.207	5.971 (0.025)	0.499	2.444 (0.025)
Advanced	0.227	6.584 (0.019)	0.518	2.566 (0.019)

Source: Author's calculations based on primary data.

The three regression models show significant contribution of customer usage score towards providing services at intermediate level, advanced level and overall. Regarding e-services provided by banks on an overall basis, 15.5% variability is explained by customer usage score as indicated by adjusted R^2 value. For intermediate level e-services, 20.7% variability is explained by customer usage score and for advanced level e-services, customer usage score accounted to 22.7% of variability. This implies that percentage of the bank customer base which has been using e-services is a significant determinant of IT adoption in transition from providing basic services to more advance services through electronic route. Positive beta signifies that the higher the customer usage the more is the IT adoption by banks. As customer usage is not an internal and controllable factor, even 22.7% can be considered as massive and concern for bank marketers and policy makers.

MANAGERIAL IMPLICATIONS

Indian banking community has witnessed substantial technological progress in the recent times. Banks are aggressively providing informational and transactional services, but they lack somewhere in maintaining relationship with the customers through electronic media. Being personalized service area, banks need to be innovative to overcome this impediment to technological progress. Further, banks have successfully replicated and improved traditional banking services over electronic media but they have yet to exploit full potential of IT in terms of new or advanced services which would be highly technology intensive. In managing customer interaction, the role of technology needs to be aligned towards maintaining and strengthening customer relationship while reaping strategic and operational benefits of technology employment. More customization may be offered to customers through electronic media in terms of banking services or interface. As banks move from basic to advance level for technology adoption, complexities increase. In order to sustain customers' relationship at this level, it is imperative to spend on effective security system and maintenance as well as up gradation of the system through which banks can leverage the benefits of technology fully. Bank groups (private or public) are found to have no significant influence on e-adoption pattern. With regards to the relationship between customer usage behavior and bank adoption behavior of electronic services, it has been observed that there is significant positive relationship between the two. It has strong insight that unless customers are not convinced and use these e-services, banks will not be motivated to adopt and provide innovative services. In order to justify IT expenditure, banks need to first create an awareness and induce more usage of e-banking services. To make transition from basic to advanced level, customer behaviour may be a significant facilitator along with other resources.

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Annexure

Table A. Weighted Average Scores of Individual E-Service Offered By Respondent Banks

	E-Service	Weighted Average Score	Standard Deviation
INFORMATIONAL SERVICES			
	Basic		
1	Institutional information	2.75	0.44
2	Promotional Information	2.60	0.60
3	Ways of contact	2.65	0.59
4	Special events	1.85	0.81
5	Addresses and Branches	2.75	0.44
6	Electronic brochure	2.50	0.69
7	News letters	2.55	0.60
8	Offers	2.15	0.81
9	Corporate governance disclosures	2.95	0.22
	Intermediary		
10	Search engines	2.45	0.60
11	Report downloads	2.75	0.44
12	Stock information	1.95	0.89
13	Download forms	2.75	0.55
14	Job offers	2.65	0.49
15	Hot links	2.10	0.91
16	Economic Information	1.70	0.80
17	Investment statistics	1.95	0.69
18	Financial Markets Information	1.65	0.67
19	Detailed Articles	1.45	0.83
	Advanced		
20	Ability to customize the interface	0.80	0.89
21	Subscription options	0.90	0.79
22	Online chat with customer service	0.65	0.93
23	Discussion groups	0.50	0.69
24	Advertisement and Promotion	1.95	0.89
TRANSACTIONAL SERVICES			
	Basic		
25	Opening accounts	1.40	1.27
26	Card requests	1.65	1.23
27	Loan applications	1.85	0.88
28	Investment applications	1.80	1.01
29	Exchange rates inquiry	2.15	1.04
30	Cheque book request	2.65	0.93
31	Request for DD	2.30	1.08
32	Standing instructions	2.60	0.60

	Intermediary		
33	Account summary/Balance enquiry	2.95	0.22
34	Transactions alerts	2.90	0.45
35	Bill payment	2.85	0.37
36	Fund transfer	2.90	0.31
37	History of the account	2.85	0.49
38	Stock trading	1.70	1.03
39	Closure of loan account	0.75	0.97
40	Getting Statements	2.60	0.68
41	TDS inquiry	2.45	0.89
42	Donation	1.60	1.35
43	FD transactions : open /sweep in/liquidate	1.70	1.30
44	Deposits	1.35	1.18
45	Withdrawals	2.90	0.31
46	Mobile recharge	1.65	1.14
47	e-Tax facility	2.50	1.00
	Advanced		
48	Virtual banks with solutions such as e-cash, e-signature and e-checks	0.55	0.76
RELATIONAL SERVICES			
	Basic		
49	Suggestions and complaint forms	2.75	0.55
50	E-mail	1.95	0.89
	Intermediary		
51	Financial advisor	0.85	0.81
52	Calculators/What if calculations	1.95	0.83
53	Download tools or software	1.70	0.86
54	Demonstrations	1.55	1.05
55	Opinion poll	0.30	0.80
	Advanced		
56	Video conferencing.	0.25	0.55
57	Product and service development	0.90	0.64

Source: Author's calculations based on primary data.