

Analytical Study of Applying the Account Aggregation Approach in E-Banking Services

A. Al Drees, A. Alahmari, R. Almuwayshir

Abstract—The advanced information technology is becoming an important factor in the development of financial services industry, especially the banking industry. It has introduced new ways of delivering banking to the customer, such as Internet Banking. Banks began to look at electronic banking (e-banking) as a means to replace some of their traditional branch functions using the Internet as a new distribution channel. Some consumers have at least more than one account, and across banks, and access these accounts using e-banking services. To look at the current net worth position, customers have to login to each of their accounts and get the details and work on consolidation. This not only takes ample time but it is a repetitive activity at a specified frequency. To address this point, an account aggregation concept is added as a solution. E-banking account aggregation, as one of the e-banking types, appeared to build a stronger relationship with customers. Account Aggregation Service generally refers to a service that allows customers to manage their bank accounts maintained in different institutions through a common Internet banking operating a platform, with a high concern to security and privacy. This paper presents an overview of an e-banking account aggregation approach as a new service in the e-banking field.

Keywords—E-banking, security, account aggregation, enterprise application development.

I. INTRODUCTION

THE advanced financial services industry is driving ongoing changes in banking. E-banking first started with the use of software and private networks, and refers to the provision of retail and small value banking products and services through electronic channels. It started with the use of ATMs (Automated Teller Machines) and telephone transactions, and recently, it has been transformed by the Internet. Burr [1] describes it as an electronic connection between bank and customer in order to prepare, manage and control financial transactions.

The development of an Internet electronic payment system provides opportunities for the creation of completely new sets of global and national trading relationships. The Internet offers the possibility of 'open systems' payment and settlement systems that operate in parallel to existing, more traditional bank-based networks. E-banking has many services and capabilities to offer. With this new approach, many people are discovering that they can do from home the things they used to go to the bank to do. Customer satisfaction is a key parameter for banks to ascertain how effectively the web furthers their objectives of customer acquisition. A lot of consumers have more than one account across different banks and they have to

login their accounts separately. This process is a time consuming and repetitive activity. With the recent advancement of the financial industry and to grow the consumer acceptance of the services, e-banking has popularized a new service called: account aggregation as a solution to this problem. Account aggregation is the process of collecting a consumer's information, reformatting it and presenting it back to the consumer. This allows the consumer to get a picture of their financial position as a whole, without having to log in separately to the websites of all of their financial institutions. Most aggregation services can also aggregate non-financial accounts, such as email and frequent flyer accounts, as well as news and information services. Account aggregation has also raised the issue of security. It must be highly secured, to ensure the integrity of the aggregated information [2], [3].

This paper presents in Section II the services that are offered by e-banking systems and discusses the impact of e-banking on banks' performance and consumers' behavior. In Section III we will see a detailed view of account aggregation services including definitions, approaches and techniques to be used. A case study will be explained in Section IV. Section V describes the risks and challenges of using account aggregation approach. In Section VI we will discuss how to control and manage those risks. Finally, conclusion and future.

II. E-BANKING CONSUMER'S ACCOUNT

Internet Banking service enables the consumers to do their banking transactions anytime, anywhere with convenience and security [4]. The common features of e-banking are:

- View and manage account details.
- Inquire about credit card details, balance, and make payments.
- Transfer money to other beneficiaries' accounts.
- Pay bills.
- Pay MOI services (passport services, civil services, and traffic).
- Activate, modify and cancel standing orders.
- Subscribe and make IPO transactions.
- Inquire about investment portfolio(s).
- Display current loans and time deposits.
- Add, edit or delete beneficiaries.

The Banking and Financial Industry (BFI) has encountered three significant changes; the combined strength of the industry, the diffusion of Internet banking, and the increased freedom to combine banking with other financial services, especially through the Internet.

On the consumer side, many researchers examine

A. AlDrees, A. Alahmari and R. Almuwayshir are with the King Saud University, Information System Department, KSA (e-mail: asma.aldrees@gmail.com, amal.7k@hotmail.com, ruba.khaled@hotmail.com).

consumers' behavior towards innovation differently. Some studies showed that due to perceived security risk, lack of comfort with computer technology, either due to a lack of awareness or age factor, as well as a host of other reasons, the Internet channel did not appear to be significantly viable or accepted warmly or quickly by consumers [5], [6].

III. E-BANKING AGGREGATION SERVICES

Account aggregation service is defined as a service that collects financial information transparently from multiple sources and analyses it. The aggregator (an entity of financial aggregation service) usually collects the information from banks, credit card issuers, utility companies and insurance companies (called "account holders"), but can also collect it from other websites like airlines' frequent flyer sites, and news and weather sources. This service allows consumers to view, on a single web page, information from their online accounts with a range of institutions. This allows the consumer to get a picture of their financial position as a whole, without having to log in separately to the websites of all of their financial institutions [7].

The early account aggregation services provided only account information, which was aggregated from multiple financial institutions. However, today's aggregators offer a variety of services, such as account summaries from multiple financial institutions, transaction histories of accounts and credit cards, and the status of frequent flyer's mileage accounts.

This service provides great benefits to consumers – in convenience, flexibility, and more efficient personal financial management. By viewing all of their accounts and other information at one place, consumers can save time. In addition, as only one password is needed to access the aggregation service, consumers do not need to remember or record the various passwords and usernames that are needed for each of the relevant websites. The account aggregation services present an opportunity by which financial institutions can build stronger relationships with customers. Such services can increase the overall number of visitors, the duration of visits, and the number of repeat visits.

Two things have to be in place in order for an account aggregation provider to access an online account. First, the financial institution must offer online access. And second, the account owner must have established online access by creating a username and password to access the account at the financial institution website. In theory, there is no limit to the type of information that can be collated by an account aggregation service. However, the information accessed generally falls into two types [8], [9]:

- Information that can only be viewed by entering a username and password (e.g. financial account balances, frequent flyer point balances, personal email accounts, etc.); and,
- Information that is publicly available (e.g. lifestyle information such as news, weather, travel specials, stock quotes, store specials, etc.).

To register with and use an aggregation service, a consumer

needs to:

- Nominate a username and password to access the service;
- Nominate websites and the information to be collected from those websites; and,
- Enter the consumer's username and password for each website where the consumer must be identified before the personal information can be retrieved.

Once registered with an aggregation service, the consumer can access all of their nominated financial and other information simply by logging onto the aggregation service. Thus, the consumer needs to remember only one username and password [10].

A. Approaches

In this section, we classify aggregator types and their methods for implementing their services. The financial aggregators can be classified into four types; relationship, comparison, Intranet, and Internet, based on the information sources and the purpose of the aggregators as defined below:

- Relationship type: an aggregator who collects and displays various types of information related to a customer obtained from multiple organizations.
- Comparison type: an aggregator who collects and displays the same information for a similar commodity, for comparison purposes.
- Internet type: an independent aggregator of information, which has no affiliations, is not constrained by tie-ups and contracts, who collects information freely from anywhere on the Web.
- Intranet type: an aggregator that collects information within the same group within its website.

Most aggregators fall into more than one type rather than fitting precisely into one classification. The need to display customized data and collect information from a broad spectrum is increasingly important as customers' needs become more diverse and competition among aggregators intensifies. In addition, we have identified two other classifications based on how the aggregator implements the aggregation service: application service and agent software:

1. Application service implementation: the aggregator collects information and a user can request data by using a web browser. In this method, the aggregation service can be accessed via any terminal capable of displaying the aggregator's website. However, security becomes an issue because access requires that an account number and personal identification number (PIN) be sent to the aggregator.
2. Agent software implementation: the software resides on each user's device, such as a PC, that collects and displays information. In this case, the account number and PIN are retained in the user's terminal. However, it is usually necessary to download software to use this service. Agent software also has two sub-categories: MS Money represents one type and eWise represents the other type [11]:
 - a. MS Money mainly processes at the user's PC and it provides a variety of services such as portfolio simulation,

loan and mortgage calculations, and tax advice. Users have to purchase the software and install it on their own PC. If the service changes, users must purchase the new version of software.

- b. EWay does much of its processing at the service provider's server, and most of its software is free. The software to be run on the user's PC is smaller than the MS Money type and downloadable via the Internet. Therefore, service providers can easily add to or change the service content.

The early account aggregators were only the application service type. Users who were concerned about security introduced the agent software type aggregator because of strong demand.

B. Techniques

Currently, account aggregators gather a consumer's account and other information by accessing a web site with customer's login name and password, through direct feed arrangements or through screen-scraping technology:

1. Direct feed: is used if there is an agreement between account holder and the aggregator allowing direct transmission of account data to the aggregator.
2. Screen scraping: takes place without the account holder's knowledge. The screen scraping aggregator logs into an account holder's website using a consumer's login name and password; when the information is displayed, the aggregator can copy the account balances directly from the screen. The data can be reformatted and presented to the consumer on a summary screen on the aggregator's website. The aggregator does not offer the customer the ability to perform transactions through the summary screen [12].

By automating this process, a financial aggregator can

gather all the financial information needed by the user and show it in one place.

IV. CASE STUDY

In this case study we will review a Vayana bank, it provides the account *aggregation* service to its customers. The link site: www.Vayana.in. Vayana is a premier financial services company, driven by the compelling vision to develop solutions that enable enterprises engaged in exchanging commercial information, making payments, settling and financing transactions. They are currently serving a number of banks with flexible, scalable and customizable solutions for delivery channels and specialized financial transactions. SolutionNET suite of products are owned, implemented and supported by Vayana.

SolutionNet Account aggregation, a pluggable component was deployed in the Corporate Online Banking of the bank.

This product helped provider bank's customers in having a consolidated view of all their accounts within the bank and other agreed banks with the SWIFT interface. This product also helped in better finance management, cash flow, and view of current net worth position daily. An option to download statements into an Excel PDF is also provided for customers. This not only helped enterprise customers of the bank, but also the bank to gain visibility of their customer's transactions with other banks and convert them as business. Other benefits to banks include, more corporate registration, indirect revenue on aggregation registration/maintenance charges. Fig. 1 shows the sample screen of consolidated accounts of the Vayana bank.

Balance >> Summary

Summary

Company* ALL COMPANIES

Bank* ALL BANKS

Branch* ALL BRANCHES

Account* ALL ACCOUNTS

Currency* ALL

Download Type* CSV

* Marked Fields are Mandatory

View

Bank Name	HDFC BANK					
Sr No.	Account No.	Currency	Account Branch	Unclear Funds	Available Balance	
1	0060093000098	INR		0.00	697,378,131.	
Total 1				0.00	697,378,131.	
Bank Name :	HSBC BANK					
Sr No.	Account No.	Currency	Account Branch	Unclear Funds	Available Balance	
1	007890234678	INR	TNAGAR CHENNAI	0.00	60000	
2	987098765412	INR	TNAGAR CHENNAI	0.00	60000	
Total 2					120000.	
Bank Name :	INDIAN BANK					
Sr No.	Account No.	Currency	Account Branch	Unclear Funds	Available Balance	
1	010200051150	AED	TNAGR-CHENNAI	0.00	60000.	
Total 1					60000.0	

Fig. 1 Sample Screen of consolidated accounts [2]

V. RISKS AND CHALLENGES

In light of the growing customers' demand for Internet banking account aggregation services, we need to set out the risks and challenges it creates from both the bank and customer point of view [13]:

A. Bank's Point of View

Banks engaged in aggregation services are exposed to many risks, some of them are:

- a) **Transaction/Operations Risk:** The highly sensitive nature of the information collected and stored by aggregators greatly increases the risk associated with aggregation services. The aggregator's ability to protect stored customer IDs and passwords, and to provide accurate and timely delivery of information from the customer's accounts, is the most significant factor in assessing the level of operations risk in aggregation services.
- b) **Strategic Risk:** It is the second highest exposure in aggregation services. Because aggregation is at an early stage of development and customer acceptance is low, banks should consider how evolving standards and customer acceptance for aggregation services may affect electronic banking strategies. Further, reliance on third party service providers introduces strategic risks that banks should consider
- c) **Reputation Risk:** It is another significant consideration in aggregation services. The viability of aggregation services depends heavily on meeting customer expectations, including availability, confidentiality, data integrity, and overall service quality. Moreover, as customer acceptance grows, customers are more likely to use the service. But failure to meet customer expectations can undermine customer confidence and trust, and will result in discontinued use of the service.

B. Customer's Point of View

Account aggregation services generate a range of customer and regulatory issues. We will briefly explain them in this section:

- a) **Disclosure:** One of the important issues for customers using aggregation services is adequate disclosure. Customers need clear, simple and upfront disclosure of relevant information. Aggregators should provide information on at least the following matters:
 - * Privacy.
 - * Terms and conditions, liability and risk.
 - * Security.
 - * Availability of complaints and dispute resolution processes.
 - * Identity of aggregator.
 - * Relationship between the aggregator and financial institutions. Financial institutions should inform customers on their views on using aggregation services.
- b) **Liability:** The second major issue that we see for customers using aggregation services is that of liability. Customers need to understand clearly how liability for loss will be allocated between themselves, the aggregation

service, and their financial institutions. A key area of concern is whether, and in what circumstances, consumers will be liable for unauthorized transactions that occur on an account that can be accessed by an aggregation service.

- c) **Complaints Process:** Aggregators should have clear and accessible information about the process for making and resolving consumer complaints about the aggregation service or its operation. Ensuring that consumers have access to appropriate processes for complaints and dispute resolution can help to build trust and confidence.
- d) **Security:** For customers, security issues include the security of their information as it is transmitted when the aggregation service is used, and the physical and electronic security of the location where account information is stored. Therefore, aggregators should inform customers about the security measures taken to safeguard their information, both in transmission and in storage, and also the level of data protection that they can provide against such matters.
- e) **Privacy:** It is a keen concern for customers. An aggregator's privacy policy should advise the customer about different things like: who has access to a customer's personal information, how that information will be used, and how can customers access their personal information. In addition, aggregators that collect personal information should advise customers about each particular instance of collection. After the personal information is collected customers should be aware of the identity of the aggregators and how to contact them [14], [15].

VI. RISK MANAGEMENT CONTROL

Aggregator banks should establish appropriate risk management controls, including procedures to monitor developments and ensure they remain main in compliance with legal and regulatory requirements. Therefore, it is required to discuss and implement effective risk management controls according to the following points:

A. Acceptable Business Models

Authorized institution should ensure that only the following types of bank accounts are allowed to be included in the service:

- * For personal internal banking, authorized institution should only allow a customer to aggregate bank accounts that belong to him individually or jointly with other individuals.
- * For business/corporate internet banking, authorized institution should only allow a business customer to aggregate bank accounts that are owned by the same company, the companies within the same group, or the same person/entity who has ownership in the companies.

B. Data Privacy Concerns

If Account Aggregation Service involves the transfer of customers' personal data between local and overseas locations, and it is important for AIs to disclose clearly and prominently to their customers the jurisdictions or locations

where the data are transmitted and stored. The disclosure should be made when customers subscribe to the service or whenever such an arrangement is made.

C. Technology-Related Issues

To address the potential technology-related risks, authorized institution should satisfy among the following requirements:

- * The authorized institution involved should perform a formal risk assessment at least once a year, to determine if any further independent assessments are necessary, and if so, the frequency and scope of such independent assessments.
- * Effective controls should be established to ensure that customer data is kept confidential and will not be divulged to any person without the customer's consent. Access to customer data should be controlled by effective and adequate authentication mechanisms associated with proper access control rules.

D. Legal and Reputational Risk Management

To protect banks against business, legal and reputation risk, e-banking services must be delivered on a consistent and timely basis in accordance with high customer expectations for constant and rapid availability and potentially high transaction demand. The bank must have the ability to deliver e-banking services to all end-users and be able to maintain such availability in all circumstances.

E. Customer Protection

Authorized institution should establish appropriate customer complaint handling procedures and internal guidelines for apportioning liability and settling customers' claims for financial loss. Fair and balanced terms and conditions in relation to customer protection should be included in the customer agreement for Account Aggregation Service. Appropriate legal advice should be sought in this regard when preparing customer agreements [16].

VII. CONCLUSION

The ability to aggregate financial information from consumers will also enable promotional efforts that are a key element to the future of bank marketing. Bankers can rely on dashboards that analyze data by demographics, account size, cards, spending category and geography to guide new product offerings and promotions, and to better target customer segments, ultimately increasing the number and profitability of accounts. As an added bonus, increased accounts per customer will result in higher profitability and retention rates.

Unfortunately, most bankers do not consider aggregation one of their top initiatives for 2012; the plans may be maxed out with service and compliance initiatives. However, aggregation should be an integral component to the self-service platforms. An aggregated platform can change Internet, mobile banking and PFM (Personal Financial Management) services from a necessary cost to a source of knowledge, power and profit.

REFERENCES

- [1] "Account aggregation in the financial services sector." Australian, Securities and Investments Commission, 2001, pp.25- 29.
- [2] "Account aggregation". Property of Vayana, pp.1-3.
- [3] "Aggregation Services." <http://ithandbook.ffiec.gov/it-booklets/ebanking/appendix-d-aggregation-services.aspx> (accessed October 10, 2012).
- [4] Ahmad A. Aqeel., Rwzaul m. Karim., Rahman A. Muhammad., "Ebanking and its impact on banks' performance and customer's behaviour". Fourth International Conference on Digital Society, 2010, pp. 238-241.
- [5] Ann, H. Spiotto, "Financial Account Aggregation: Liability Perspective", VIII: 3, 2003, pp. 557-602.
- [6] Clifford, A. Wilke, "Bank-Provided Account Aggregation Services". Comptroller of the Currency Administrator of National Banks, 2001, pp. 1-9.
- [7] Datwani, M., "Risk management controls over Internet Banking Account Aggregation Service." Hong Kong Monetary Authority, 2010, pp. 1-6.
- [8] Emor, E-Monitoring Report, March-May 2002 (in Estonian), 2002.
- [9] Hiroshi Fujii, Taeko Okano, Stuart Madnick, Michael Siegel, "EAggregation: The Present and Future of Online Financial", Sloan School of Management, Massachusetts Institute of Technology Cambridge, MA 02139.
- [10] John, Luciano., "Account Aggregation" <http://www.accountaggregation.com/> konnte", Bank und Markt, 11, 1996, pp. 28–31 (accessed October 16, 2012).
- [11] Kaskosas, Innoias, "The Pros and Cons of the Internet Banking". Business Excellence and Management, 1:1, 2011, pp. 49-58.
- [12] Mugavero, S. Patricia, "Opportunities in Account Aggregations". Mortgage banking, 2000, pp. 1-7.
- [13] Mugavero, Patricia S.; Negroni, Andrea Lee, "opportunities in account aggregation", Mortgage banking, 2000, pp. 1-13.
- [14] Nami, M. Reza, "E-Banking: Issues and Challenges". International Conference on Software Engineering, 2009, pp. 263-266.
- [15] Rickard, D., "Protecting Account Aggregation Consumers." Australian Securities and Investments Commission, 2001. pp.1-13.
- [16] W. Burr, "Wie Informationstechnik die Bankorganisation verandern konnte", Bank und Markt, 11, 1996, pp. 28–31.