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## **RETURN ON INVESTMENT FROM ONLINE BANKING SERVICES: AN ANALYSIS OF FINANCIAL ACCOUNT AGGREGATION**

**Tereza Cristina Melo de Brito Carvalho and Michael Siegel**

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# **Return on Investment from Online Banking Services: An Analysis of Financial Account Aggregation**

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## **Abstract**

The successful adoption of Financial Account Aggregation requires a careful analysis of the business model. The business model must be defined in a way that provides value to both customers and financial institutions. This paper identifies business models for adoption of Account Aggregation technology; proposes a method for calculating the return on investment related to the adoption of this technology; and applies the proposed method to estimate this return for various business models. The results show how the return on investment is affected by parameters such as initial investment, customer acquisition and retention cost and product and service cross-selling. This analysis is applicable to financial and non-financial institutions considering Account Aggregation or other new online account applications.

## **1. Introduction**

Account Aggregation is considered to be one of the most compelling technologies on the Internet. From a single site, customers can access and manage their entire financial lives, gaining transparency, efficiency, savings, and cost reduction. In the United States, it is estimated that by 2003, there will be 22 million aggregation users corresponding to 40% of total online banking and brokerage customers [McVEY00].

This paper emphasizes the factors related to the business models and the financial return that the adoption of this technology can bring. In addition, other aspects are considered such as the constraints of each business model and recommendations to maximize returns. This paper presents the results of research whose objectives are as follows:

- Identify business models for adoption of Account Aggregation technology.
- Develop a method for calculating the return on investment related to the adoption of this technology.
- Apply the proposed method to estimate the return on investment related to Account Aggregation technology adoption.
- Analyze the results for different business models.
- Recommend the actions to be taken in order to maximize return on investment.

This paper has five sections. In Section 1 we present the objectives and the motivation for the research. In Section 2 we present a conceptual view of Account Aggregation. In addition, we define the basic Account Aggregation business models that can be adopted by a financial institution. In Section 3 we describe three scenarios for evaluating the return on investment of an Account Aggregation project. We describe the components of the return on investment related to the development, implementation and maintenance of

this project by a financial institution. In Section 4 we present the results of simulations that were developed for each of the three scenarios defined in Section 3. Finally, in Section 5 we present the research results, along with recommendations for guaranteeing a positive return on investment for an Account Aggregation project of a financial institution, and its optimization.

## 2. Conceptual View about Account Aggregation Business Models

Account Aggregation is a tool that allows individuals to view all their financial, credit, reward programs and other online accounts at different institutions from one site on the Internet.

In the Account Aggregation service arena, there are two major players: the **web aggregators** and the **aggregation service providers**. The **web aggregators** provide technical resources for aggregating accounts from different financial and non-financial institutions. They maintain the login and password information related to these customer accounts. They are also capable of transacting, allowing electronic bill presentment and fund transfer, and providing allocation asset advice based on financial analysis.

The **aggregation service providers** are the entities (e.g. financial institutions) with which customers have the contracts to provide aggregation and other services. Financial Account Aggregation services are provided not only by financial institutions such as banks, credit card and brokerage companies, but also by portals and web aggregators.

Financial institutions have two basic ways to provide Account Aggregation. The web aggregator functions can be outsourced or implemented in house by the financial institutions. With the first option, a third party company that maintains the customer information in its database performs the web aggregator functions. With the second option, the financial institution implements the web aggregator functions in-house. The financial institution can acquire this implementation in the market and incorporate new features to achieve differentiated capabilities or it can build the Account Aggregation application from the scratch. The former solution can demand a significant investment and resource commitment.

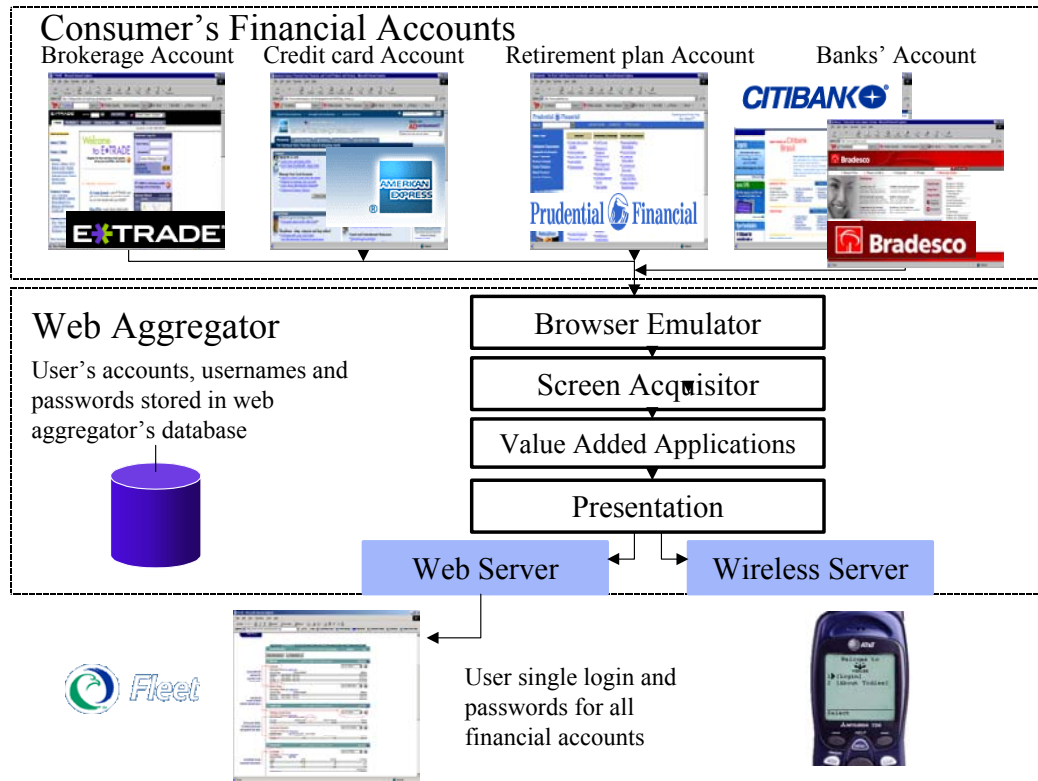
In the case of Financial Account Aggregation from one single site, customers can access all of their financial accounts. Figure 2.1 presents an example of Financial Account Aggregation where there are two bank accounts, two credit card accounts, and an investment account.

### 2.1 Basic Concepts

In this section we present the building blocks of an Account Aggregation system, when a financial institution provides the Account Aggregation services. The Account Aggregation system is composed of three basic components, as depicted in Figure 2.1:

- **Financial Accounts:** these are comprised of various financial accounts such as brokerage, bank, retirement, and credit card, which are kept by a customer.
- **Web Aggregator:** this maintains, in its database, information related to customer accounts, usernames and passwords. It is comprised of the following.
  1. **Browser Emulator:** this is deployed to access the web sites of the customer's financial accounts.
  2. **Information Acquisition:** The information provided by the web aggregator can be acquired primarily through the following:

- a) **Screen Scraper:** Scrapes out the useful data fields from any online account. The aggregator must analyze the account web pages and determine where the necessary information is located on each of these pages. Every bank or financial institution has its web pages laid out in different ways, and the web page layouts can change from time to time. It makes life difficult for the account aggregator and frequently leads to delays, lack of accuracy, and low performance. Screen scraping is normally done with automated scripts, often without consent or knowledge of the aggregatee (eg, financial institution).



**Figure 2.1 – Account Aggregation System Organization**

The aggregator logs into the account of customers using their usernames and passwords, which are stored in the database, and retrieves all the desired information. This information is consolidated and formatted for presentation to the end-user.

As the financial institutions can change their sites from time to time, the screen scraper can retrieve inaccurate data. This lack of accuracy is the most significant drawback of the screen scraping method. In order to avoid such inaccuracy, the aggregator has to check often for web site layout changes. This results in poorer performance and higher maintenance costs.

- b) **Screen Reader:** Instead of doing a screen scraper, the web aggregator can simply obtain the desired information from the aggregatee web sites. This is possible if these web sites are implemented deploying specific standards developed for the financial services industry, such as OFX, and standards designed to make web pages more accessible by software applications, such as XML. The aggregator obtains information from the OFX servers. However, the financial institutions can control what data are transmitted via their OFX servers. Thus, the aggregators can only access the data whose access is permitted.

OFX is a more accurate, cost-effective, scalable solution than screen scraping. Unfortunately, OFX and XML are not widely employed for electronic banking, making screen scraping the most deployed alternative at this time.

3. **Value-Added Applications:** In order to differentiate among Account Aggregation services, it is important that the web aggregators support some value-added applications. In the case of financial institutions, they can support, for instance, fund transfers between accounts from different institutions and asset allocation, analysis, and interest rate optimization.
  4. **Presentations:** The final web page containing information from the aggregatee accounts should be created and stored in the web server and/or wireless web server. Any normal browser can access the web server. The wireless web server can be accessed by mobile phones that support, for example, WAP (Wireless Application Protocol) in the case of 2G technologies.
  5. **Database:** The aggregator stores the customer login, password and account data. The amount and type of account data vary from one aggregator to another. Most aggregators store transaction data for a period of up one year.
- **Customer Browser:** Customers have a single login and password for all financial accounts. They normally call the site of the aggregation service provider. At this point, the customers must login using this single login and password. If they want to perform more complex transactions, they can jump to the financial institution's web site without have to log in again. The web aggregator automatically enters the user's passwords.

## 2.2 Business Models

The business models to be adopted may vary from country to country and from continent to continent. The models will depend on how the banking industry is organized in each country, on bank empowerment and on local legislation.

The aggregator bank and the aggregatee banks may or may not have an agreement. In the case of no agreement, the information is acquired from aggregatee banks without their knowledge or permission. There has been fierce competition for the first mover advantage and financial institutions will strive to maximize the number of early customer adopters. After the Account Aggregation service is consolidated, the competition should occur at the post-aggregation service level. It can include financial services at lower cost and higher diversity and quality, but also home shopping services, reward programs alliances, communication, news and information.

If the aggregator bank and the aggregatee banks have an agreement among themselves that establishes rules to be followed for providing aggregation services, they should agree on the time when this technology should be adopted and will compete only at the level of post-aggregation services. However, the competitive advantage will be based not only on the quality of the provided services, but also on security issues and brand.

In both cases, the basic business models are as follows:

- **Aggregation with Web Aggregator In-House:** In this case, the web aggregator function can be implemented within the aggregator bank. The aggregator bank has a very high initial investment related to the computer and network infrastructure acquisition and the development of the account aggregation system.

- **Aggregation with Outsourced Web Aggregator:** In this case, a third party company supports the web aggregator functions. The aggregator bank normally pays an initial license fee and monthly fee per user to this company.

In the future, some hybrid models can be adopted. For instance, if the financial institutions begin to support open standards, they can aggregate in-house accounts that can be accessed via open standards, and they may aggregate via outsourced aggregators accounts that can be accessed only through screen scraping.

### 3. Return On Investment

The return on investment of the Account Aggregation technology will be evaluated using the calculation of the EBIT (Earnings Before Interest and Taxes) NPV (Net Present Value).

The EBIT is obtained as the revenue of the Account Aggregation project minus the sum of the expenses related to investments, fixed and variable costs.

$$\text{EBIT} = \text{Revenues} - (\text{Investments} + \text{Fixed Costs} + \text{Variable Costs})$$

The return on investments of the Account Aggregation project is a function of the business model to be adopted. In order to evaluate this return, some scenarios are defined in the next section.

#### 3.1 Scenarios For Return On Investment Evaluation

There are three scenarios defined to evaluate the return on Investments of an Account Aggregation project as follows.

- Scenario 0 – No Account Aggregation Support:** In this scenario, the Account Aggregation service is not provided. The purpose of this scenario is to evaluate how much a financial institution will gain or lose if it does not provide Account Aggregation services.
- Scenario 1 – Aggregation with Web Aggregator In-House:** The web aggregator functions are implemented in-house and the Account Aggregation service is provided without any extra costs to the customers. The information from the aggregatee banks is normally obtained through screen scraping without knowledge or permission of the aggregatee banks.
- Scenario 2 - Aggregation with Outsourced Web Aggregator:** A third-party company implements the web aggregator functions and the Account Aggregation service is provided without any extra costs to the customers. The information from the aggregatee banks is normally obtained through screen scraping without knowledge or permission of the aggregatee banks.

Table 3.1 presents an overview on EBIT components for the two business models: **Account Aggregation with Web Aggregator In-House** and **Account Aggregation with Outsourced Web Aggregator**.

In Scenario 1 the web aggregator can collect revenue from the aggregator bank for the provided service as well from the aggregatee banks for prioritizing their information on the aggregated pages. services. In Scenario 2, the costs related to computational and network infrastructure, its administration and maintenance, and contract of broadband access, are paid by the web aggregator and to some extent shared among the aggregatee banks.

However, the intangible cost related to the risk involved in outsourcing should also be considered. The aggregator bank passes the control of its customer accounts to the web aggregator. If a problem occurs, the aggregator bank is likely to be affected by customer dissatisfaction.

	<b>Aggregation with Web Aggregator in-house</b>	<b>Aggregation with Outsourced Web Aggregator</b>
<b>Investment</b>	<ul style="list-style-type: none"> <li>• Computer and Network Infrastructure</li> <li>• Technology Acquisition Fee</li> <li>• Customization Customisation &amp; Implementation</li> <li>• Cross-Selling Implementation</li> </ul>	<ul style="list-style-type: none"> <li>• License Fee</li> <li>• Cross-Selling Fee</li> <li>• Cross-Selling Implementation</li> </ul>
<b>Fixed Costs</b>	<ul style="list-style-type: none"> <li>• Maintenance and Management</li> <li>• Insurance</li> </ul>	<ul style="list-style-type: none"> <li>• Maintenance Fee</li> </ul>
<b>Variable Costs</b>	<ul style="list-style-type: none"> <li>• Customer Acquisition</li> <li>• Customer Retention</li> <li>• Customer Attrition Due Account A.ggregation (AA)</li> </ul>	<ul style="list-style-type: none"> <li>• Customer Acquisition</li> <li>• Customer Retention</li> <li>• Customer Attrition Due AA</li> <li>• AA Fees to Web Aggregator.</li> </ul>
<b>Revenue</b>	<ul style="list-style-type: none"> <li>• Customer Acquisition</li> <li>• Customer Savings</li> <li>• Cross-Selling</li> </ul>	<ul style="list-style-type: none"> <li>• Customer Acquisition</li> <li>• Customer Savings</li> <li>• Cross-Selling</li> </ul>

**Table 3.1 – Components of EBIT for the Aggregator Banks**

## 3.2 Investments

### 3.2.1 Web Aggregator In-House

In the case of implementing the web aggregator in-house, the following initial investments have to be taken into account.

- **Computational and Network Infrastructure:** In order to support Account Aggregation, the financial institution needs to acquire computational and network infrastructure required to build-up the system. This system will host customer information such as account, login and passwords at other financial institutions and software programs to be deployed to support Account Aggregation services.
- **Technology acquisition fee:** The financial institution can develop an Account Aggregation application from the beginning or it can acquire the core system from a vendor. In the later case, a technology acquisition fee would be paid to this vendor. The major advantage here is the timesavings in the initial development.
- **Customisation and implementation:** If the financial institution has decided to purchase the Account Aggregation core system from a vendor, this core system must be customized and complemented with additional features to assure a differentiated Account Aggregation service. In the case of implementation from the beginning, the project would be comprised of various phases, including functional specification, project design, development and tests, and it will likely take more time to become operational.
- **Cross-Selling implementation:** As will be shown later, the cross-selling features are the most important ones to guarantee a positive financial return from an Account Aggregation project. The purpose is to cross-sell financial products and services. It requires that the financial institution be able to access information about the financial products and services that the customer holds at this

institution and other institutions. Based on this information, it would be possible to offer alternatives that are advantageous to the to customer.

To some extent, the cross-selling implementation requires some degree of integration and interoperability among database systems in different parts of the organization. These database systems usually store customer information related to various banking products and services.

### **3.2.2 The Outsourced Web Aggregator**

In the case of outsourcing web aggregator functions, some important initial investments have to be taken, including the following:

- **License Fee:** when the web aggregator is outsourced to a third-party company, the company charges the financial institution a license fee, which represents an initial payment for Account Aggregation service implementation and for customer data hosting. This license fee varies from \$10,000 to \$750,000 [MOORE01].
- **Cross-Selling License Fee:** Cross-selling implementation requires that the financial institution can access information about the financial products and services that the customers hold within the institution as well as other institutions. If the web aggregator functions are outsourced, at least the information related to the other institutions should be provided by the web aggregator. Normally, the web aggregator charges a fee for this service that varies from 10% to 30% of the Account Aggregation fee (This data was obtained direct from interviews with professionals in the banking industry).
- **Cross-Selling implementation:** This requires a computational infrastructure, the development of cross-selling applications, and the integration of database systems located in different parts of the organization. These database systems store customer information related to various banking products and services.

## **3.3 Costs**

The costs are comprised of fixed costs and variable costs. The fixed costs correspond to the expenses related to physical assets, such as computational and network resources. The variable costs involve customer marketing and services.

### **3.3.1 Fixed Costs**

#### **3.3.1.1 Web Aggregator in House**

The fixed costs include the following.

- **Management and Maintenance:** The continuous operation of the Account Aggregation services should be assured. The management system is deployed to monitor and control performance, fault occurrence, security and workload of the Account Aggregation system. Based on the collected information about its operation, it would be possible to perform capacity planning, take corrective measures and define maintenance procedures.
- **Insurance:** Every IT system can experience security threats that are physical or systemic in nature. Examples of a physical threat are fire, flood and any natural or provoked incidents that can cause partial or total system destruction. Example of a system threat would involve any data modification or corruption caused by voluntary or non-voluntary access, or any data read by unauthorized user.



In the case of physical threat, insurance should cover the system replacement and reinstallation. In the case of system threat, the security attack can damage one to several customers, who must recover their losses.

### 3.3.1.2 Outsourced Web Aggregator

The fixed costs include only the **maintenance fee**, which is due to the web aggregator, is related to management and maintenance of web aggregator functions. It includes changes and improvement of the provided functions.

## 3.3.2 Variable Costs

### 3.3.2.1 Web Aggregator in House

The variable costs include the following.

- **Customer Acquisition:** This cost comprises the marketing budget, which is spent to attract Internet banking customers to the Account Aggregation services.

There are four categories of customer acquisition costs:

- a) **Acquisition Cost of new Internet Banking Customers:** If customers decide to switch their Internet banking because their financial institution does not provide Account Aggregation service, the bank should spend the equivalent of the acquisition cost of new online banking customers.
- b) **Acquisition Cost for Account Aggregation and no Cross-Selling:** When a financial institution wants to persuade *online customers* to sign up for the Account Aggregation service, it will spend the equivalent of the acquisition cost for Account Aggregation and no cross-selling.
- c) **Acquisition Cost for Account Aggregation and Cross-Selling:** When a financial institution wants to convince *online customers* not only to sign up for the Account Aggregation service, but also purchase some banking products and services, it will spend the equivalent of the acquisition cost for Account Aggregation and cross-selling.
- d) **Acquisition Cost for Account Aggregation and Aggressive Cross-Selling:** If the financial institution wants to convince *online customers* to sign up for the Account Aggregation service, and to improve its cross-selling towards customers, it will spend the equivalent of the acquisition cost for Account Aggregation and aggressive cross-selling.

The acquisition cost for Account Aggregation and aggressive cross-selling is the highest, while the acquisition cost for Account Aggregation and no cross-selling is the lowest.

- **Customer Retention:** This cost includes marketing and services expenses, invested to retain customers who have already signed up for Account Aggregation services.
- **Customer Attrition Due Account Aggregation:** When a financial institution loses customers due to their dissatisfaction with the Account Aggregation services, there is an associated cost referred to as customer attrition cost.

### 3.3.2.2 Outsourced Web Aggregator

In addition to those costs already described to the **Web Aggregator In-house**, in the case of the **Outsourced Web Aggregator**, the variable costs also includes the **Account Aggregation Fees to the**

**Web Aggregator.** Besides a license fee, the financial institution will likely pay an Account Aggregation fee to the web aggregator. This fee is charged per active aggregation user. Its value varies from \$5 to \$12 per year [MOORE01].

### 3.4 Revenues

The Account Aggregation services can generate some revenues such as the following.

- **Customer Acquisition due to Account Aggregation:** Account Aggregation services can have a significant value as a customer retention and acquisition tool. By offering Account Aggregation services, financial institutions can acquire a competitive advantage over other institutions that do not offer these services, and thus provide a compelling reason for customers to open an account. Such customer acquisition is counted as revenue for the Account Aggregation services.
- **Customer savings:** The cost savings over traditional delivery channels, of online banking are derived from reduced calls to live customer service centers, reduced application-processing costs, reduced statement-issuing costs, electronic payment cost savings, and a reduction in direct marketing expenses due to weak prospects [MOORE01]. The Account Aggregation services are generally used by online banking customers and they do not result in meaningful savings.
- **Cross-Selling:** Financial institutions can take advantage of access to the customers' aggregated information to support cross-selling and to maximize the returns on many of their banking products and services. These banking products and services include the following.
- **Funds transfer:** This can involve accounts within the same bank or accounts from different financial institutions. In the case of the Account Aggregation, it is considered only the revenue derived from the real time fund transfer between accounts from different financial institutions.
- **Asset Allocation:** This is one of the most important services that can be provided as a result of an Account Aggregation offering. Since the financial institution can have access to the customers' aggregated financial information, it knows the amount and where the customers' assets are located. Thus, it is capable of managing the customers' assets in order to maximize their return.
- **Credit card:** The financial institution knows the customers' aggregated financial information, including which credit cards they hold and how much they pay in annual rates for these credit cards. It can attempt to sell them another credit card at a lower rate or an upgrade of their credit cards (e.g., from a gold card to a platinum card).
- **Consumer loans:** Consumers can apply online for bank loans, including consumer, auto and home-secured loans. Online lending generates direct revenues in the form of loan initiation fees and loan interest income [MOORE01]. As the financial institution has customer information, such as account balances and goods ownership (e.g., auto), it can offer online lending when it is appropriated.
- **Mortgage:** Similar to consumer loans, customers can apply for mortgage and credit lines when they want to purchase, for example, a house or land. The financial institution can offer online mortgages when it is proper. The mortgage also generates direct revenues in the form of mortgage initiation fees and mortgage interest income [MOORE01].
- **Car Insurance:** The financial institution normally knows whether their customers have cars. Through the customers' aggregated information, it can also know if they have car insurance with some other financial institution or insurance agency. In this case, the financial institution can simply

offer car insurance or car insurance at a lower price than that offered by other financial institutions or agencies.

- **Home Insurance:** Similar to cars, the financial institution knows the properties that their customers own and if these properties carry insurance. It can offer property insurance or insurance at a lower price than that offered by other financial institutions or agencies.
- **Brokerage:** The financial institution can suggest an investment in stock options and bonds. For revenue, the financial institution can earn a percentage of the customer gain (e.g., separately managed accounts).
- **Online Advice:** The financial institution can provide online advice based on information that it owns about customers' financial life. This service can be charged for based on connection time or traffic volume.
- **Wireless Aggregation:** The access to aggregated accounts can be offered through mobile devices such as cell phones, deploying WAP (Wireless Application Protocol), or PDAs (Personal Digital Assistants) [McVey01]. This type of access provides consumers with a great deal of convenience and will enhance the usefulness of the Account Aggregation services. This service can be charged for based on wireless connection duration and on number and type of financial operations that were performed.

Table 3.1 shows how the investments, fixed and variable costs, and revenue are distributed in the case of the two scenarios, including **Aggregation with Web Aggregator In-House** and **Aggregation with Outsourced Web Aggregator**.

#### **4. Account Aggregation Business Model Evaluation**

The primary objectives of this work are to evaluate :

- Which Account Aggregation business model yields the greatest return on investment.
- How the return on investment is affected by changes in certain project parameters, such as initial investment, fixed and variable costs, and revenue.
- Which of these parameters are more relevant to maximize return on investment.
- How do size and type of financial institution influence return on investment.

##### **4.1 Description of Scenarios and Parameters**

The business models to be evaluated corresponds to the following scenarios:

- a. **Scenario 0 – No Account Aggregation Support:** The purpose of this scenario is to evaluate the potential losses by a financial institution to not provide the Account Aggregation service. In this case, the customer attrition rate due to no Account Aggregation Service support should be estimated.
- b. **Scenario 1 – Aggregation with Web Aggregator In-House:** In this model, the initial investment is higher than the initial investment taken when the web aggregator functions are outsourced. This initial investment is comprised of computer and network infrastructure acquisition, a technology acquisition fee, customisation and implementation costs, and cross-selling implementation. Normally, the financial institutions have exercised the option of acquiring the basic technology platform, whose features are customized and complemented in order to fulfil the requirements for a differentiated Account Aggregation service.

The fixed costs include the management, maintenance and insurance expenses. The most relevant variable costs are customer acquisition and retention costs.

The main source of revenue is cross-selling. This model is evaluated according to how the return on investments of the Account Aggregation is affected by changes to the computer and network infrastructure cost, the customer acquisition cost, the customer retention cost and the level of cross-selling level. This evaluation is performed for small, medium and large banks.

- c. **Scenario 2 - Aggregation with Outsourced Web Aggregator:** A third-party company implements the web aggregator functions, and the Account Aggregation service is provided without cost. The information from the aggregatee banks is normally obtained through screen scraping without knowledge or permission of the aggregatee banks.

In this case, the financial institution pays the initial license fees to the web aggregator. The license fees are for the Account Aggregation service provision and the cross-selling support when applicable. Some financial institutions are implementing the Account Aggregation services in two phases: with and without cross-selling support.

The relevant variable costs are related to the customer acquisition, customer retention and the Account Aggregation fees paid per customer to the web aggregator.

The main source of revenue is the cross-selling. This model is evaluated based on how the return on investment of the Account Aggregation project is affected by changes of the customer acquisition cost, the customer retention cost, the web aggregator fees and the cross-selling level. This evaluation is performed for small, medium and large banks.

## 4.2 Simulation Assumptions

In order to evaluate the return on investment of Account Aggregation for various scenarios and different parameters, the following assumptions were made:

- **Bank Size:** Three basic bank sizes according to the number of its online customer accounts were considered. Small banks were taken those with 240,000 to 1.6 millions of online accounts; medium banks, those with 2.8 to 6.0 millions online accounts; and large banks, those with 8.0 to 16 millions online accounts.
- **Period:** the simulation was run for five consecutive years. Year 1, the Account Aggregation project is initiated and all meaningful investments are made. The cross-selling functions do not have to be implemented in Year 1. Its implementation and support depend on the value of cross-selling level in each specific year.
- **Average Percentage of Active Account Aggregation:** Normally, less than 50% of the Account Aggregation accounts are kept active after their enrolment. [GRAEBER01]
- **Customer growth rate:** Three customer growth rates were assumed: regular banking, Internet banking and Account Aggregation customer growth rate. The Account Aggregation customer is an Internet banking customer. An Internet banking customer is a banking customer. The regular banking customer growth rate is about 1% and is a very steady value. The other rates have increased from year to year and were obtained from specialized literature [MOORE01].
- **Cross-Selling level:** The financial institutions can implement cross-selling after Year 1. If the cross-selling level is equal to zero, the cross-selling functionality is not supported. The number of financial products and services that can be offered as cross-selling can vary from one year to the next. This variation is translated in the cross-selling level value.

- **Cross-selling products and services:** These represent the most important revenue source. Some of these products and services are only feasible if the Account Aggregation service is supported. Examples include funds transfer from accounts of different financial institutions, asset allocation, and wireless Account Aggregation. The other products and services are cross-sold more efficiently due to Account Aggregation, because the financial institution owns the customers aggregated finance information.

Table 4.1 summarizes the most important assumptions that were made in the simulations.

### 4.3 Simulation Results

All simulations were performed considering the bank size, classified as small, medium and large for a period of five years, where Year 1 is the first year of Account Aggregation service adoption.

The **EBIT** NPV is calculated as follows.

$$\text{EBIT} = \text{Revenues} - (\text{Investments} + \text{Fixed Costs} + \text{Variable Costs})$$

where NPV (Net Present Value) is calculated for Years 1 to 5 at Year 1.

#### 4.3.1 Scenario 0 – No Account Aggregation Support

The customer attrition rate due to no provision for an Account Aggregation service should be estimated. It is supposed that the customer attrition rate is equal to the customer conversion rate if the Account Aggregation service would be offered. This means that the financial institution would lose all online customers who are supposed to be current users of the Account Aggregation service.

If these customers are lost, the financial institution has to invest in marketing in order to attract new online customers to replace the old ones. This expense corresponds to the acquisition cost of new customers.

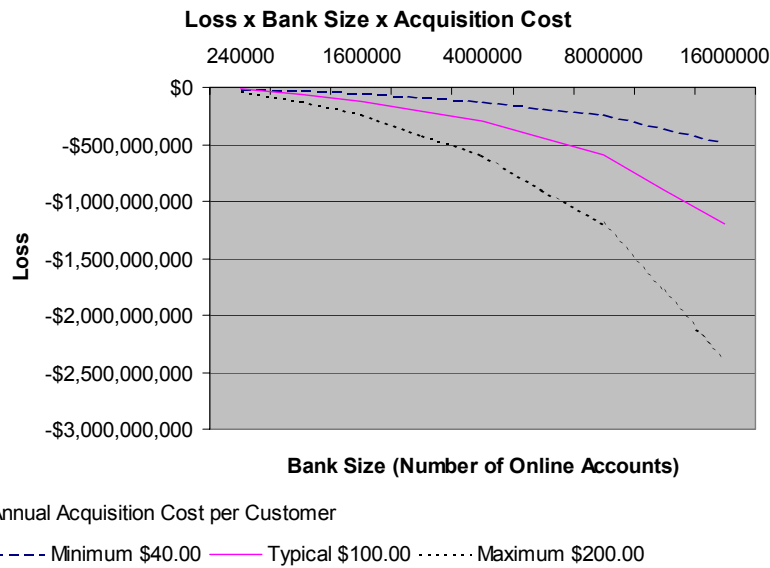
In addition to this expense, changes in the customer conversion rate due to no Account Aggregation Service provision should be considered. During the first five years, these changes should not be meaningful because the normal rate of banking customers who are already online customers is lower than 10% and the remaining 90% should be aware first of online services and their advantages, and later on, of the Account Aggregation service. Normally, the early adopters of a new technology such as Account Aggregation are already online customers [GRAEBER01].

Thus, if the financial institution does not provide the Account Aggregation service, its loss will be the cost of acquiring new customers to replace those who have switched the financial institution due to no Account Aggregation service support. This cost of acquisition will vary from \$10 for a very focused bank that works within a market niche to \$250 for large financial companies [LBC02][HBS01] (see Table 4.1).

Type of Information	Description	Default Assumptions
<b>General Information</b>	<b>Bank Size - Number of Online Customer Accounts</b> <ul style="list-style-type: none"> <li>• Small</li> <li>• Medium</li> <li>• Large</li> </ul> Average percentage of active Account Aggregation users Banking customer growth Rate (per year) Discount rate (per year) Mortgage rate (per year)	240 k–1.6 mil 2.8 – 6.0 mil 8.0 – 16 mil 50% 1 % 12% 8%
<b>Banking Costs</b>	License fee for Account Aggregation (initial payment) Cross-selling fee (per year) (percentage of license fee) Account Aggregation fee (per customer per year) Computer & network infrastructure per customer Acquisition cost of new online customers (per year) Acquisition cost for A Aggregation & no X-Selling (per year) Acquisition cost for A Aggregation and X-Selling (per year) Acquisition cost for AA and aggressive X-Selling (per year) Customer retention cost (per year)	\$10K - \$750K 10% - 30% \$5 - \$12 \$ .25 - \$ 1 \$ 40 - \$ 200 \$ 3 - \$ 9 \$ 4.5 - \$ 18 \$ 6 - \$ 24 \$ 25 - \$ 75
<b>Banking Income</b>	Average number of fund transfers per year Average Fee for asset allocation management Average percentage of AA online customer applying for credit card per year Average annual fee for credit card Average annual interest for credit card Average consumer loan Percentage of AA online customers applying for consumer loans annually Average mortgage Percentage of AA online customers applying for mortgage annually Average car value for insurance Percentage of AA online customers applying for car insurance per year Average home value for insurance Percentage of AA online customers applying for home insurance per year Average health insurance value per year Percentage of AA online customers applying for health insurance per year Average value of brokerage applications Percentage of AA online customers doing brokerage operations per year Average expenses with online advice Percentage of online customers using online advice per year Average annual fee for wireless aggregation Percentage of online customers using wireless aggregation per year	10 1% of Assets 1 % \$ 20 \$25 \$ 10,000 0.45 % \$ 100,000 0.30% \$20,000 5.00 % \$150,000 3.00 % \$ 1,500.00 5.00 % \$ 220.00 2.00 % \$10.00 1.00 % \$ 24.00 3.00 %

**Table 4.1 – Primary Assumptions**

Figure 4.1 shows how much the banks of various sizes will lose if they do not provide an Account Aggregation service. It presents the NPV from Year 1 to Year 5 at Year 1 for different bank sizes (from 240,000 online customer accounts to 16 million) and acquisition costs varying from \$40 to \$200.



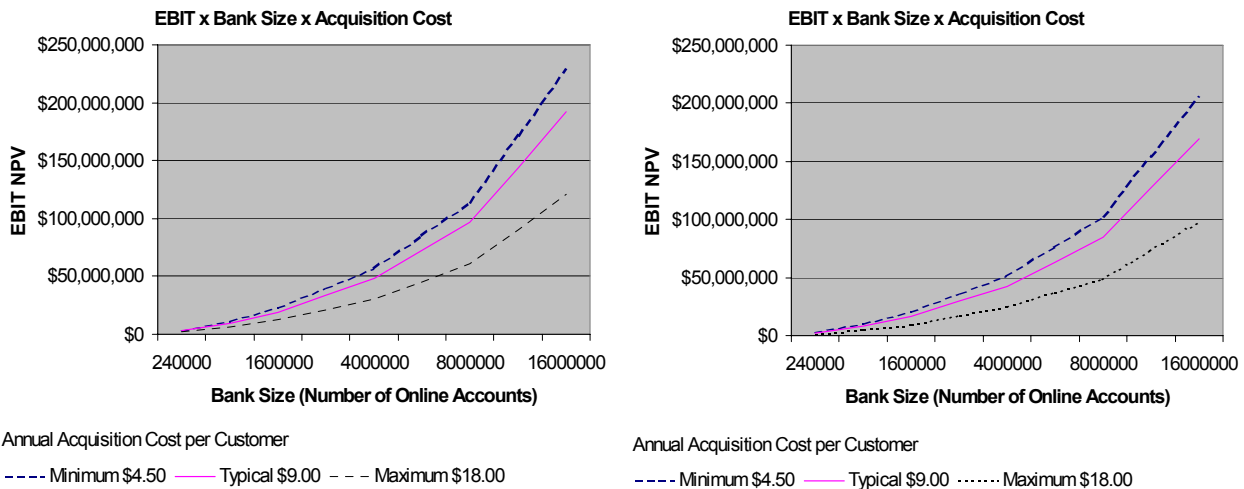
**Figure 4.1 – Loss Evaluation for No Account Aggregation Provision**

**4.3.2 Scenarios 1 and 2 - Aggregation with Web Aggregator In-House and Outsourced**

For Scenarios 1 and 2, it was determined how the return on investment for Account Aggregation is affected by changes in the customer acquisition cost, the customer retention cost and the cross-selling level. In Scenario 1, the computer and network infrastructure cost is also an important component because it increases with customer growth. Similarly, in Scenario 2, the Account Aggregation fee that is paid to the web aggregator should be considered.

**4.3.2.1 Customer Acquisition Cost**

In the case of the Scenario 1, if the customer retention cost, the computer and network infrastructure cost, and the cross-selling level are kept at typical values, and the acquisition cost varies from \$4.5 to \$18 [GRAEBER01], it can be seen that the earnings of the Account Aggregation project are greater for lower acquisition costs (see Figure 4.2-a left). The same result was obtained for the Scenario 2, keeping the customer retention cost, Account Aggregation fee and cross-selling level at typical values and varying the acquisition cost within the same range defined for Scenario 1 (see Figure 4.2-b right).

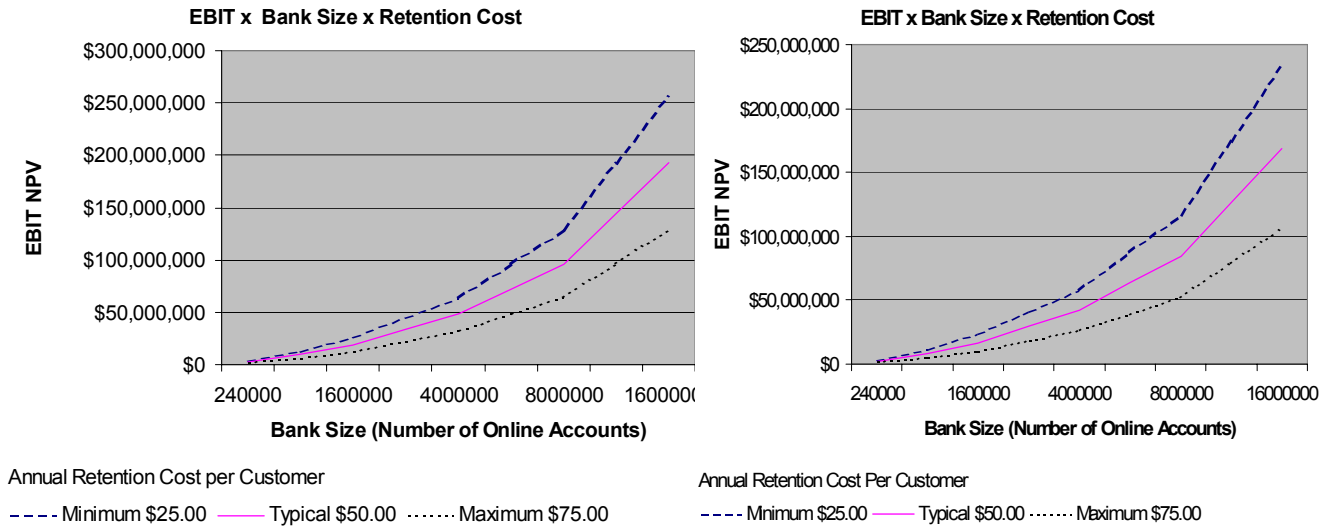


**Figure 4.2 –Evaluation of EBIT as function of Bank Size and Acquisition Cost for Scenarios 1 and 2**

Comparing the charts in Figure 4.2, it can be seen that both scenarios present the same degree of earnings variation when the acquisition cost varies.

#### 4.3.2.2 Customer Retention Cost

In the case of the Scenarios 1 and 2, if the customer acquisition cost, the Account Aggregation fees, the computer and network infrastructure cost, and the cross-selling are kept at typical values and the customer retention cost varies from \$25 to \$75 [GRAEBER01], the earnings of the Account Aggregation project decrease, but remain positive (Figure 4.3).



**Figure 4.3 – Evaluation of EBIT as function of Bank Size and Retention Cost for Scenarios 1 and 2**

The customer retention cost is related to marketing and services that are provided in order to retain customers who were already acquired. It has less influence on the final earnings of the Account Aggregation project than the acquisition cost. It can be easily explained because the total acquisition cost corresponds to a more significant portion of the total cost than the total retention cost.

#### 4.3.3.3 Cross-Selling

For typical values of the acquisition cost, the retention cost, the computer and network infrastructure cost and the aggregation fee, it is possible to evaluate the influence of cross-selling in the return on investment, taking the following into account.

- Different costs of the financial product and services.
- Different levels of cross-selling: The level of cross-selling is related to the percentage of Account Aggregation customers who are cross-sold.

Table 4.1 presents typical values for financial products and services, such as credit cards, loans, mortgages and insurance. The minimum and maximum values correspond respectively to half and double of the typical values. Some of these values are taken from specialized literature [GRAEBER01], [MOORE01], [MOORE2], [McVEY00] and others from interviews with professionals from the banking industry. Table 4.2 contains the values that were adopted for both typical and aggressive levels of cross-selling. It is assumed that the cross-selling level increases from year to year since the Year 1, when the Account Aggregation project was implemented [GRAEBER01].



	Year 1	Year 2	Year 3	Year 4	Year 5
<b>Typical</b>	0.10	0.12	0.14	0.18	0.24
<b>Aggressive</b>	0.10	0.14	0.18	0.22	0.28

**Table 4.2 – Cross-Selling Levels**

In addition, it was assumed that not all financial products and services are provided in the first year of Account Aggregation adoption. Table 4.3 shows the evolution of the financial product and service offering during the first five years since the Account Aggregation support [This information was obtained from interviews with professionals in the banking industry].

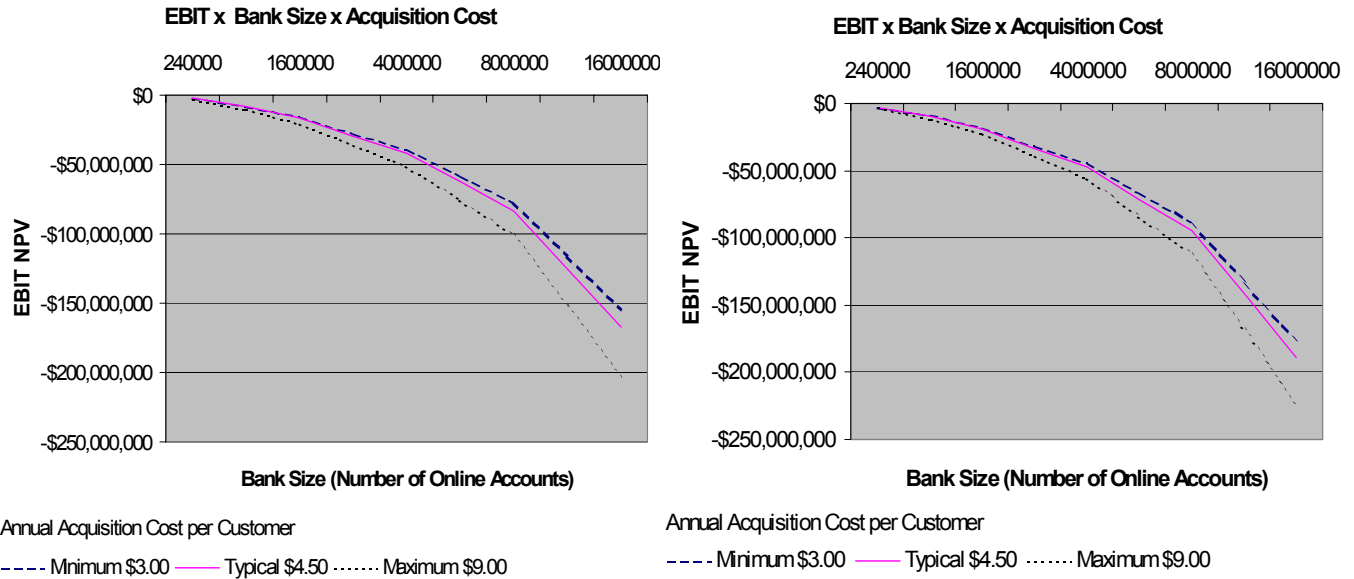
	Year 1	Year 2	Year 3	Year 4	Year 5
<b>Bill Payment</b>	x	x	x	x	x
<b>Fund Transfer</b>	x	x	x	x	x
<b>Asset Allocation Management</b>			x	x	x
<b>Credit Card</b>	x	x	x	x	x
<b>Consumer Loan</b>	x	x	x	x	x
<b>Mortgage</b>	x	x	x	x	x
<b>Car Insurance</b>		x	x	x	x
<b>Home Insurance</b>				x	x
<b>Health Insurance</b>				x	x
<b>Brokerage</b>	x	x	x	x	x
<b>Online Advice</b>			x	x	x
<b>Wireless Aggregation</b>			x	x	x

**Table 4.3 – Financial Offerings during the first 5 years since Account Aggregation adoption**

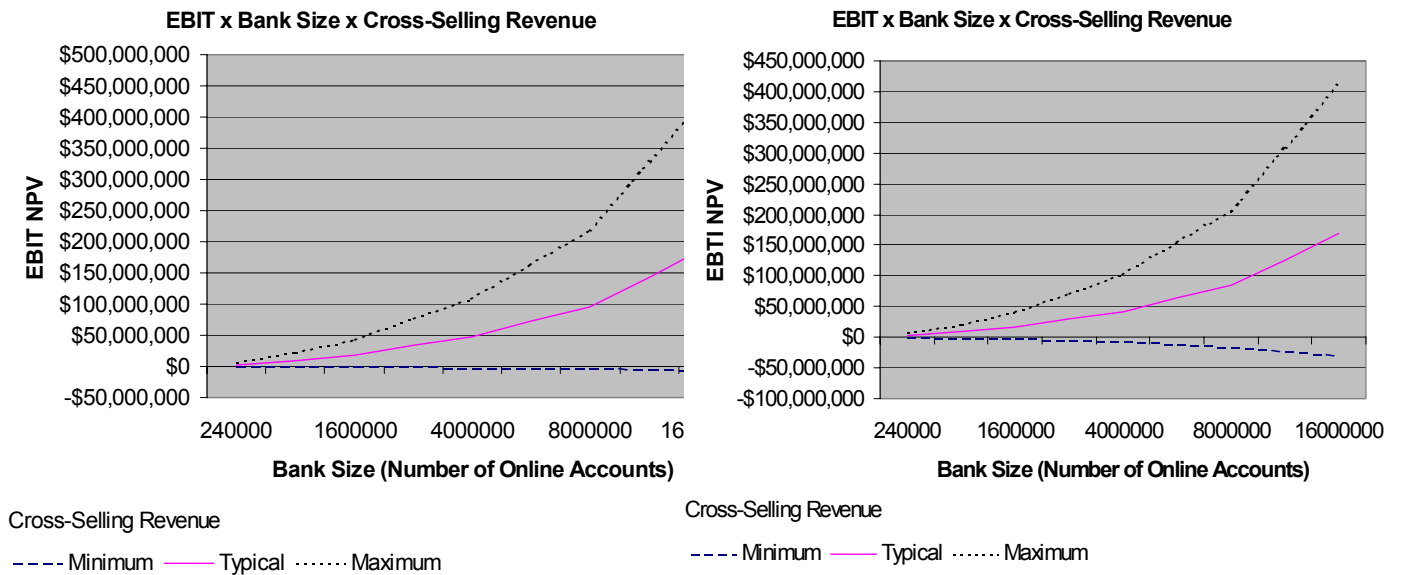
For different cross-selling levels, different earnings were achieved as follows:

- **No cross-selling:** When cross-selling functions are not supported, Account Aggregation incurs losses for Scenarios 1 and 2. Figure 4.4a shows the EBIT NPV for Years 1 to 5 at Year 1 for Scenario 1. The EBIT NPV has a negative value for different acquisition costs, varying from \$5 to \$20, and for all bank sizes. Similar values of EBIT NPV are obtained for Scenario 2 (Figure 4.4b).
- **Typical cross-selling:** When cross-selling functions are implemented, the return on investment is positive for typical and maximum revenue levels of the cross-sold products and services for both Scenarios 1 and 2. Figure 4.5a shows the EBIT NPV for Years 1 to 5 at Year 1 for Scenario 1. Lower EBIT NPVs are obtained for Scenario 2 for all bank sizes (Figure 4.5b).
- **Aggressive cross-selling:** In the case of aggressive cross-selling, the financial institution tries to push product and service sales through a more focused marketing based on market segmentation. This market segmentation is defined taking as basis the customers' profile, which can be known through the aggregated data owned by the financial institution. In addition, the financial institution offers its products and services to customers more often than in the case of typical cross-selling.

When aggressive cross-selling is delivered, the return on investment is positive for typical and maximum revenue levels of the cross-sold products and services for both Scenarios 1 and 2. Figure 4.6a presents the EBIT NPV for Years 1 to 5 at Year 1 for Scenario 1. Lower EBIT NPVs are obtained for Scenario 2 for all bank sizes (Figure 4.6b).



**Figure 4.4—Evaluation of EBIT as function of Bank Size without Cross-Selling for Scenarios 1 and 2**

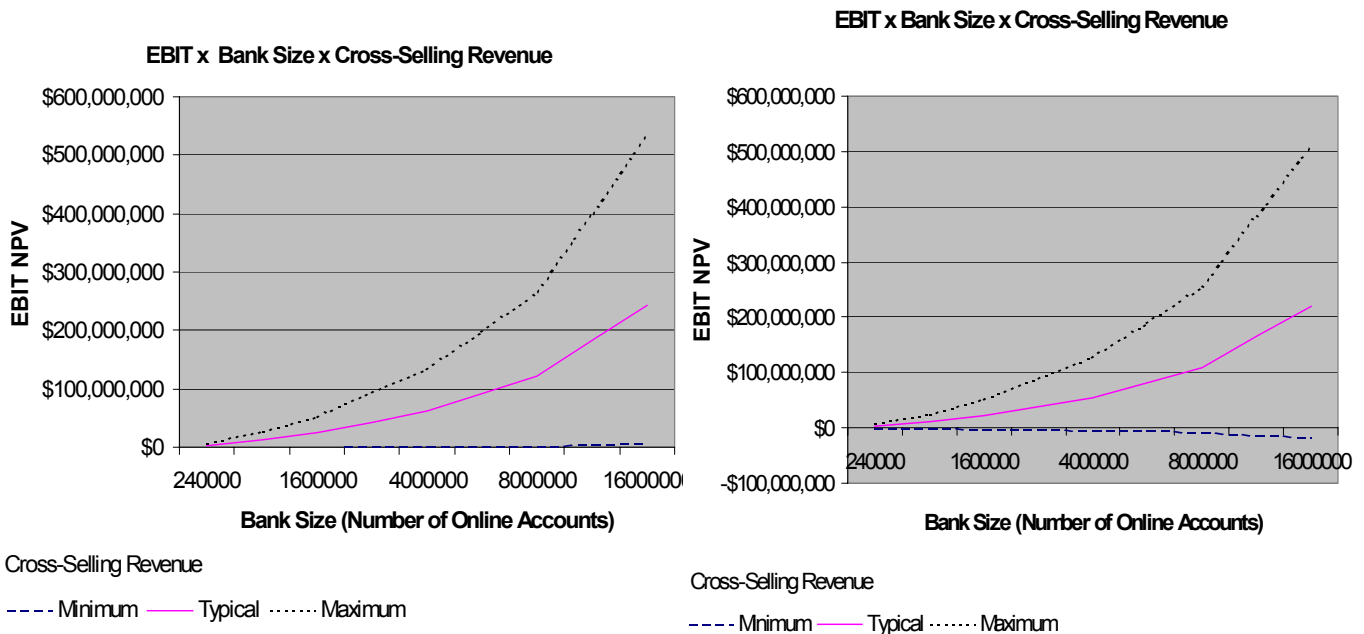


**Figure 4.5 –EBIT as function of Bank Size with Typical Cross-Selling for Scenarios 1 and 2**

Table 4.4 shows the estimated minimum cross-selling revenue per year per Active Account Aggregation customer in the case of typical and aggressive cross-selling. The revenue increases meaningfully in Years 4 and 5, in Year 4 two more new products and services are offered, home insurance and health insurance.

Level of Cross-Selling	Year 1	Year 2	Year 3	Year 4	Year 5
<b>Typical</b>	\$ 6.15	\$ 6.23	\$ 9.53	\$ 36.36	\$49.37
<b>Aggressive</b>	\$7.35	\$7.43	\$ 12.09	\$44.37	\$57.72

**Table 4.4 – Cross-Selling Revenue per Year per Active Account Aggregation Customer**



**Figure 4.6 – Evaluation of EBIT as function of Bank Size with Aggressive Cross-Selling**

Comparing the different levels of cross-selling, it was verified that if the cross-selling is not supported, the Account Aggregation project earnings tend to be negative. In the case of the typical and the aggressive cross-selling, the earnings have positive values when the revenue from products and services are at typical and maximum values. The aggressive cross-selling always results in greater earnings than with typical cross-selling.

#### 4.3.3.4 Account Aggregation Fee

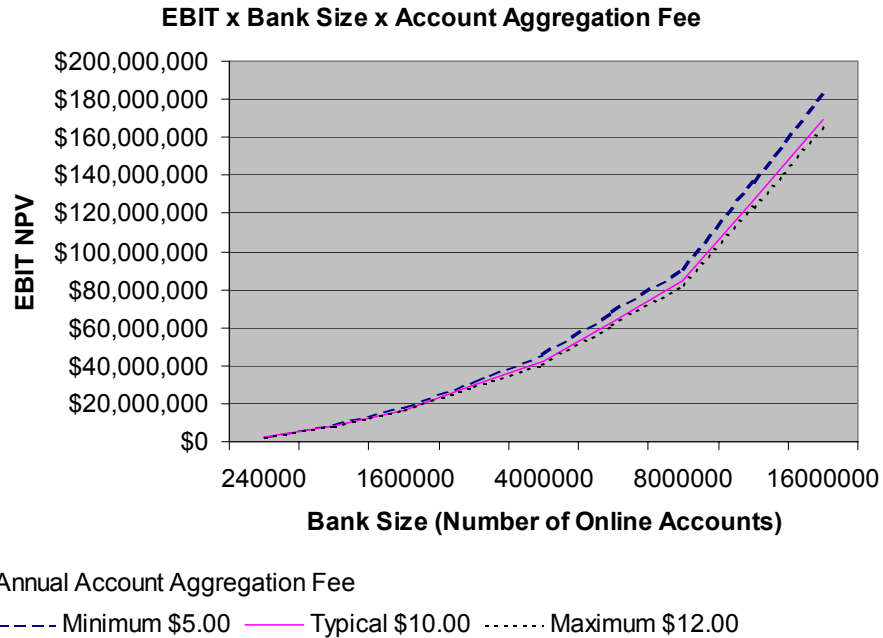
In Scenario 2, the web aggregator functions are outsourced. Here, the financial institution must pay an initial license fee at project start-up and a monthly per user Account Aggregation fee. This Account Aggregation fee varies from \$5 to \$12 per year [MOORE02].

Figure 4.7 shows how the return on investment of the Account Aggregation project is influenced by the Account Aggregation fee variation for typical values of acquisition cost, retention cost and cross-selling. Within this range, the Account Aggregation fee has less impact on the earnings than acquisition cost, retention cost and cross-selling.

#### 4.3.3.5 Computer and Network Infrastructure Costs

In Scenario 1, the computer and network infrastructure costs are comprised of an initial investment and an annual investment due to the customer base growth. The initial investment includes the acquisition of the computer and network infrastructure, as well as the technology acquisition fee and the customisation and implementation cost. It is assumed that the initial system has a scalability of 30%. Then, if the customer base growth rate per year is greater than 15%; it becomes necessary to do new investments in the computer and network infrastructure.

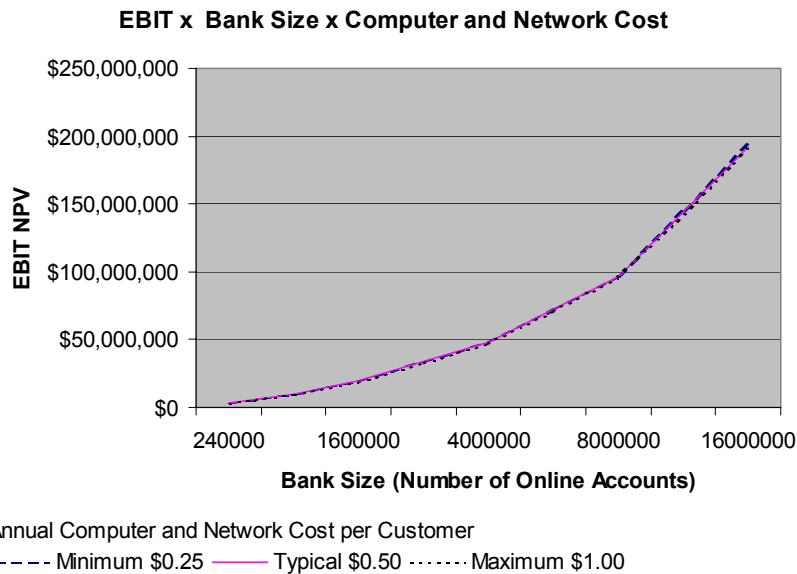
For typical values of the customer acquisition cost, the customer retention cost and the cross-selling levels and for the computer and network costs per user varying from \$0.25 to \$1.00, earnings have positive values for all bank sizes (Figure 4.8). The computer and network cost has less impact on the earnings values than acquisition cost, retention cost and cross-selling.



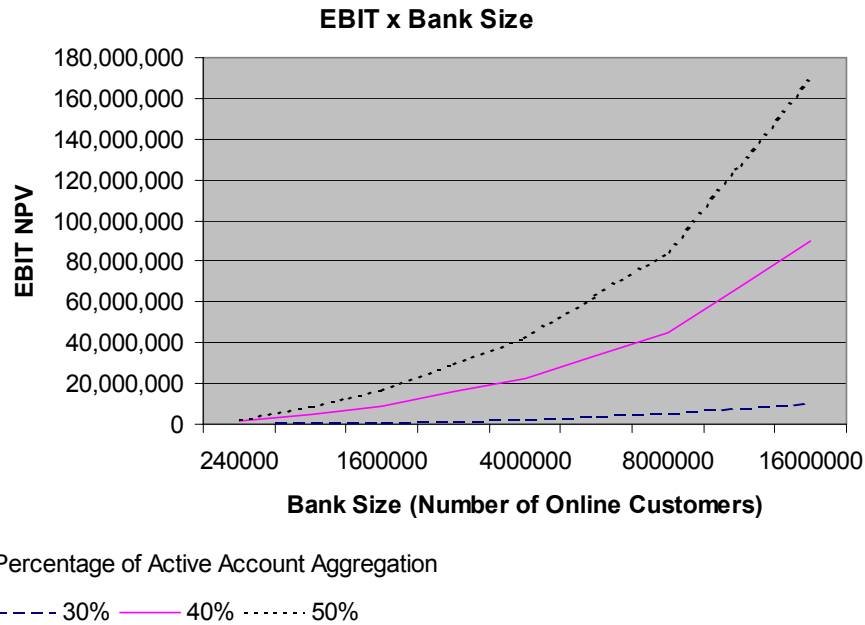
**Figure 4.7 – Evaluation of EBIT as function of Bank Size and Account Aggregation Fee**

4.3.3.6 The Active Account Aggregation Customer

Finally, it is important to note that the percentage of active Account Aggregation customers has a major impact on Account Aggregation returns, as it can be seen in Figure 4.9. As the cross-selling is the most important source of revenue, if a lower percentage of the Account Aggregation customers are cross-sold, it immediately results in lower earnings. This indicates that the financial institution should attempt to keep these customers active through focused marketing or promotion campaign.



**Figure 4.8 – Evaluation of EBIT as function of Bank Size and Computer and Network Cost**



**Figure 4.9 – Impact of Active Account Aggregation on EBIT**

#### 4.4 Web Aggregator In-House versus Outsourced

In Scenario 1, if the computer and network costs vary within the specified range, the simulation reveals that they do not have a meaningful impact on the final return on investment. Similar results were obtained for the Account Aggregation fee in Scenario 2.

For both scenarios, the cross-selling and the customer acquisition cost are the factors that have the greatest effect on the return on investment. They are followed by the customer retention cost. The customer acquisition cost should be reduced through well-focused marketing and proper market segmentation. The cross-selling should be improved through better knowledge of customer needs and a more comprehensive offer of financial products and services.

Comparing Scenarios 1 and 2 with Scenario 0, it was verified that Scenario 0 and Scenarios 1 and 2 without cross-selling support have a negative EBIT NPV. Both Scenarios 1 and 2 will have a positive EBIT NPV for typical and aggressive cross-selling when the financial products and services have at least typical revenues. Figure 4.10 compares the NPV for the Scenarios 0 and 2 with typical, aggressive and no cross-selling. Similar results were obtained for Scenario 1.

The business model associated with Scenario 1 is more profitable and results in somewhat earlier earnings than the business model associated with Scenario 2. Given typical values for the cross-selling, the acquisition cost, the retention cost and the computer and network cost, Scenarios 1 and 2 begin to generate a significant positive earnings in the fourth year after the Account Aggregation project was launched (see Figures 4.11 a and b).

## EBIT NPV x Bank Size

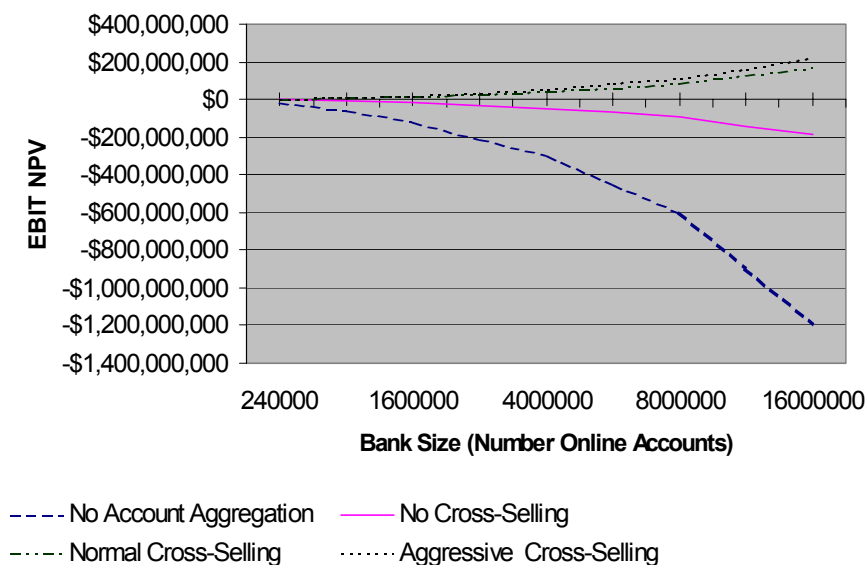


Figure 4.10 – EBIT Comparison for Scenario 0 and 2

## 5. Account Aggregation Analysis

### 5.1 Business Model Analysis

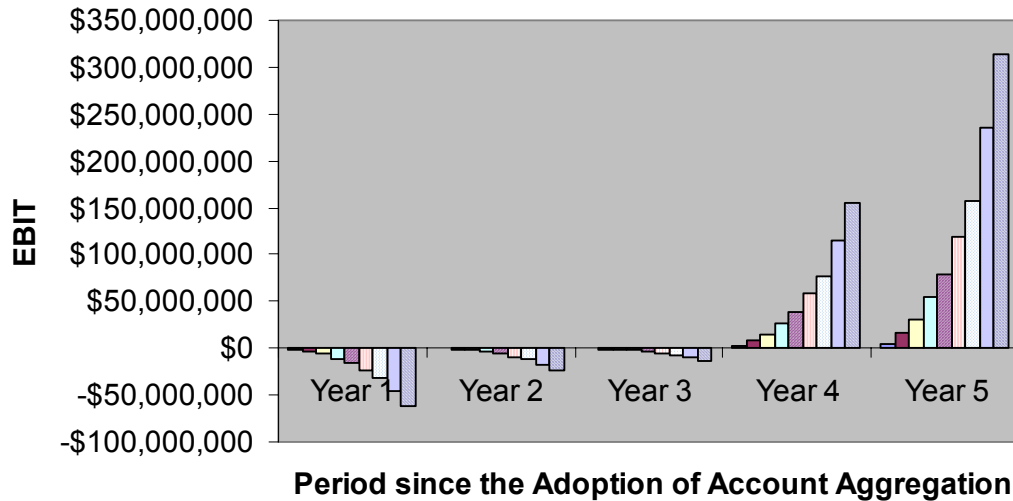
Two basic business models were analyzed **Aggregation with Web Aggregator In-House** and **Aggregation with Outsourced Web Aggregator**.

For each of these business models, the EBIT of an Account Aggregation project was estimated and the impact on these earnings related to the customer acquisition cost, customer retention cost, the cross-selling level, the Account Aggregation fee paid to the web aggregator, the computer and network cost, and the Account Aggregation cost charged to the customer, were evaluated. This evaluation was performed through a series of simulations, the results of which were discussed in Section 4.

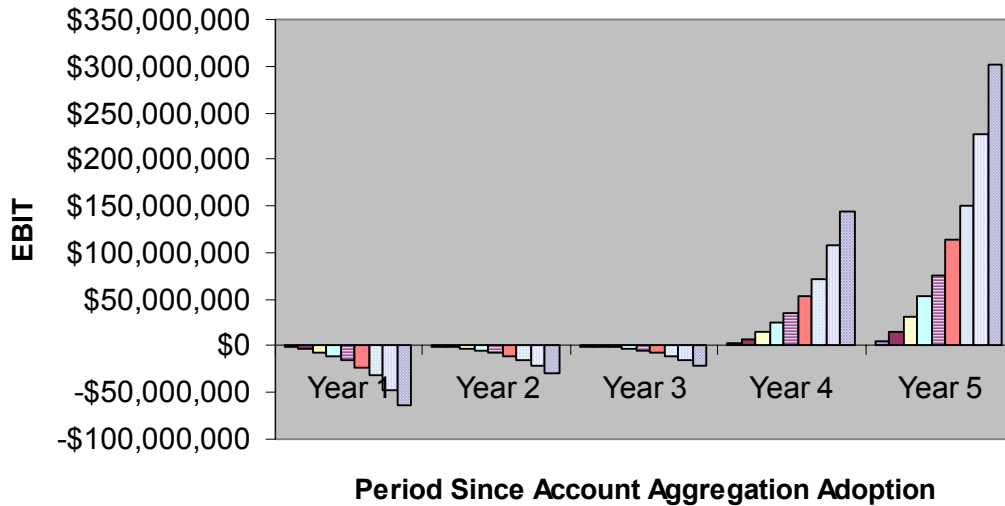
The following are the primary conclusions of this investigation.

- Account Aggregation is a compelling technology that should become a commodity in the sense that most important banks will provide it, and it will represent no more a differentiated competitive advantage. If the financial institutions decide not to provide Account Aggregation service, they will lose customers and the acquisition cost of new customers to replace old ones will be significant. In the case of the simulations, the proposed business models were compared to the business model without the support of an Account Aggregation service. Taking into account a steady acquisition cost over a period of five years, the loss for not supporting Account Aggregation is very high, particularly for the larger banks.
- Account Aggregation services without cross-selling results in losses for a financial institution. It means that Account Aggregation makes little sense without cross-selling, especially in long term when it will turn a commodity. It is better to provide Account Aggregation without cross-selling instead of not providing Account Aggregation at all.

### Scenario 1 - EBIT per Year for Different Bank Sizes



### Scenario 2 - EBIT per Year for Different Bank Sizes



Bank Size (Number of Online Accounts)

- 240 K   ■ 800 K   ■ 1.6 mil   ■ 2.8 mil   ■ 4.0 mil   ■ 6.0 mil   ■ 8.0 mil
- 12 mil   ■ 16 mil

**Figure 4.11 – EBIT per Year since Account Aggregation Adoption for Scenarios 1 and 2**

- Two levels of cross-selling were considered: typical and aggressive. The typical level supposes that, in Year 1 of the Account Aggregation adoption, only 10% of the Account Aggregation customers will be cross-sold, and its level reaches the maximum value of 24% in Year 5. The aggressive level begins at the same start value, increases faster and reaches 28% in Year 5. For these cross-selling levels, three revenue ranges of the cross-sold products and services were defined: minimum, typical and maximum. The typical corresponds to the current price of these products and services, the minimum to the half of the typical values, and the maximum to the double of the typical values.

For the typical level of cross-selling and the typical revenue of the cross-sold products and services, the earnings of the Account Aggregation project is positive, but very sensitive to the revenue of those cross-sold products and services. If there is some reduction in this revenue, the earnings tend to be negative.

Theoretically, then, the solution would be to increase the revenue (increasing, for example, the price of the products) or the cross-selling level. But the first option may have to be discarded, because Account Aggregation makes the banking market even more competitive and should drive down prices. Then the only solution would be to enhance the level of cross-selling. The enhancement of cross-selling can be achieved through very focused marketing and an integrated CRM solution capable of pooling aggregated data to produce sophisticated customer profiles [McVEY00].

- Another important component of an Account Aggregation project is the cost of customer acquisition, which is related to marketing expenses. It should be minimized through focused marketing strategy based on sophisticated customer profiles.
- The cross-selling and the customer acquisition cost are followed by the customer retention cost. The retention cost is related to the marketing and services expenses incurred in retaining Account Aggregation customers. As the Account Aggregation is considered a sticky technology, in the long run, it will be necessary to spend less to retain customers. As consequence, the effect of the retention cost on the earnings of the Account Aggregation project tends to be low [McVEY00].
- In the case of the outsourced web aggregator, the Account Aggregation fee paid to the web aggregator has no major impact on the earnings of the Account Aggregation project. If a financial institution has outsourced the web aggregator, it normally implements the cross-selling in-house and pays the web aggregator for the customer data necessary to implement the cross-selling. This payment corresponds to an annual fee, and has no major impact on the final project earnings.
- When the web aggregator is outsourced, the Account Aggregation project begins to have a positive value in the fourth year. If it is not outsourced earnings will also begin in the fourth year but will be somewhat greater. This implies that the **Aggregation with Web Aggregator In-House** is the most profitable.
- Finally, the percentage of active Account Aggregation accounts has a significant impact on project earnings. In the simulations, it was assumed a percentage of 50% active customers, however the actual percentage may be much lower. Thus, it is recommended that financial institutions adopt a strategy in order to keep active a higher percentage of the aggregated accounts.

## 5.2 Short and Long-Term Recommendations

Based on the analysis of return on investments and on the trends of the Account Aggregation, we make the following recommendations:

- As Account Aggregation is a sticky technology and it is very important to maintain the relationship with the customer, the first mover advantage is crucial.

If the financial institution decides to implement the web aggregator functions in-house, it will take more time to provide the Account Aggregation service than those financial institutions that outsource it. Thus, in the short run, to outsource the web aggregator function seems to be a reasonable solution. However, it should move towards an in-house implementation due to greater earnings and control over the customer data. To have control over customer data gives the financial institution more autonomy to implement cross-selling and protection against security, as well as the ability to address other administrative problems with the web aggregator. If the web aggregator company is sold to a



competitor financial institution, it cannot be guaranteed what will happen with the other aggregated financial institutions.

An intermediary solution would be to acquire the Account Aggregation system from market vendors and then customize it. This approach decreases the time to launch the Account Aggregation service, and, in the long run, turns the Account Aggregation project more profitable.

- Cross-selling has a very positive impact on the earnings of the Account Aggregation project. To enhance it, sales tool, such as sales advisor [URBAN02], and an integrated CRM solution capable of pooling aggregated data to produce sophisticated customer profiles, can be adopted. However, the implementation of the cross-selling function requires integrated data not only of the investment and commercial banks, but also of the credit card operators. Normally, there is not such integration in the banks. Thus, the implementation of cross-selling functions is not straightforward and it will take time.
- Screen scraping technology has problems with accuracy and scalability. So, in the long run, Account Aggregation should move towards an open solution and continue to support screen scraping in order to access institutions that do not adopt open standards.
- Cross-selling has a very positive impact on the earnings of the Account Aggregation project. To enhance it, sales tool, such as sales advisor [URBAN02], and an integrated CRM solution capable of pooling aggregated data to produce sophisticated customer profiles, can be adopted. However, the implementation of the cross-selling function requires integrated data not only of the investment and commercial banks, but also of the credit card operators. Normally, there is not such integration in the banks. Thus, the implementation of cross-selling functions is not straightforward and it will take time.
- Financial institutions should attempt to improve the percentage of the Account Aggregation customers who continue to use the service after enrollment.

## **7. Acknowledgements**

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