



A Primary Matters Total Cost of Ownership/ROI Analysis . . .

The Impact of a Next Generation Voice Recognition Solution on Credit Union and Banking IVR Applications

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Primary Matters, Inc.

(902) 794-7095

www.primarymatters.com

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Executive Summary

Voice Recognition solutions continue to evolve in quality and ease of use. This analysis focuses on the approach offered by the next generation of voice recognition applications, which may be developed using the emerging application development platforms from a variety of companies. Typically, the companies developing these platforms are beginning to offer XML-based scripting languages ready for building packaged applications. They also use underlying voice technology from companies such as Nuance and Speechworks.

The goal of these platforms is to make it easier for an organization to include voice recognition in a company's portfolio of customer service options. The goal being a significant impact on both cost savings and increased customer satisfaction.

Just as Touch-Tone based Integrated Voice Response (IVR) has revolutionized the interface to customer service centers over the last 10 years, voice recognition solutions are likely to do the same. Those companies, who embrace the technology making it a seamless part of their service environment, will find their costs per customer decreased. These companies will also find greater customer loyalty and increased new customer attraction. This will increase their market share.

This analysis describes the financial and customer relationship impact of replacing a classic banking Touch-Tone IVR application with voice recognition. The usage data describing the Touch-Tone application is based on actual data. The post-voice recognition changes are based on analyzing the impact that voice recognition would have on the use of touch-tone applications. In this analysis the bank receives 100,000 calls a month from a base of 200,000 customers. The impact of voice recognition can be summarized as:

- Over a 16-month phase-in, use of the IVR grows significantly because of ease and speed.
- The average duration of each IVR usage declines to almost half of the time used during a Touch-Tone interface.
- Calls transferred to Agents decline by about a third saving major labor expenses.
- Customer satisfaction increases lengthening the average customer life cycle by about 20%.
- Profits and revenues of the financial institution increase significantly over the three-year period due to heightened customer satisfaction.

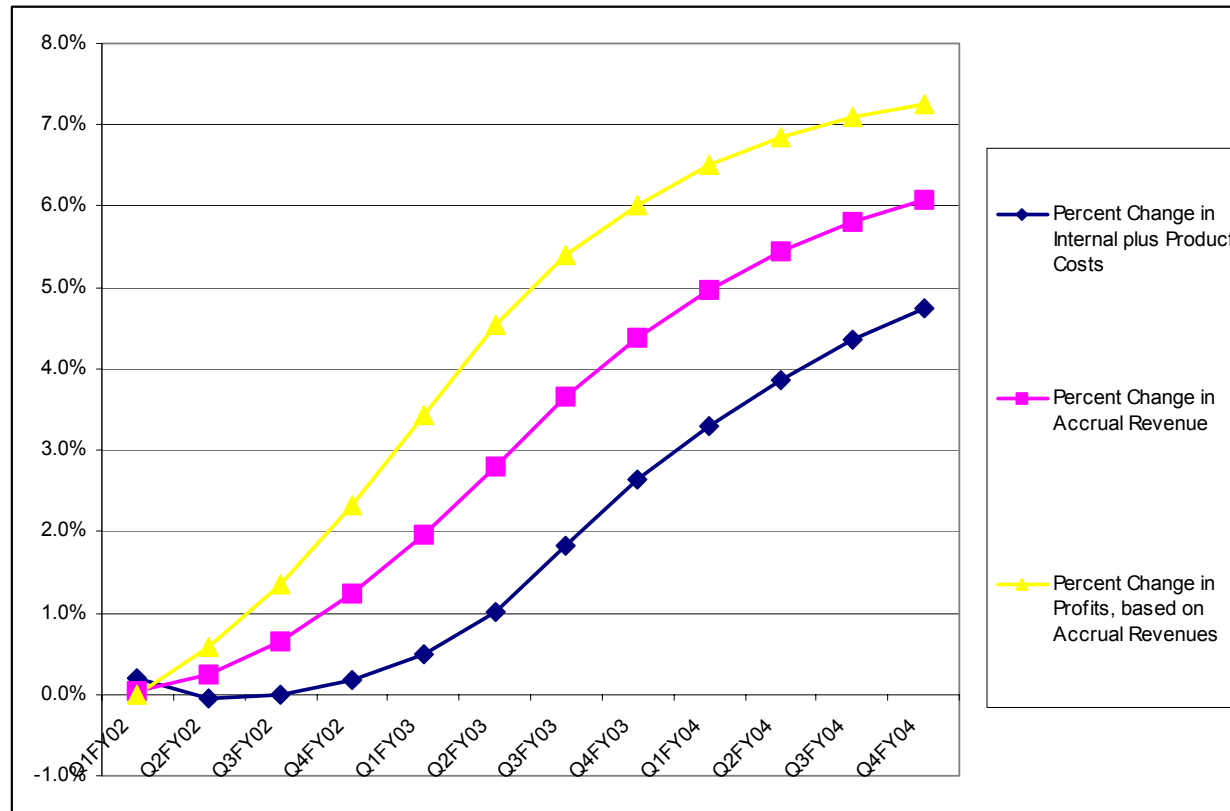
Impact on the Customer Base and Financial Performance of a Small Financial Service's Retail Banking Business

The following table and graph summarize the impact of voice recognition. The customer base grows, and revenues and profits increase significantly. The product costs increase due to the larger number of customers remaining with the bank longer.

Total Customers at start of Model					200,000
Total Customers after Three Years					
Customers when Touch-Tone IVR Interface to Bank					468,200
Customers when Voice Recognition IVR Interface to Bank					497,000
Change in Number of Customers					28,800
% Change in Customer Base at end of 3 Years					6.2%
Cash Revenues & Product Costs	Year 1	Year 2	Year 3	Cumulative over 3 Years	
Changes in Cash Revenues	\$ 342	\$ 2,484	\$ 6,198	\$ 9,024	
Changes in Internal Operations Costs	\$ (58)	\$ (311)	\$ (454)	\$ (823)	
Changes in Product Costs	\$ 72	\$ 886	\$ 2,610	\$ 3,569	
Total Changes in Costs (Operations Plus Product)	\$ 14	\$ 575	\$ 2,156	\$ 2,745	
Changes in Contribution to the Company (P & L)	\$ 328	\$ 1,909	\$ 4,042	\$ 6,279	
Total Cost of Ownership for Technology	\$ 117	\$ 122	\$ 181	\$ 420	
ROI on TCO Changes in Cash Flows, Internal Costs Only	50%	154%	196%	196%	
ROI on TCO Changes in Cash Flows, including Revenue & Product Cost	281%	935%	1494%	1494%	

This graph illustrates the impact on the major financial measures of the bank.

Impact of Voice Recognition on Bank's Financial Performance



Assumptions Used in the Small to Medium Financial Service Company Analysis

The information in this document is based on a small financial services company offering retail banking, loans and credit card services to its customers. A Touch-Tone based IVR application is used as the first point of contact to all callers. They can choose to go directly to Contact Center Agents, or to use the IVR application to receive the information and service they need.

The basis of the data and estimates in this document are:

- The analysis of caller usage, call lengths and transfer rates are based on research data from a small financial service's IVR application.
- Data supporting the costs of personnel, technology and telecommunications services are based on research across multiple organizations.
- The revenue and product costs for the banking products are estimates.
- The contact ratio per customer (one time every two months) is also an estimate.
- The scenario data describing the impact of voice recognition on these applications is based on estimates.
- This model uses a phase-in schedule of 16 months for the changes in caller behavior and consequent financial benefit of adding the voice recognition solution to its user interface.

The Call Model

A simple call model is used in this analysis:

- Calls arrive at the IVR Application where the primary Greeting Menu is played to the caller.
- A proportion of Callers who are familiar with the IVR Application immediately enter the number they need to go to the next menu bypassing the IVR Application.
- Callers listening to the Greeting Menu choose to either go into the Banking IVR Application, or choose to go directly to agents for service.
- When Callers transfer to Agents:
 - The caller is in queue for 30 seconds, and on average 2% of the calls drop out of the queue
 - The caller is transferred to an available Agent, who on average, talks with the customer for 3 minutes
 - At call termination, the agent does 'after-call work' which averages 30 seconds per call, and is required for half of the calls.

- Those using the IVR Application go through the menus obtaining the information they need. Some percentage of these callers will also opt out to Agents during their interaction with the IVR Application.

The following table illustrates the major flow of calls into the organization (based on actual data). It also provides estimates of the impact of voice recognition on call flow.

Major Categories of Call Handling and IVR Application Menu Usage	Touch-Tone User Interface	Voice Recognition User Interface
Calls that immediately bypass IVR Application and go to Agents	25.6%	15.0%
All Calls that use the IVR Application, some of which consequently transfer to Agents	74.4%	85.0%
Calls that use the IVR Applications and never are transferred to Agents	51.9%	68.8%
Calls that either immediately, or during use of the IVR Application, transfer to Agents	48.1%	31.2%
Average Weighted Duration of IVR Usage per Call	114.4 seconds	62.7 seconds

Benefits of Voice Recognition to Financial Service Companies using IVR Applications

BENEFIT 1: Shorter period of time using IVR due to simpler, faster entry of information using verbal responses instead of Touch-Tone responses

- ***Fast, information requests, bypassing traditional IVR Menu structures***

With a voice recognition solution, users will no longer be restrained by a structured menu approach. For instance, after the caller is authenticated, they will be able to state their interest. A caller can state “Checking Balance”, and two menus will be bypassed saving between 40 and 100 seconds.

After receiving this, the caller might state, “VISA Balance,” bypassing the traditional IVR menu tree (going up and back down) to get their VISA balance. In a traditional environment, the callers opt to the customer service representative to obtain the information to avoid the annoying IVR navigation at a much higher cost to the bank.

- ***Faster and more accurate numeric data entry***

Even if the caller does use the menu structure, it takes less time to speak the entry and there is more accuracy than attempting to enter 12 and 16 digit numbers using Touch-Tone.

These changes in the IVR usage time and the reduction in call transfers to Agents are quantified in the next several pages of this document.

BENEFIT 2: Higher Use of IVR Scripts for Customer Service and Fewer Transfers to Customer Service Agents During IVR Usage

Two major themes are present in the increased IVR productivity from voice recognition technologies when compared to Touch-Tone based IVR applications:

- ***Fewer Users Dial ‘0’ to go immediately to agents***

Studies comparing voice recognition with the traditional Touch-Tone approach show that there is a higher usage of the IVR applications. This is due to the ease of speaking one’s responses, and to the fact that caller’s sometimes are not able to use Touch-Tone, for instance while in automobiles using cell phones.

The impact of this varies by application but it can be assumed that as users become acclimated and know that they can 'speak' instead of using Touch-Tone there can be a reduction anywhere from 25% to 75% in the use of Agents for those roles which are supported by the IVR applications

- ***Fewer Users transfer to Agents in the middle of the IVR Scripts due to frustration***

Users often become frustrated with IVR solutions. This leads to 3% of the users, who have already started the IVR application, giving up in frustration and requesting an Agent.

Voice recognition reduces both the frustration factor and the mistake factor, which leads to the Agent Transfer request.

- **BENEFIT 3: Higher Customer Satisfaction reducing churn and increasing new customer acquisition rates**

For those financial institutions that successfully incorporate voice recognition into their organizations, customers will increase their usage of IVR applications due to their increased satisfaction with the interface. Noting that the IVR handles more than 50% of the calls into smaller credit union and bank contact centers and 80% of calls into larger banks, the importance of customer satisfaction with the IVR applications is paramount.

Quantifying Benefit 1: Time Savings due to simpler, faster entry of information using voice recognition

The following tables outline the usage of the most important of the IVR menus, and compare a Touch-Tone IVR Application environment with a Voice Recognition Application environment. The duration of a session using voice recognition is 54% shorter, 52 seconds less per caller, than using Touch Tone. This benefit takes about 16 months to phase in, as the Caller's become accustomed to Voice Recognition and begin to use it more. The impact of upgrading to voice recognition is summarized in the following table.

This analysis highlights the impact of voice recognition on the four menu choices that account for 70% to 80% of the typical IVR application usage in a credit union or small bank. These choices are the 'Greeting Menu', 'Caller Authentication', 'Retail Banking Menu', and 'Checking Account Status' menu.

Usage Patterns and Durations, by Prompt, for Touch-Tone and Voice Recognition-based IVR Application

Major Categories of Call Handling and IVR Application Menu Usage	Percent of Total Calls arriving at the Financial Services Company		Time (seconds) Caller listens and responds to each IVR Application Menu	
	Touch-Tone User Interface	Voice Recognition User Interface	Touch-Tone User Interface	Voice Recognition User Interface
Calls, using the IVR Application				
Calls, listening to the Greeting Menu & Making their choice	74.4%	85.0%	40.0	27.2
Calls requiring Account ID and Authentication (PIN or equivalent) via Authentication Menu	74.4%	85.0%	50.0	22.0
Calls using Retail Banking Applications Menu	53.1%	60.2%	11.9	5.3
Calls using Checking Account Status Menu	44.0%	49.9%	21.7	13.7
Calls using Other IVR Banking Application Menus (estimated times)	9.1%	10.3%	25.0	15.0
TOTAL of All Calls that use the IVR Application	74.4%	85.0%		
Total Weighted Average Time Using IVR Applications				
	Weighted Average Duration using Touch-Tone Interface		114.4 seconds per call	
	Weighted Average Duration using Voice Recognition Interface		62.7 seconds per call	

Analysis of Calls Transferring to Agents Comparing a Touch-Tone Interface with a Voice Recognition User Interface

Major Categories of Call Handling and IVR Application Menu Usage	at the Financial Services	
	Touch-Tone User Interface	Voice Recognition User Interface
Call transferring to Agents		
Calls, arriving at the IVR Greet Menu, immediately transferring to Agents with no PIN or ID	25.6%	15.0%
Calls, using the IVR Application, transferring directly to Agents after Caller Authentication	21.3%	15.0%
Calls, transferring to Agents, after using IVR Menus	1.2%	1.2%
Total Calls going to Agents, either immediately or from IVR Application	48.1%	31.2%

Guide to the IVR Application Menu Analysis Tables

The following terms define the table headers that follow.

Function Used	Percent of Callers using this function
ByPass	Percent of Callers immediately entering their choice, by-passing the full script
Listening	Percent of Callers listening to this menu prompt, and then choosing it
Cumulative Listening	Percent of Callers who listen to this menu prompt, and then either choose it or listen to the next prompt
Incremental Prompt Time	Time it takes to listen, and sometimes respond, to each prompt
Caller Response Time	The total duration, up to the time that a prompt is chosen, that the Caller listens to this menu
Weighted Time	The weighted average time that this prompt is listened to. This is equal to the (Caller Response Time) times the (Cumulative Listening) percent.

The Initial Greeting Menu

Current IVR Application:

This example IVR menu typically greets each caller to a financial services company when their main number is called. Of the new call arrivals 75% of the callers go through this menu and 25% immediately make their choice, either by dialing '0' to go directly to an agent or by choosing another option going directly to the next IVR application menu.

With a Touch-Tone User Interface:

Touch-Tone based IVR Menu							
	Function Used	ByPass	Listening	Cumulative Listening	Incremental Prompt Time	Caller Response Time	Weighted Time
Greeting to All Callers	100.0%	25.0%	75.0%	75.0%	10	10	7.5
Selections available to Callers							
Dial by Name Directory	1.4%		1.1%	75.0%	8	18	6.0
TO IVR Banking Application	53.1%		39.8%	73.9%	8	26	5.9
To Lending Center	3.1%		2.3%	34.1%	8	35	2.7
To Agents (enter ID & PIN)	22.7%		17.0%	31.8%	8	45	2.5
3-5 other misc prompts	5.4%		4.1%	14.8%	24	70	3.6
Repeat this menu to choice	14.3%		10.7%	10.7%	40	110	4.3
Percent of Total Callers who reach this menu			75.0%				
Of callers reaching this menu, what percent listen to it			75.0%	Total Weighted Average Duration of this Script		40.0	

Under the Touch-Tone IVR Applications approach, the average time spent on this menu is 43.8 seconds.

With a Voice Recognition User Interface:

Most callers to a small bank or credit union are reasonably familiar with the IVR application content and know why they are calling. These callers will be able to state "I want to talk to an Agent." or "I want my checking balance." and the application will pass them to the next step, for instance, requesting a User Authentication, saving time.

The following chart provides an example of the new timing associated with a menu using Voice Recognition

Voice Recognition based IVR Script							
	Function Used	ByPass	Listening	Cumulative Listening	Incremental Prompt Time	Caller Response Time	Weighted Time
Greeting to All Callers	100.0%	59.0%	41.0%	41.0%	10	10	4
Selections available to Callers							
Dial by Name Directory	1.4%		1.0%	41.0%	8	18	0
TO IVR Banking Application	53.1%		18.0%	40.0%	8	26	5
To Lending Center	3.1%		3.0%	22.0%	8	35	1
To Agents (enter ID & PIN)	22.7%		9.0%	19.0%	8	45	4
3-5 other misc prompts	5.4%		5.0%	10.0%	24	70	4
Repeat this menu to choice	14.3%		5.0%	5.0%	40	110	6
Percent of Total Callers who reach this menu			85.0%				
Of callers reaching this menu, what percent listen to it			41.0%	Total Weighted Average Duration of this Script		27.2	

With Voice Recognition, the average time per contact for using this menu is 27.2 seconds a savings of about 12.8 seconds per caller.

The number of callers transferring to Agents declines, since more callers will use the Voice Recognition interface. They don't have to remember their Account ID and PIN, and the interface is easier when driving and using cell phones.

Percent immediately transferring to Agents with Touch Tone User Interface	25%
Percent immediately transferring to Agents with Voice Recognition User Interface	15%

The number of callers listening to this menu declines significantly with voice response, since a caller can state, “Checking Balance” and bypass this menu without having to key into the telephone set. The estimates of use of this menu are:

Percent using this menu with Touch Tone User Interface	75%
Percent using this menu with Voice Recognition Interface(declines due to bypassing menu)	41%

The User Authentication Menu

Whenever a user chooses to go for the IVR Banking application menu or they immediately choose to talk to an Agent, they are requested to enter their Account Number and PIN for Identification. Of the calls arriving at the bank’s main number, this typically represents about 75% of the callers.

Current IVR Application:

Touch-Tone based IVR Menu							
	Function Used	ByPass	Listening	Cumulative Listening	Incremental Prompt Time	Caller Response Time	Weighted Time
Please enter your account number, followed by the # key	100.0%	0.0%	100.0%	100.0%	30	30	30.0
Please enter your PIN, followed by the # key	100.0%		100.0%	100.0%	20	50	20.0
Percent of Total Callers who reach this menu			75.0%				
Of callers reaching this menu, what percent listen to it			75.0%	Total Weighted Average Duration of this Script			50.0

With Voice Recognition

This Voice Recognition solution is based on the emerging voice authentication recognition standards that can provide highly secure caller identification by requesting the caller's name, and then asking them to repeat three words. This approach has been proven to be as, or more, accurate in authenticating callers than the current approach used with Touch-Tone.

Voice Recognition based IVR Script							
	Function Used	ByPass	Listening	Cumulative Listening	Incremental Prompt Time	Caller Response Time	Weighted Time
Please speak your name	100.0%	0.0%	100.0%	100.0%	10	10	10.0
Please repeat the following 3 words	100.0%		100.0%	100.0%	12	22	12.0
Percent of Total Callers who reach this menu			85.0%				
Of callers reaching this menu, what percent listen to it			85.0%	Total Weighted Average Duration of this Script			22.0

There will be a slightly higher usage rate since those that cannot remember their account number and PIN will be able to fully identify themselves, and the time required to accomplish the identification is about half of that required by the traditional touch-tone user interface.

Percent using this menu with Touch Tone User Interface	75%
Percent using this menu with Voice Recognition Interface	85%

The IVR Retail Banking Main Menu

After successfully being identified by the system, this example menu is typical of the IVR menu that customers use to acquire account information or do other simple services, such as activating banking cards or re-setting their Personal Identification Numbers (PINs):

Current IVR Application:

Touch-Tone based IVR Menu							
	Function Used	ByPass	Listening	Cumulative Listening	Incremental Prompt Time	Caller Response Time	Weighted Time
Checking	67.5%	25.0%	47.5%	75.0%	6	6	4.5
Loans & VISA	4.1%		4.1%	27.5%	6	12	1.7
Transfers	5.1%		5.1%	23.4%	6	18	1.4
Savings, certificates & IRA's	11.2%		6.2%	18.3%	6	24	1.1
PIN Change	0.2%		0.2%	12.1%	6	30	0.7
Activity TCU Card	0.7%		0.7%	11.9%	6	36	0.7
Member Services	0.5%		0.5%	11.2%	6	42	0.7
Repeat Menu	2.8%		2.8%	10.7%	6	48	0.6
End Session	7.9%		7.9%	7.9%	6	54	0.5
Percent of Total Callers who reach this menu			53.1%				
Of callers reaching this menu, what percent listen to it			75.0%	Total Weighted Average Duration of this Script		11.9	

With Voice Recognition

With the Voice Recognition solution users will no longer be restrained by a structured menu approach. For instance, after the caller's authentication is passed, they will state their interest (as described above) bypassing this menu entirely.

Voice Recognition based IVR Script							
	Function Used	ByPass	Listening	Cumulative Listening	Incremental Prompt Time	Caller Response Time	Weighted Time
	Checking	67.5%	73.8%	10.0%	26.2%	6	1.6
	Loans & VISA	4.1%		2.0%	16.2%	6	1.0
	Transfers	5.1%		4.0%	14.2%	6	0.9
	Savings, certificates & IRA's	11.2%		5.0%	10.2%	6	0.6
	PIN Change	0.2%		0.2%	5.2%	6	0.3
	Activity TCU Card	0.7%		0.5%	5.0%	6	0.3
	Member Services	0.5%		0.5%	4.5%	6	0.3
	Repeat Menu	2.8%		2.0%	4.0%	6	0.2
	End Session	7.9%		2.0%	2.0%	6	0.1
	Percent of Total Callers who reach this menu		60.2%				
	Of callers reaching this menu, what percent listen to it		26.2%		Total Weighted Average Duration of this Script		5.3

The Checking Account Status Menu

This example is typical of the menu of the IVR applications that customers use to acquire account information or do other simple services:

Current IVR Application:

Touch-Tone based IVR Menu							
	Function Used	ByPass	Listening	Cumulative Listening	Incremental Prompt Time	Caller Response Time	Weighted Time
	Balance Inquiry	44.7%	10.0%	34.7%	90.0%	6	5.4
	Last 5 cleared checks	18.5%		18.5%	55.3%	6	3.3
	Transfers	2.4%		2.4%	36.8%	6	2.2
	Last 5 non-check w ithdraw als	8.7%		8.7%	34.4%	6	2.1
	Specific Check #'s	3.9%		3.9%	25.7%	6	1.5
	Last 5 deposits	8.9%		8.9%	21.8%	6	1.3
	Withdraw al by check	0.2%		0.2%	12.9%	6	0.8
	Last dividend paid & YTD dividenc	0.1%		0.1%	12.7%	6	0.8
	Repeat menu choices	0.0%		0.0%	12.6%	6	0.8
	For member services	0.7%		0.7%	12.6%	6	0.8
	Repeat Main Menu	1.5%		1.5%	11.9%	6	0.7
	End Session	10.4%		10.4%	10.4%	20	2.1
	Percent of Total Callers who reach this menu			44.0%			
	Of callers reaching this menu, what percent listen to it			34.4%	Total Weighted Average Duration of this Script		21.7

With Voice Recognition

Voice Recognition based IVR Script							
	Function Used	ByPass	Listening	Cumulative Listening	Incremental Prompt Time	Caller Response Time	Weighted Time
Balance Inquiry	44.7%	64.8%	10.0%	35.2%	6	6	2.1
Last 5 cleared checks	18.5%		5.0%	25.2%	6	12	1.5
Transfers	2.4%		1.0%	20.2%	6	18	1.2
Last 5 non-check w ithdraw als	8.7%		1.0%	19.2%	6	24	1.2
Specific Check #'s	3.9%		2.0%	18.2%	6	30	1.1
Last 5 deposits	8.9%		4.0%	16.2%	6	36	1.0
Withdraw al by check	0.2%		0.2%	12.2%	6	42	0.7
Last dividend paid & YTD dividenc	0.1%		0.1%	12.0%	6	48	0.7
Repeat menu choices	0.0%		0.0%	11.9%	6	54	0.7
For member services	0.7%		0.5%	11.9%	6	60	0.7
Repeat Main Menu	1.5%		1.0%	11.4%	6	66	0.7
End Session	10.4%		10.4%	10.4%	20	20	2.1
Percent of Total Callers who reach this menu			49.9%				
Of callers reaching this menu, what percent listen to it			19.2%	Total Weighted Average Duration of this Script		13.7	

Quantifying Benefit 2: Higher Use of IVR Scripts for Customer Service and Fewer Transfers to Customer Service Agents during IVR Usage

Two factors affect the calls transferred to Agents:

- Users immediately transfer to Agents because they do not want to use a Touch-Tone based IVR Application. In this model, it is assumed there is an immediate 25% transfer to Agents using the Touch-Tone based IVR Application. This is reduced to 15% with the voice recognition user interface.
- Fewer users who begin using the IVR Application consequently transfer to Agents in mid-stream. Research shows that the mid-stream transfers account for about 24% of calls for small to mid-sized banks. This is anticipated to go down to 17% with voice response applications.
- In total, the voice recognition user interface will reduce the percent of calls going to agents from 49.5% to 32%.

These impacts are detailed in the tables presented under Quantifying Benefit 1.

Quantifying Benefit 3: Changes in Customer Satisfaction and Customer Life Cycle

A financial institution that increases its IVR platforms ease of use and shortens the time it takes for a user to receive benefits will increase customer satisfaction. Changes to customer churn, especially in the credit card industry, may have a material impact on financial results.

In this document, the initial customer life cycle is assumed to be 48 months. We assume that the average customer life cycle lengthens by 20% to 60 months due to the major improvements in communicating with the financial institution. This phases-in over a sixteen-month period, as the users become familiar with the voice recognition user interface, and then become *dependent* on voice recognition!

The Cost of the Voice Recognition: An ASP Service Costing \$0.10 per Minute of Usage

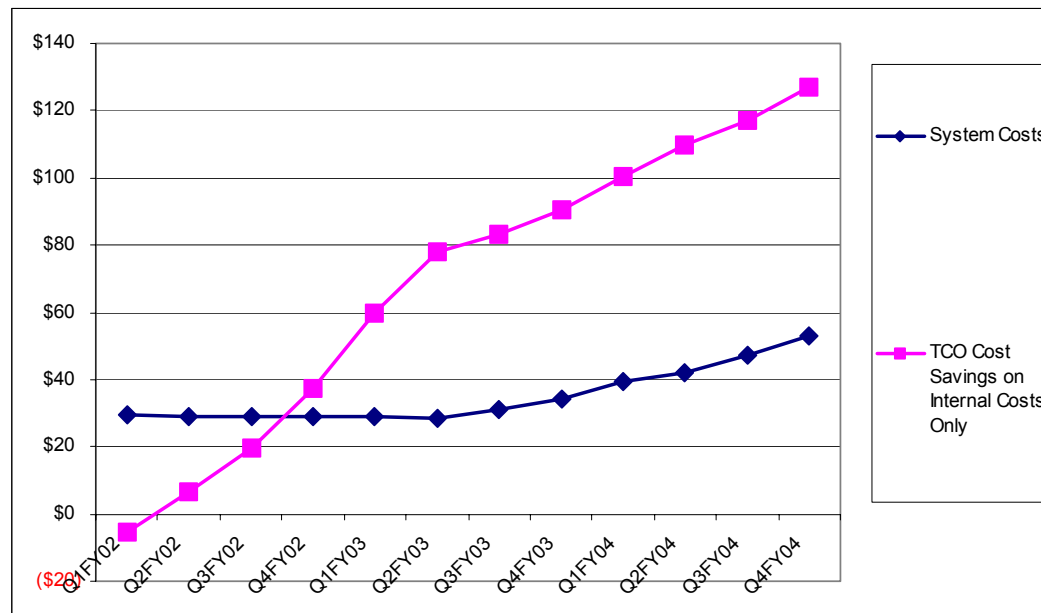
The voice recognition solution is presented as an ASP service, as opposed to a customer-installed option. Voice technologies are evolving quickly, and such an approach enables the solution provider to continuously upgrade to further improve customer service.

This is an expensive approach costing \$400,000 per year. (See the detailed table below.) The return due to this solution justifies such a major increase in costs.

Financial Implications: Cost Savings by Quarter

This graph shows the Total Cost of Ownership (investment, expenses, operations and personnel costs) associated with implementing the voice recognition solution compared to the cost savings obtained by the financial services company. Break even is reached in three quarters, leading to a positive Return on Investment in the first year.

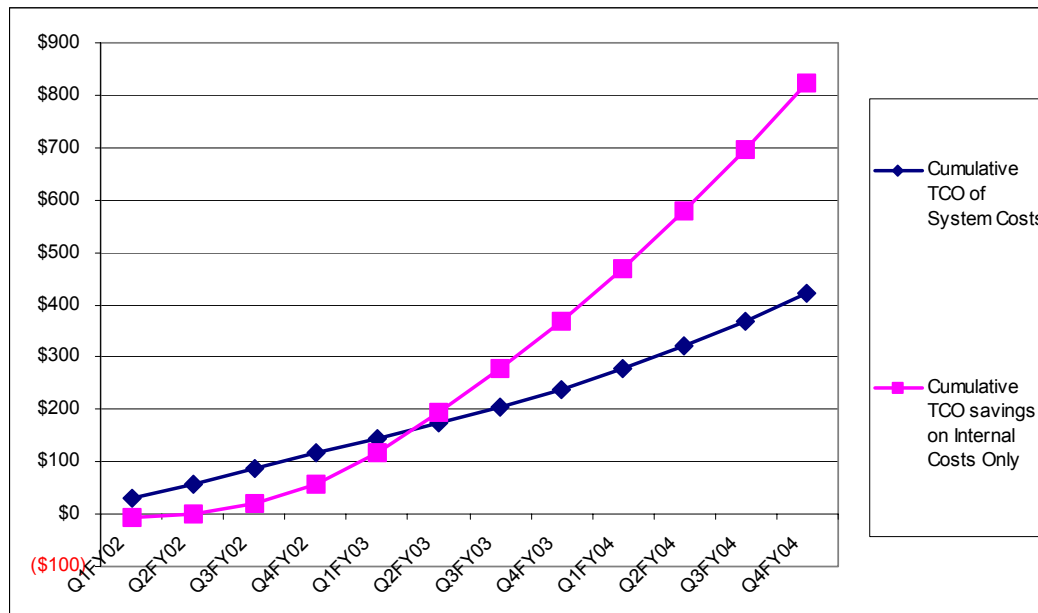
The increase in revenues, not accounted for in this cash flow and breakeven analysis, is the most important benefit. However, it is not necessary to include this benefit to justify the investment in a Voice-Recognition Solution.



Financial Implications: Comparison of Cumulative TCO and Cost Savings

This chart shows that the cumulative Total Cost of Ownership of the voice recognition solution, and the cost savings to the small retail bank cross into positive territory in the fifth quarter after deployment.

The break-even is based on a 16-month phase-in for the bank's callers to become familiar with the voice recognition solution and change their usage patterns. If this change is faster, the financial benefits to the bank will be accrued more quickly.



Financial Implications: Return on Investment, Based on Internal Cost Savings Only

The Return on Investment for voice recognition applications is positive in the first year, increasing significantly in years two and three. This chart does not include the benefits of the revenue increases, which provides a much more compelling case for voice recognition solution.

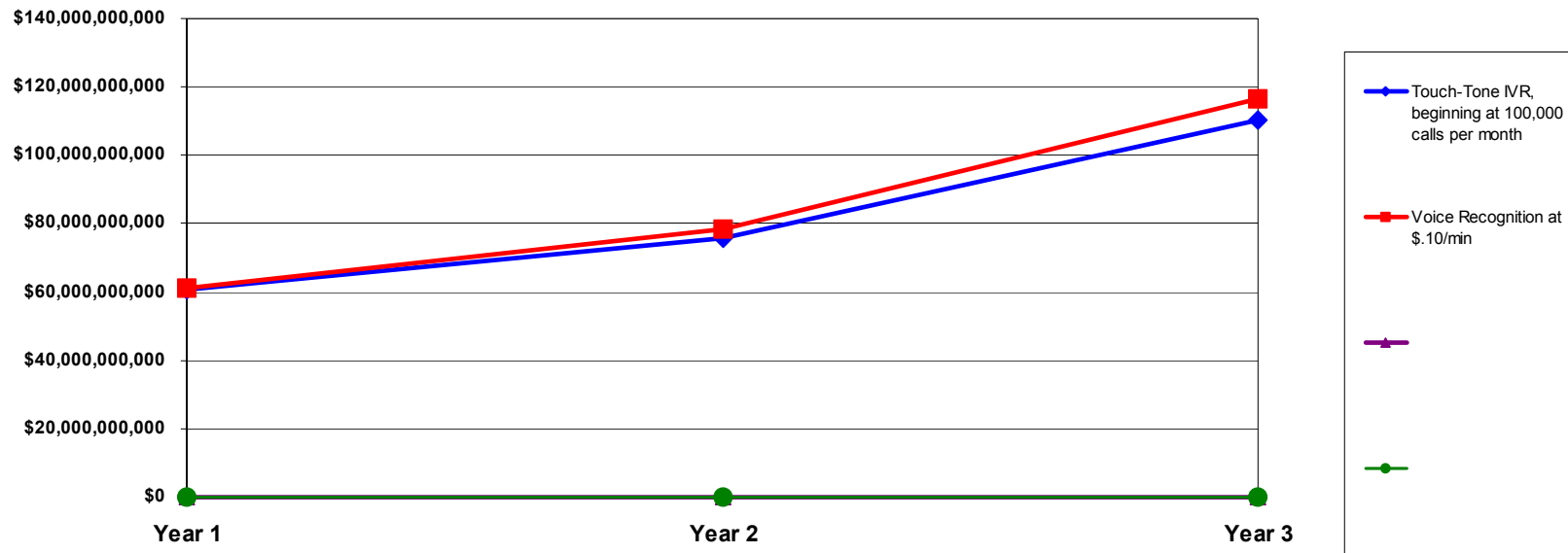
ROI based on Annual Cash Budget Comparison for Internal Cost Changes Only (\$ 000's)			
	Year 1	Year 2	Year 3
Touch-Tone IVR, beginning at 100,000 calls per month	\$1,234	\$1,442	\$2,089
Voice Recognition at \$.10/min	\$1,176	\$1,131	\$1,635
Annual Cashflow Savings due to System Implementation	\$58	\$311	\$454
Total Cost of Ownership of System	\$117	\$122	\$181
Cumulative Return on System Investment for Telecom Usage Costs IVR @ \$.10/min	50%	154%	196%

Financial Implications: Increase in Revenue Due to Higher Customer Satisfaction

This chart shows the annual revenue increase due to voice recognition's impact on the customer life cycle. A dominant part of the increase is available in the later years as the impact of lengthening the average customer life cycle begins to increase revenues.

Annual Accrual Revenue Comparison

	Year 1	Year 2	Year 3	Total
Touch-Tone IVR, beginning at 100,000 calls per month	\$60,641,240,851	\$75,742,523,016	\$110,317,991,790	\$246,701,755,657
Voice Recognition at \$.10/min	\$60,983,095,747	\$78,226,841,599	\$116,516,173,074	\$255,726,110,419

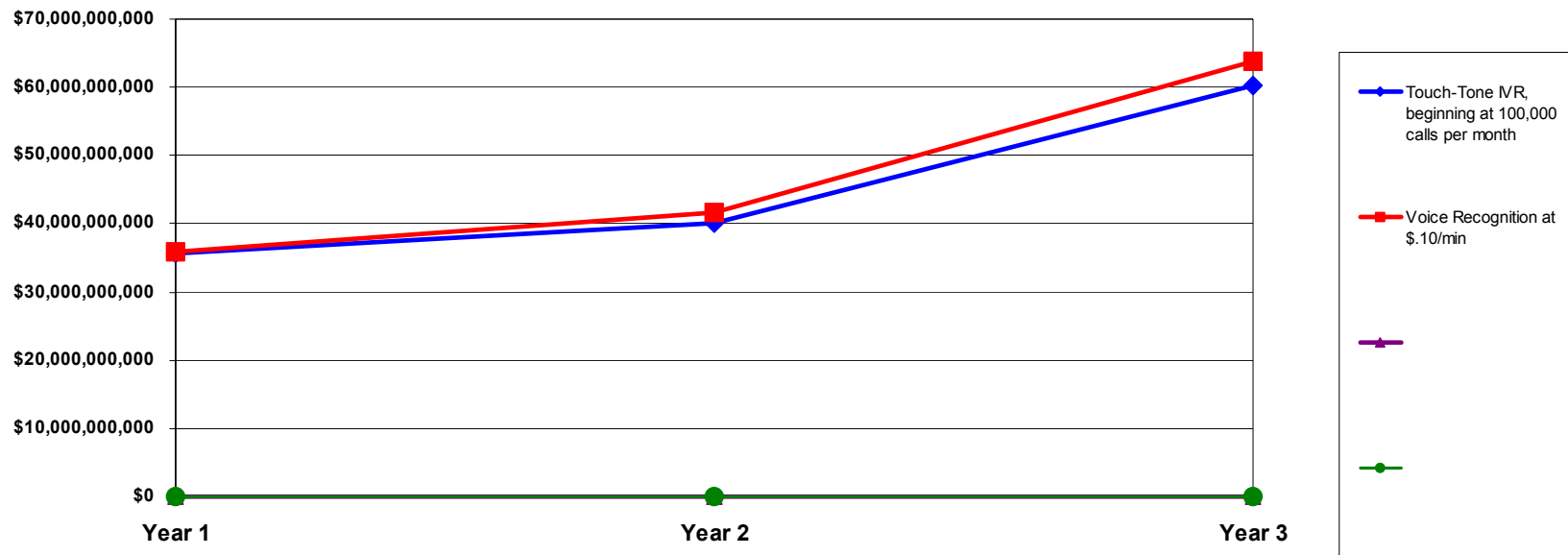


Financial Implications: Increase in Profits Due to Higher Customer Satisfaction

This chart shows the annual profit increase due to voice recognition's impact on the customer life cycle. A dominant part of the increase is available in the later years as the impact of lengthening the average customer life cycle begins to increase profits.

Profit based on Accrual Revenues, Accrual Product Costs, Capitalized Budget

	Year 1	Year 2	Year 3	Total
Touch-Tone IVR, beginning at 100,000 calls per month	\$35,665,663,487	\$40,100,905,211	\$60,157,434,722	\$135,924,003,420
Voice Recognition at \$.10/min	\$35,935,342,126	\$41,699,336,727	\$63,745,960,921	\$141,380,639,775



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Summary of Assumptions and Methods

The model used is of a generic, smaller financial institution. Although specific banks may differ, such differences can easily be accounted for to better understand the specific impact of Voice Recognition on an individual bank.

In providing this Business Impact Analysis, Primary Matters has:

- Created a model of a typical small financial institution with 200,000 customers.
- Assumed that each customer contacts the center one time every two months.
- Modeled the likely impact of a voice response solution on the customer contact centers as well as its potential impact on the customer base.
- Linked this to a simple revenue model for the example line of business.
- Created a Baseline and Scenario representing the before and after conditions.

The financial institution has customers using Credit Card and Retail banking services. In this study, the voice recognition solution affects these businesses in several ways. Details of the calls, volumes and changes in these due to the solution are provided later in this document.

For the revenue and product cost analysis, it is assumed that the improvements in customer satisfaction from better service will lead to:

- The average customer life cycle lengthens for each line of business due to better customer service from 48 months to 60 months.
- Increasing the average customer life cycle changes each line of business in the following ways:
 - The installed base of active customers becomes larger since customers are churning at a slower rate.
 - The revenues increase in line with the increase in the installed base.
 - The monthly product cost increases because there are more products to support in the installed base.
 - Profitability of the bank increases as most profits are made in the latter part of the customer life cycle. The ‘new customer acquisition’ costs are covered in the first part of the life cycle.

Assumptions about Customer Contact Center Agents, Supervisors and Operations Personnel

Contact Center Agents Compensation and Benefits

Customer service agents receive an average compensation of \$13.00 per hour and work a 40-hour workweek. They are provided full benefits, two weeks of vacation, 10 holiday days and require three weeks of new agent training at the start of their employment. There is one week per year of ongoing agent training. The average job duration is 24 months.

Contact Center Supervisors Compensation and Benefits

Supervisors receive an average compensation of \$17.00 per hour and work a 40-hour workweek. They are provided full benefits, two weeks of vacation, 10 holiday days and require three weeks of new agent training at the start of their employment. There is one week per year of ongoing agent training. The average job duration is 30 months.

Operations Personnel Compensation and Benefits

Operations personnel are those who manage, maintain and run the technology for the bank or credit union. Operations personnel receive an average compensation of \$55,000 per year and work a 40-hour workweek. They are provided full benefits, two weeks of vacation, 10 holiday days and require three weeks of new agent training at the start of their employment. There is one week per year of ongoing agent training. The average job duration is 30 months.

Assumptions and Profile of the Financial Services Company's Retail Banking Products

A simple, installed base and per customer revenue model is used in this analysis. Each customer has a Retail Banking account, offering checking, savings and money market services, and a credit card account. The average revenue and costs of supplying each of these accounts, excluding the costs of the customer contact center and IVR applications follows:

Summary of Monthly, Per Customer, Services Revenues and Product Costs to the Bank			
	Revenue	Product Costs	Contribution
Basic Checking and Savings Accounts	\$ 1.67	\$ 1.00	\$ 0.67
Loans	\$ 12.50	\$ 8.83	\$ 3.67
Credit Cards	\$ 9.75	\$ 2.00	\$ 7.75
TOTAL	\$ 23.92	\$ 11.83	\$ 12.09

The details underlying the revenues and costs per customer are detailed below.

New Customer Acquisition Costs and Average Active Customer Life Cycle

The average cost to obtain a new customer is \$120. This cost includes marketing and sales-related costs as well as new account set-up costs. The average customer life cycle - the time that the individual is a customer **and** that their accounts are actively used (thus creating revenues and profits for the bank) is 48 months.

Detailed Assumptions: Credit Card Account Revenue & Product Costs

Summary of Credit Card Revenue and Product Costs to a Bank

Monthly Revenue per Customer	\$ 9.75
Monthly Cost per Customer	\$ 2.00
Monthly Contribution to the Bank per Customer	\$ 7.75

Credit Card Revenue Components to a Bank:

Revenue for Credit Card Purchases	
Average credit card purchases per month	\$500
Percent of Average Transaction Value going to the financial institution	0.75%
Monthly Revenue per Account	\$3.75
Revenue for Credit Card 'Loan' Balances	
Average Credit Card Balance per Month	\$300
Annual Interest Rate Percentage	15%
Monthly Revenue per Account	\$4.50
Annual Fee	\$18.00
TOTAL Monthly Revenue per Credit Card	\$9.75

Credit Card Product Cost Components to a Bank

Monthly Account Product Costs	\$2.00
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Detailed Assumptions: Summary of Banking Account and Loan Revenues and Product Costs

Summary of Banking Account and Loan Banking Revenue and Product Costs per Customer

Monthly Revenue per Customer	\$14.17
Monthly Cost per Customer	\$ 8.83
Monthly Contribution to the Bank per Customer	\$ 7.34

Revenue Components for a Customer

Account Balance Interest Revenue	
Average account balance per month	\$500
Annual percent interest income to the financial institution	4.00%
Annual Revenue per Account	\$20.00
Monthly Revenue per Account	\$1.67
Loan Revenue per Customer	
Average Loan Balance per Month	\$1,200
Annual Interest Rate Percentage	10%
Monthly Loan Revenue per Account	\$10.00
Loan Processing Fee Revenue per New Loan	\$150.00
Percent of Customer Base getting new loans per year	20%
Monthly Average New Loan Processing Fee/Customer	\$2.50
TOTAL Monthly Retail Banking Revenue per Customer	\$14.17

Product Cost Components (exclusive of the contact center IVR and Agent Costs) for a Retail Banking Customer

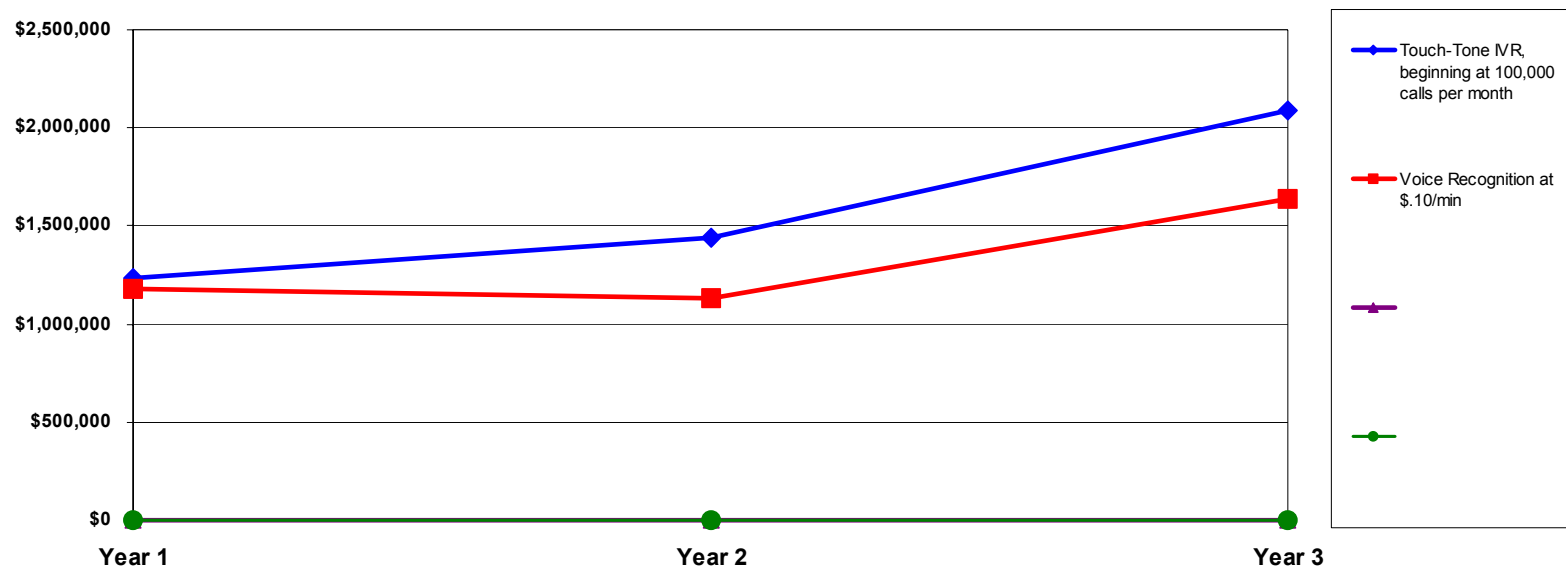
Account Balance Costs per Customer	
Monthly Product Costs	\$1.00
Loan Costs per Customer	
Average Annual percent Cost of Funds to Bank	5.5%
Monthly Cost of Funds for Loans	\$5.50
Monthly Loan Product Costs	\$1.50
Average New Loan Processing Fee Cost to Bank	\$50.00
Monthly Average New Loan Processing Fee Cost per Customer	\$0.83
Total Monthly Loan Product Costs per Customer	\$7.83
TOTAL Monthly Retail Banking Cost per Customer	\$8.83

Contact Centers Annual Operating Budget Before and After the Addition of Voice Recognition

This budget comparison shows the pre- and post- voice recognition contact center budget. There is a material impact on the cost side of a bank's major lines of business.

Annual Budget Comparison, Capitalized Investment

	Year 1	Year 2	Year 3	Total
Touch-Tone IVR, beginning at 100,000 calls per month	\$1,234,136	\$1,442,250	\$2,088,668	\$4,765,055
Voice Recognition at \$.10/min	\$1,176,059	\$1,131,147	\$1,634,795	\$3,942,001



Baseline (Before Voice Recognition Solution) Operations Budget

Three-Year Quarterly Budget, with Revenues, Product Costs and Capitalized Investments

(\$000's)

Total Budget

	Q1FY02	Q2FY02	Q3FY02	Q4FY02	Year 1	Q1FY03	Q2FY03	Q3FY03	Q4FY03	Year 2	Q1FY04	Q2FY04	Q3FY04	Q4FY04	Year 3
REVENUES	\$ 14,489	\$ 14,818	\$ 15,320	\$ 16,014	\$ 60,641	\$ 16,923	\$ 18,075	\$ 19,502	\$ 21,242	\$ 75,743	\$ 23,339	\$ 25,843	\$ 28,814	\$ 32,322	\$ 110,318
BAD DEBT PROVISION	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
PRODUCT COSTS	\$ 7,323	\$ 7,490	\$ 7,743	\$ 8,094	\$ 30,650	\$ 8,553	\$ 9,136	\$ 9,857	\$ 10,737	\$ 38,283	\$ 11,796	\$ 13,062	\$ 14,564	\$ 16,337	\$ 55,759
INTERNAL COSTS															
Empl Expenses															
Employee Comp	140	148	165	174	626	185	199	215	236	835	260	289	324	364	1,238
Emp Ben, tax	45	47	53	55	200	59	63	69	75	265	83	92	103	116	393
Misc, Training	4	7	6	6	23	6	7	7	8	29	9	10	11	12	41
Total	188	202	224	235	849	250	269	291	319	1,129	352	391	437	492	1,672
External Labor															
Consulting	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Outsourced Labor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Labor	188	202	224	235	849	250	269	291	319	1,129	352	391	437	492	1,672
Equip, Sftw & Mntc	17	149	39	19	224	19	25	25	26	95	27	28	22	23	100
Utilities	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Telecom Services	0	0	1	1	2	1	1	1	1	2	1	1	1	1	3
Offices/Occupancy	38	38	38	42	156	51	51	51	59	211	77	77	77	77	308
Marketing Expense	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Travel/Entertainment	1	1	1	1	3	1	1	1	1	5	1	1	1	2	6
Misc Expenses	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Internal Costs	244	389	302	298	1,234	322	346	369	406	1,442	458	498	538	595	2,089
TOTAL COSTS	7,568	7,879	8,045	8,392	31,884	8,875	9,481	10,226	11,143	39,725	12,254	13,560	15,102	16,931	57,847
PROFIT & LOSS	\$ 6,921	\$ 6,939	\$ 7,274	\$ 7,622	\$ 28,757	\$ 8,048	\$ 8,594	\$ 9,276	\$ 10,100	\$ 36,017	\$ 11,085	\$ 12,283	\$ 13,712	\$ 15,391	\$ 52,471

Scenario (After Voice Recognition Solution) Operations Budget

Three-Year Quarterly Budget, with Revenues, Product Costs and Capitalized Investments

(\$000's)

Total Budget

	Q1FY02	Q2FY02	Q3FY02	Q4FY02	Year 1	Q1FY03	Q2FY03	Q3FY03	Q4FY03	Year 2	Q1FY04	Q2FY04	Q3FY04	Q4FY04	Year 3
REVENUES	\$ 14,494	\$ 14,855	\$ 15,421	\$ 16,213	\$ 60,983	\$ 17,256	\$ 18,583	\$ 20,216	\$ 22,172	\$ 78,227	\$ 24,498	\$ 27,247	\$ 30,485	\$ 34,286	\$ 116,516
BAD DEBT PROVISION	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
PRODUCT COSTS	\$ 7,326	\$ 7,508	\$ 7,794	\$ 8,194	\$ 30,823	\$ 8,722	\$ 9,392	\$ 10,218	\$ 11,207	\$ 39,539	\$ 12,382	\$ 13,772	\$ 15,408	\$ 17,329	\$ 58,891
INTERNAL COSTS															
Empl Expenses															
Employee Comp	133	133	140	139	545	138	139	150	165	591	182	203	227	256	869
Emp Ben, tax	43	43	45	44	174	44	44	48	52	188	58	64	72	81	275
Misc, Training	3	5	5	4	17	4	5	6	6	21	7	7	8	9	31
Total	179	181	190	187	736	186	188	203	223	800	247	274	307	346	1,175
External Labor															
Consulting	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Outsourced Labor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Labor	179	181	190	187	736	186	188	203	223	800	247	274	307	346	1,175
Equip, Sftw & Mntc	10	141	31	11	193	11	15	15	16	57	16	17	11	13	57
Utilities	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Telecom Services	30	30	30	29	118	29	29	31	35	124	40	43	48	54	183
Offices/Occupancy	31	31	31	32	126	35	35	35	41	146	54	54	54	54	215
Marketing Expense	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Travel/Entertainment	1	1	1	1	3	1	1	1	1	4	1	1	1	1	5
Misc Expenses	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Internal Costs	250	383	282	261	1,176	262	268	286	315	1,131	357	389	421	468	1,635
TOTAL COSTS	7,576	7,891	8,077	8,455	31,999	8,984	9,660	10,504	11,522	40,670	12,739	14,160	15,830	17,797	60,526
PROFIT & LOSS	\$ 6,919	\$ 6,964	\$ 7,344	\$ 7,757	\$ 28,984	\$ 8,272	\$ 8,923	\$ 9,712	\$ 10,650	\$ 37,557	\$ 11,759	\$ 13,087	\$ 14,656	\$ 16,489	\$ 55,990

ROI Based Only on Operations Cost (Contact Center Cost Savings)

This chart shows the ROI for the voice recognition solution based only on the cost savings in the Contact Center. The investment is justified solely on the cost savings, even though the most material benefits are the revenue and profitability increases to the Bank.

Return on System Investment (ROI)

Headcount Comparison												
	Q1FY02	Q2FY02	Q3FY02	Q4FY02	Q1FY03	Q2FY03	Q3FY03	Q4FY03	Q1FY04	Q2FY04	Q3FY04	Q4FY04
Baseline Total Employees	21	21	23	24	25	27	29	32	35	39	43	48
Scenario Total Employees	20	19	19	19	19	19	20	22	24	27	30	33
Personnel Reduction	1	2	4	5	7	8	9	10	11	12	13	15

System Investment and Expenses												
Total	Q1FY02	Q2FY02	Q3FY02	Q4FY02	Q1FY03	Q2FY03	Q3FY03	Q4FY03	Q1FY04	Q2FY04	Q3FY04	Q4FY04
	\$29,396	\$29,235	\$29,113	\$28,981	\$28,763	\$28,684	\$30,953	\$34,030	\$39,180	\$41,990	\$47,059	\$53,004

Summary Financial Results in \$000's												
	Q1FY02	Q2FY02	Q3FY02	Q4FY02	Q1FY03	Q2FY03	Q3FY03	Q4FY03	Q1FY04	Q2FY04	Q3FY04	Q4FY04
Baseline Budget	\$244	\$389	\$302	\$298	\$322	\$346	\$369	\$406	\$458	\$498	\$538	\$595
Scenario Budget	\$250	\$383	\$282	\$261	\$262	\$268	\$286	\$315	\$357	\$389	\$421	\$468
Savings	(\$5)	\$6	\$20	\$37	\$60	\$78	\$83	\$91	\$101	\$110	\$117	\$127
Cumulative Savings	(\$5)	\$1	\$21	\$58	\$118	\$196	\$279	\$369	\$470	\$579	\$696	\$823

Annual Cash Budget Comparison			
	Year 1	Year 2	Year 3
Touch-Tone IVR, beginning at 100,000 calls per month	\$1,226,201	\$1,422,241	\$2,146,778
Voice Recognition at \$.10/min	\$1,170,409	\$1,110,854	\$1,659,587
Annual Cashflow Savings due to System Implementation	\$55,792	\$311,387	\$487,191
System Investment	\$116,725	\$122,430	\$181,233

Cumulative Return on System Investment for			
	Year 1	Year 2	Year 3
Telcom Usage Costs	48%	154%	203%
IVR @ \$.10/min			

NOTE: For ROI Analyses a Cash Budget is used. The annual and other budget figures differ from other charts in this report since this is a cash-based budget, and the others capitalize the investment.

ROI Based on Total Impact, Including Operations Costs, Revenues and Product Cost Changes

ROI based on Annual Cash Budget Comparison for P&L (Revenues, Product Cost & Internal Cost Changes) (\$ 000's)			
	Year 1	Year 2	Year 3
P& L for: Touch-Tone IVR, beginning at 100,000 calls per month	\$34,433	\$38,660	\$58,071
P& L for: Voice Recognition at \$.10/min	\$34,760	\$40,569	\$62,113
Annual Cashflow Savings due to System Implementation	\$328	\$1,909	\$4,042
Total Cost of Ownership of the System	\$117	\$122	\$181
Cumulative Return on System Investment for Telecom Usage Costs IVR @ \$0.10/min	281%	935%	1494%

System Investment, Systems Integration, Maintenance and Operations Personnel Expense Details

Individual System Budget

(\$000's)

	Usage based Services					Voice Recognition Services									
Cash Flow Budget:	Q1FY02	Q2FY02	Q3FY02	Q4FY02	Year 1	Q1FY03	Q2FY03	Q3FY03	Q4FY03	Year 2	Q1FY04	Q2FY04	Q3FY04	Q4FY04	Year 3
System Purchase:															
Cash Investment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Loan:															
Down Payment:	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Interest	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Principal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lease/License	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Start-up Expenses	-	-	-	-	-	-	-	-	-	-	1.5	-	-	-	1.5
Internal S/I Expense	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
External S/I Expense	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chargeback/Assessment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
External Services	29.4	29.2	29.1	29.0	116.7	28.8	28.7	31.0	34.0	122.4	37.7	42.0	47.1	53.0	179.7
Maintenance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Cash Outflow	29.4	29.2	29.1	29.0	116.7	28.8	28.7	31.0	34.0	122.4	39.2	42.0	47.1	53.0	181.2
Capital Budget															
System Purchase:															
Depreciation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Interest	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lease/License	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Start-up Expense	-	-	-	-	-	-	-	-	-	-	1.5	-	-	-	1.5
Internal S/I Expense	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
External S/I Expense	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chargeback/Assessment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
External Services	29.4	29.2	29.1	29.0	116.7	28.8	28.7	31.0	34.0	122.4	37.7	42.0	47.1	53.0	179.7
Maintenance Expense	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Expenses	29.4	29.2	29.1	29.0	116.7	28.8	28.7	31.0	34.0	122.4	39.2	42.0	47.1	53.0	181.2
Operations Personnel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL Cost of Ownership															
Cash Budget	29.4	29.2	29.1	29.0	116.7	28.8	28.7	31.0	34.0	122.4	39.2	42.0	47.1	53.0	181.2
Capital Budget	29.4	29.2	29.1	29.0	116.7	28.8	28.7	31.0	34.0	122.4	39.2	42.0	47.1	53.0	181.2
TOTAL Three-Year Budget															
Cash Budget	\$	420.4													
Capital Budget	\$	420.4													

Headcount Comparison

This Full Time Equivalent Agent Headcount comparison shows the pre- and post- voice recognition Contact Center staffing for Agents, Supervisors, and Operations Personnel.

Total Average Quarterly Headcount

	Q1FY02	Q2FY02	Q3FY02	Q4FY02	Q1FY03	Q2FY03	Q3FY03	Q4FY03	Q1FY04	Q2FY04	Q3FY04	Q4FY04
Touch-Tone IVR, beginning at 100,000 calls per month	20.8	21.3	23.0	24.1	25.5	27.2	29.3	31.9	35.0	38.7	43.0	48.1
Voice Recognition at \$.10/min	19.9	19.2	19.5	19.1	18.8	18.7	20.1	22.0	24.2	26.8	29.9	33.5

