Robo Advisor Analysis

BOK Financial Corporation

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Executive Summary

Robo-advisors represent a new wave of financial advice and investment management firms. They automate asset allocation and portfolio management, giving mainstream investors access to a service once reserved for high-net-worth individuals. These new entrants to the wealth industry use technology and automated investment capabilities to offer traditionally out-of-reach management at lower-fee levels and client assets under management (AUM) thresholds. The success of these online financial advisors has been exceptional, increasing their total assets under management by 11 percent in the first six months of 2015 to a total of $21 billion, even as markets remained relatively flat. Assets rose 34% between July 2014 and July 2015[1]. As of February 2016, the top 5 robo advisors alone represent $44.2 billion in AUM[2].

These growth numbers are not intended to lead the reader to think robo, or online advice, will ever replace a traditional human advisor. One must consider that 'Turbo Tax' did not replace accountants nor did sites like 'rocketlawyer.com' replace attorneys. On the contrary, this paper looks to explore how a robo advice solution can complement the BOK Financial suite of investment advice offerings. The paper explores two options for launching a robo advice solution,

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[1] Allessandra Malito and Ellie Zhu, "Top 5 robo-advisors by AUM," *InvestmentNews*, (2/2016), http://www.investmentnews.com/article/20160225/free/160229960/top-5-robo-advisers-by-aum (accessed April 20, 2016).

[2] Ibid

an internally developed offering and a ‘white labeled’ partnership with a leading robo platform.

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Introduction

BOKF, NA. traces its history to the founding in 1910 of Exchange National Bank of Tulsa, Oklahoma by Harry Sinclair and other noted oilmen of the day. In 1918, with the establishment of the Trust Division, BOKF, NA. became Oklahoma's first trust company. In 1933, the bank was reorganized as National Bank of Tulsa, which became Bank of Oklahoma in 1975. Tulsa businessman George B. Kaiser formed BOK Financial Corporation (BOKF), which in 1991 acquired Bank of Oklahoma.

Today BOKF, NA. is a wholly owned subsidiary bank of BOK Financial. BOKF, NA operates TransFund, Cavanal Hill Investment Management, and seven banking divisions: Bank of Albuquerque, Bank of Arizona, Bank of Arkansas, Bank of Kansas City, Bank of Oklahoma, Bank of Texas and Colorado State Bank and Trust. Other wholly owned subsidiaries of BOK Financial include BOSC, Inc., a broker/dealer that engages in retail and institutional securities sales and municipal bond underwriting and The Milestone Group, Inc., an investment adviser to high net worth clients. At December 31, 2015, the Company reported total consolidated assets of $31 billion and ranked in the top 50 largest bank holding company based on asset size.

BOK Financial operates three principal lines of business: Commercial Banking, Consumer Banking and Wealth Management. Commercial Banking includes lending, treasury and cash management services and customer risk management products for small businesses, middle market and larger commercial customers. Commercial Banking also includes the TransFund electronic funds network. Consumer banking includes retail lending and deposit services, lending and deposit services to small business customers served through the retail branch network and all mortgage banking activities. Wealth Management provides fiduciary services, private bank services and investment advisory services in all markets. Wealth Management also underwrites state and municipal securities and engages in brokerage and trading activities

Opportunity

This project will analyze the Robo-Advisor landscape and present a recommended strategy for BOK Financial. To accomplish this, focus will be given to analyzing two approaches to implementing a Robo Advisor solution. The first option will involve partnering with BlackRock, a global leader in investment and risk management. In August 2015, Black Rock acquired Future Advisor for $150MM and is now licensing the platform to financial institutions. The second option will be based on building a custom Robo Advisor solution. With the second option, consideration will be given for the one time capital expenditure to build out the platform along with sizing a product ecosystem to ensure continual investment and ongoing viability of the product. For both options consideration will be given to the required marketing and placement of the Robo Advice solution such that the product does not cannibalize current advice offers. Finally, it will provide a recommendation and implementation plan to establish BOKF, NA's position in this emerging landscape.

Background

The first robo-advisors were founded in 2008, the year of the financial crisis. Their initial innovation was to rebalance investor assets within target-date funds, and give investors a modern, online interface. The strategy is essentially passive, since robo-advisors tend to buy and hold, rebalancing only when market shifts or when portfolio becomes unbalanced as a result of different levels of growth in various holdings thus skewing a portfolio's allocations among equity, debt and other assets such as real estate investment trusts.

In the first few years, though, many consumers weren't ready to share their financial information online, and many others were simply uncomfortable entrusting software with portfolio management. Silicon Valley saw proof that consumer habits had changed for good with the success of Mint, the online checking account aggregator that Aaron Patzer founded in 2006, and sold to Intuit in 2009 for $170 million. That success created a groundswell of support in the investment community for robo-advisors. In addition, the industry has also experienced a growth in ETFs (Exchanged Traded Funds) which happen to be the primary investment product for robo advice platforms. The growth in ETF's affords investors more investment options. The advancements in robo advice have created more readily available options for mass investors to use as an easy and user friendly way to manage those inexpensive assets. Today, there are a number of successful Robo Advisors on the market. The top ten[3] are as follows:

Vanguard Personal Advisor Services

Assets under management: $4.2 billion

Fees: 0.30% annually, $100,000 minimum

Betterment

Assets under management: $2.5 billion

Fees: 0.15-0.35% annually

Wealthfront

Assets under management: $1.7 billion

Fees: 0.25% annually for accounts over $10,000

Personal Capital

Assets under management: $1 billion

Fees: Basic use of software is free, fees begin at 0.89% annually for accounts of $100,000 to $1 million

Asset Builder

Assets under management: $600 million

Fees: 0.20%-0.50% annually. $50,000 minimum.

Future Advisor

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[3] Hal M. Bundrick, "10 Best Robo Advisors Ranked: Find the Best Automated Online Investing Services," *TheStreet*, (August 14, 2015), http://www.thestreet.com/story/13256668/1/10-best-robo-advisors-ranked-find-the-best-automated-online-investing-services.html (accessed January 15, 2016).

Assets under management: $200 million (paid users)

Fees: Free to 0.50% annually ($10,000 minimum)

Rebalance IRA

Assets under management: $180 million

Fees: 0.50% annually (Minimum fee of $500 per year; minimum $75,000 opening account balance)

Liftoff

Assets under management: $150 million

Fees: 0.40% annually

SigFig

Assets under management: $60 million

Fees: 0.25% annual fee for accounts over $10,000. “The first $10,000 managed by SigFig is free.”

Solution

BOK Financial will consider developing a robo advisor capability. This offering will be another distribution channel for delivering investment advice. This online channel must intuitively present customers with investment options that can be purely automated and managed online. For simplicity and cost efficiency, the investment options will be focused on exchanged traded funds (ETF’s). Typically speaking, this investment instruments offer lower fees and is easier to manage with online investment tools than traditional mutual funds. As a comparison, ETF fees might range from 0.23% to 0.56% whereas mutual funds might range from 1.06% to 1.57% for comparable fund types[4]. Traditional mutual funds are priced daily, at the end of the day, and are based on the individual investments in the fund. ETF prices are based on customer demand at any given time during the day. There can also be redemption fees associated with mutual funds to discourage excess turnover if a fund is sold prior to a specific period of time. ETF's are more tax effective than mutual funds. An ETF's ability to decrease or avoid capital gain distributions comes from two differences: Unlike mutual-funds where shares are redeemed with the Fund directly, ETF's are traded on an exchange just like a stock. When one party sells the ETF and another buys on the exchange so the underlying securities within the ETF are not sold to raise cash for the redemption, therefore no gain- no tax. The redemption process also enables the fund manager to sell the most effective cost-basis stocks through stock transfers during the redemption or creation process. These characteristics can also mean a difference in the after-tax rate of returns from a mutual fund versus an ETF, even when they both replicate the same underlying index[5].

The advice platform should have two primary components, a free account aggregation service and a fee based account management component. The aggregation service gives users a useful platform to view their various financial

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[4] Michael Chamberlain, "What's The Difference? Mutual Funds And Exchange Traded Funds Explained," *Forbes/Advisor Network*, (July 18, 2013), http://www.forbes.com/sites/feeonlyplanner/2013/07/18/whats-the-difference-mutual-funds-and-exchange-traded-funds-explained/#78a57f4663e3 (accessed March 26, 2016).

[5] Ibid

accounts in a single dashboard. This will also incent customers to take advantage of the premium investment capabilities as they get more comfortable with this new digital relationship. In addition, this free service provides the bank with important financial data about the customer, particularly around the accounts held at other financial institutions. For example, this data could be used to create targeted marketing campaigns with the goal of increasing customer wallet share. The premium managed account service will be a fee based product with an annual fee ranging from 25 to 50 bps (basis points).

Moving customers from the free data aggregation service to the premium fee based investment solution will require the collection of key data elements. Information such as age, marital status, income, desired date of retirement, and investment objective (example, aggressive growth) will be collected and used to calculate an asset allocation model for the customer's review. There is a balancing act during this collection of data. It's important not to require too much data be provided such that it could hamper the adoption rate of the platform. At the same time, it's critical to collect the right amount of data in order to create an accurate and efficient asset allocation model.

Upon acceptance of the asset allocation the customer will be presented with the required disclosures and account opening documents. This experience will be completely digital and seamless to the customer. The customers will have the option to review and electronically sign the documents and then receive their copies via an electronic document vault or encrypted email. At this point, the customer will have the option to either migrate existing brokerage accounts and/or deposit cash from a demand deposit account to begin investing with BOK Financial. There could be follow-up required of the customer if they are moving an existing investment from another broker. If this is the case, detailed instructions will be provided to the customer regarding the communication and steps required to move the investments to BOK Financial. It is imperative that this initial engagement and onboarding be completely automated. This automation is standard among the top robo advisor solutions and required to be considered a viable solution.

Once the onboarding has been completed customers will now be able to login to the BOK Financial advice portal and view both their aggregated accounts as well as the managed portfolio solution that has been created through the onboarding process. The primary landing page for customers will represent a dashboard of overall accounts and recent account activity. The system will present a graphical analysis of the customer's demand deposit accounts and identify cash levels such as emergency spending levels as well as excess cash levels. When excess cash is identified the platform will present the customer with investment options to better leverage the excess capital. In addition, real time alerts of all account activity will be loaded to this dashboard as well as being made available via email or real time mobile delivery. These activities might include annual fee assessments, recent portfolio rebalancing, or any of a number of activities that could impact the customer. The goal is to clearly communicate to the customer on a near real time basis all activities occurring within their accounts.

Other key functions of a successful robo advice solution at BOK Financial will include capabilities such as presenting customers with the option of speaking to a personal advisor. This could be handled with a number of options such as online chat, online appointment setting (for in-person meetings), and online video conferencing. In addition, these managed portfolios will be passively managed and therefore will require periodic rebalancing. This could be necessitated when a managed portfolio 'drifts' away from predetermined investment policy for a specific strategy due to corporate actions, stock splits, etc… The system will include a capability to optimize this rebalancing function taking into consideration tax and fee implications.

The target market for the robo advice platform should be the upper mass market and mass affluent customer segments. There should be future state capability that provides tiered capabilities that is paired with additional advisor interaction but this capability is largely non-existent in the market today. The marketing capabilities required to launch and sustain a successful advice solution should encompass upselling current customers from within the platform. For example, if the customer indicates the existence of children when signing up for the premium managed service and a college savings plan is not aggregated into the platform there should be targeted marketing campaigns presenting this opportunity to the customer. In addition, there should also be online and email marketing campaigns directed towards existing bank customers who are not currently taking advantage of this product offering. For example, a targeted campaign towards millennials in the mass affluent segment could drive traffic to the site given these customers are more adept at digital engagement. Another example might be a targeted email campaign to all customers with IRA balances of $10k or less. This approach could move lower value customers out of the retail advisor’s book of business and offer a lower cost model to the customer while also allowing the retail advisor to focus on higher value customers.

These marketing campaigns require not just robust marketing but also the data analytics to mine meaningful information from the data being gathered in the online advice platform. Besides driving effective marketing, data analytics can uncover important information about customer behavior. For example, it can identify when customer balances make them candidates for more personalized services. While the initial launch of the platform may be focused on mass/mass affluent segments it would be relatively simple to extract this data and present to the wealth management for proactive engagement. In addition, data analytics can also uncover trends such as when a customer is routinely moving money to outside investment advisors. This can once again provide opportunity for targeted marketing campaigns focused on increasing customer wallet share and bringing this business back to BOK Financial.

Strategy and Implementation

Why this project is being considered

There are several reasons this project is being considered but fundamentally it is due to the belief that robo advice platforms are a lost cost means of delivering passive management advice. Today technology plays a big part in almost all Americans' lives. Because of the success of technology in other business sectors new disruptors are now shaking up the financial services industry. Customers today expect to have access to their accounts and financial relations anytime and from any device.   As such, financial institutions must continually look to define (and redefine) the digital experience provided to their customers. There have also been changes in the regulatory landscape that has given additional favor to robo advice. The Department of Labor released a new Fiduciary rule in April 2016 that will have sweeping changes in the wealth management industry. At a high level this new rule imposes more stringent requirements for advisors acting as fiduciaries to act in the best interest of their customers. In addition, the DOL provides some favoritism to robo advice as it is perceived that these solutions provide unbiased investment options.

BOK Financial has also been very focused on refactoring its mass affluent customer strategy. There are, on average, 11,000 baby boomers retiring each day[6] and many fall into the mass affluent segment. These new retirees are moving retirement savings from ERISA accounts (example, 401(K)) and into other investment instrument and thus creating significant opportunity for financial

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[6] Glenn Kessler, "Do 10,000 baby boomers retire every day?" *The Washington Post*, (July 24, 2014), https://www.washingtonpost.com/news/fact-checker/wp/2014/07/24/do-10000-baby-boomers-retire-every-day/ (accessed April 23, 2016).

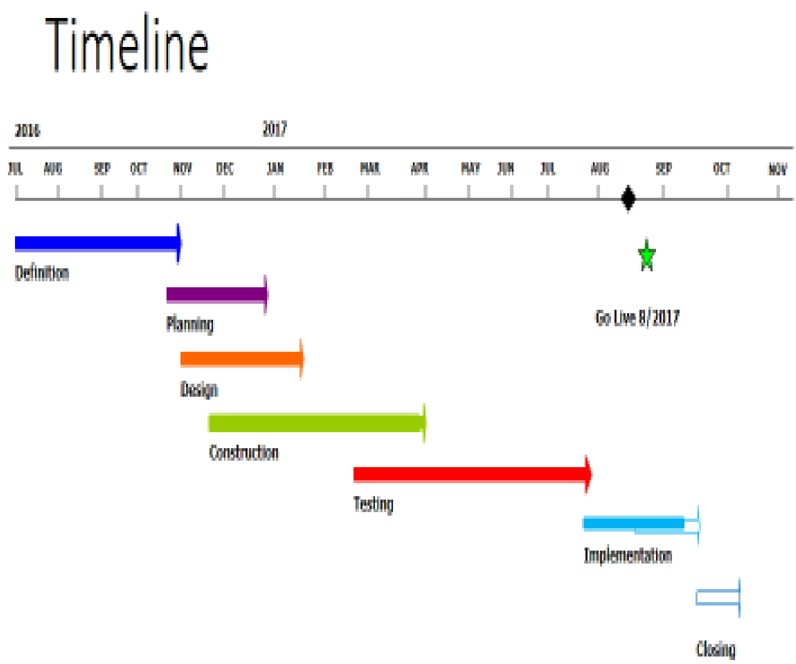
institutions to grow AUM (or retain AUM in a different product). There multiple components to the overall MA segment strategy; robo advice capability provides yet another investment option for those in this segment.

My role in the process

I will serve as analyst in defining and documenting functional requirements for online delivery of investment advice at BOK Financial. Based upon these requirements, I will define options for a potential Robo Advisor product offering that will satisfy these high level requirements. I will also build out financial estimates to launch either a partnership with Blackrock (Future Advisor) or build a custom solution. In doing so, I will help quantify the overall one time capital outlay required as well as the ongoing investment required to mature and maintain the robo advisor ecosystem. In addition, I will review and consider other key requirements to launching a successful online advice offering such as risk management, marketing, and product placement. Another component of this exercise will be to development a high level project implementation schedule and quantify the required resources to roll out the solution. Finally, I will provide a recommendation on whether or not this is a worthwhile investment for BOK Financial.

Implementation Schedule

The overall project timeline from definition to closing is expected to be between twelve and fourteen months. The following graph is representative of the implementation timeline:



The timeline estimate is believed to be accurate regardless of approach, developing an in-house solution or partnering with Black Rock to white label the 'Future Advisor' solution. The phases can be broken into three main groups:

- Definition/Planning/Design – This phase of the project will define the project charter, functional business requirements, and overall strategic plan for the product. Examples of elements considered in this phase of the project include risk, compliance, branding, and technical architecture.
- Construction/Testing – This is the primary 'build' phase of the project where the team takes all of the upfront definition and design and begins to construct what will become the robo advice platform. Testing of the product will occur early and often, culminating in a thorough end-to-end testing of the entire platform prior to launch.
- Implementation/Closing – The implementation will include a focused 'live pilot' of the platform to specific groups such as employees and then rolled out to specific markets based on priority.

Financial Impact

Size and Type of Investment Required for Undertaking this Change

There are two approaches being considered for project, partnering with Black Rock and 'white labeling' a commercially available solution called 'Future Advisor' or creating a custom developed in-house solution. This section will look at the size and type of investment required for both options. We will first consider the required investment for the in-house developed solution and then evaluate the white label option.

The initial financial investment to research, develop and implement the first phase of the in-house developed robo advisor platform is projected to be a minimum of $1.5 million USD. On-going annual investment to create the robo advisor ecosystem, maintain the platform and roll out subsequent releases is projected to be a minimum of $1.4 million USD, including a minimum of 6 additional long term staff adds for the implementation and maintenance of the proposed platform. This does not include the cost of labor for current employees that may be invited to participate in focus groups, surveys, or pilot testing.

Revenue and Expense Estimates for Each Period – In House Solution

Highlights of the cash flow analysis for the in-house solution are as follows:

CASH FLOW ANALYSIS		Initial	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
Cashflows								
Initial Cash		-1,373,002	-100,000	-100,000	-100,000	-100,000	-100,000	-1,873,002
Residual Value		0	0	0	0	0	0	0
Revenues		0	2,016,000	1,854,720	1,706,342	1,569,835	1,444,248	8,591,146
Expenses		-79,000	-1,146,534	-1,546,615	-1,565,514	-1,356,145	-1,147,361	-6,841,169
Depreciation		0	228,834	457,667	457,667	228,834	0	1,373,002
Taxes		30,731	-338,222	-119,853	-54,782	-83,125	-115,489	-680,741
Net Cashflows		($1,421,271)	$660,078	$545,919	$443,714	$259,398	$81,398	$569,235
Cumulative Net Cashflows			($761,193)	($215,274)	$228,440	$487,837	$569,235	
Cashflow Ex-Residual								$569,235

NPV of Cashflows			
Discount Rate =	6.00%	$326,153	
Discount Rate =	12.50%	$115,553	
Discount Rate =	15.00%	$46,033	
		3yr	5yr
Internal Rate of Return		8.43%	16.77%
Initial Cash			In Service Month
Hardware and Software-3 yr		$1,373,002	July
Telecom/Office Eq/ATMs - 5 yr			January
Furniture/Lease/Bldg Improv -10 yr life			January
Net Initial Cash Outlay		$1,373,002	

Initial cash outlay of $1.42 MM consists of the following:

- $1.373 MM Capital hardware, software, and resources
- $79 M Expense
- $31 M Taxes

It is assumed that there will be a 'net new' capital investment of $100M per year ongoing for enhancements and maintenance (independent of resource costs). This would be considered steady state ongoing 'care and feeding' of the platform. Any substantial investment beyond $100M would require additional cash flow analysis.

Revenue factors are estimated and represented as follows:

Annual Percent Penetration	8%
Average Balance	$140,000.00
Annual Fee	50 bps

	Account Growth	AUM Growth	Fee Growth
Year 1	2880	$403,200,000.00	$2,016,000.00
Year 2	2650	$370,944,000.00	$1,854,720.00
Year 3	2438	$341,268,480.00	$1,706,342.40
Year 4	2243	$313,967,001.60	$1,569,835.01
Year 5	2063	$288,849,641.47	$1,444,248.21

Income statement analysis for the in-house solution is as follows:

INCOME STATEMENT ANALYSIS		Sales Production	Initial	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL/AVG
SALES PRODUCTION:									
Loans - *Ending Balance*		January 1, Yr 2		$0	$0	$0	$0	$0	
Spread		0		0.00%	0.00%	0.00%	0.00%	0.00%	
Fees as % of Loans				0.00%	0.00%	0.00%	0.00%	0.00%	
Demand Deposits - *Ending Balance*				$0	$0	$0	$0	$0	
Spread				0.00%	0.00%	0.00%	0.00%	0.00%	
Interest Deposits / Liabilities - *Ending Balance*				$0	$0	$0	$0	$0	
Spread				0.00%	0.00%	0.00%	0.00%	0.00%	
TOTAL FIXED ASSETS				**$1,373,002**	**$1,373,002**	**$1,373,002**	**$1,373,002**	**$1,373,002**	
Accumulated Depreciation				**($228,834)**	**($686,501)**	**($1,144,168)**	**($1,373,002)**	**($1,373,002)**	
NET ASSETS - Period End				**$1,144,168**	**$686,501**	**$228,834**	**$0**	**$0**	
Average Assets				**$286,042**	**$915,335**	**$457,667**	**$114,417**	**$0**	**$354,692**
Revenue Factors									
Net Interest Revenue				0	0	0	0	0	0
Household Revenue				2,016,000	1,854,720	1,706,342	1,569,835	1,444,248	8,591,146
Total Revenue Factors				2,016,000	1,854,720	1,706,342	1,569,835	1,444,248	8,591,146
Expense Factors									
Salaries - *Adds to Staff*	Avg Salary	$110,000		330,000	453,200	466,796	480,800	495,224	2,226,020
Total # FTE	Year 1 Start Mo.: July	4		4.00	4.00	4.00	4.00	4.00	
Benefits		24.00%		79,200	108,768	112,031	115,392	118,854	534,245
Incentives	% of Salary	15.00%		49,500	67,980	70,019	72,120	74,284	333,903
Hardware/Software expense items			0		0	0	0	0	0
Marketing									0
Training/Travel			0	0	0	0	0	0	0
Non-capitalizable resources - SLK ongoing supp/dev resources			0	108,000	108,000	108,000	108,000	108,000	540,000
Hardware maintenance - Amazon AWS			54,000	54,000	54,000	54,000	54,000	54,000	324,000
Software maintenance - MuleSoft			0	297,000	297,000	297,000	297,000	297,000	1,485,000
Telecom charges			0	0	0	0	0	0	0
Cornerstone/Account Fee			0						0
Legal				0	0	0	0	0	0
Contigency		0.00%	25,000	0	0	0	0	0	25,000
Deprec/amort - 3 yr	Deprec Mo. Yr 1	6	0	228,834	457,667	457,667	228,834	0	1,373,002
Deprec/amort - 5 yr	Deprec Mo. Yr 1	12	0	0	0	0	0	0	0
Deprec/amort - 10 yr	Deprec Mo. Yr 1	12	0	0	0	0	0	0	0
Total Expense Factors			79,000	1,146,534	1,546,615	1,565,514	1,356,145	1,147,361	6,841,169
Net Income Statement Impact Before Taxes and Opportunity Cost			**-79,000**	**869,466**	**308,105**	**140,829**	**213,690**	**296,887**	**1,749,976**
Tax Effect			-30,731	338,222	119,853	54,782	83,125	115,489	680,741
Net Income Statement Impact After Taxes			**-48,269**	**531,244**	**188,252**	**86,046**	**130,564**	**181,398**	**1,069,235**
Opportunity Cost									
Initial Cash Outlay			53,288	55,244	57,272	59,373	61,552	63,811	350,542
Average Cashflows			-886	12,176	37,976	59,806	76,378	86,301	271,751
Tax Effect			20,385	26,226	37,051	46,361	53,655	58,394	242,072
Total Opportunity Cost			32,018	41,194	58,196	72,819	84,275	91,719	380,221
Net Income Statement Impact			**($80,287)**	**$490,050**	**$130,056**	**$13,228**	**$46,289**	**$89,679**	**$689,014**

Highlights of the income statement analysis are as follows:

- Four full time technology resources are included in this analysis with an estimated salary of $110M plus benefits
- Two additional offshore technical resources are included in this analysis with an annual run rate of $108M (in aggregate)
- Ongoing hardware costs are estimated at $54M per year. This is based on the assumption that the solution will be hosted in the Amazon cloud and thus cannot be considered as a capital expenditure.
- Software maintenance is estimated at $297M per year. This is ongoing license/maintenance costs associated with data integration and aggregation.

Revenue and Expense Estimates for Each Period – White Label Option

The initial financial investment to partner with Black Rock and implement a 'white labeled' version of the Future Advisor platform is projected to be a minimum of $1.5 million USD. On-going annual investment to maintain the platform and roll out subsequent releases is projected to be a minimum of $460,000 USD, including a minimum of 2 additional long term staff adds for the implementation and maintenance of the proposed platform. This does not include the cost of labor for current employees that may be invited to participate in focus groups, surveys, or pilot testing.

Revenue and Expense Estimates for Each Period – White Label Option

Highlights of the cash flow analysis for the in-house solution are as follows:

CASH FLOW ANALYSIS		Initial	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
Cashflows								
Initial Cash		0	0	0	0	0	0	0
Residual Value		0	0	0	0	0	0	0
Revenues		0	1,008,000	927,360	853,171	784,918	722,124	4,295,573
Expenses		-1,465,825	-417,575	-450,657	-459,677	-468,967	-478,536	-3,741,237
Depreciation		0	0	0	0	0	0	0
Taxes		570,206	-229,675	-185,437	-153,069	-122,905	-94,756	-215,637
Net Cashflows		**($895,619)**	**$360,750**	**$291,266**	**$240,425**	**$193,046**	**$148,832**	**$338,699**
Cumulative Net Cashflows			**($534,869)**	**($243,604)**	**($3,179)**	**$189,867**	**$338,699**	
Cashflow Ex-Residual								**$338,699**

NPV of Cashflows		
Discount Rate =	6.00%	**$169,928**
Discount Rate =	12.50%	**$27,150**
Discount Rate =	15.00%	**($19,231)**

	3yr	5yr
Internal Rate of Return	**-0.19%**	**13.94%**

Initial Cash		**In Service Month**
Hardware and Software-3 yr	$0	July
Telecom/Office Eq/ATMs - 5 yr		January
Furniture/Lease/Bldg Improv -10 yr life		January
Net Initial Cash Outlay	**$0**	

Initial cash outlaw of $1.47 MM consists of the following:

- $945 M Expense professional services
- $330 M Internal resources Expense
- $190 M Contingency
- 570 M Taxes

It is assumed that there will be a ‘net new’ investment of $100M per year ongoing for enhancements and maintenance (independent of resource costs). This would be considered steady state ongoing ‘care and feeding’ of the platform. Any substantial investment beyond $100M would require additional cash flow analysis. Further, because this is a cloud based solution there will be no actual asset created and depreciated. As such, the white label option is considered to an expense based project. Also, the white label option requires a revenue split between BOK Financial and Black Rock Advisors; it is assumed in this estimate that split will be fifty/fifty.

Revenue factors are estimated and represented as follows:

Annual Percent Penetration	8%			
Average Balance	$140,000.00			
Annual Fee	50 bps			
* For the white label cash flow assume annual fee is split evenly between Black Rock & BOK Financial				
	Account Growth	AUM Growth	Fee Growth	Split Evenly
Year 1	2880	$403,200,000.00	$2,016,000.00	$1,008,000.00
Year 2	2650	$370,944,000.00	$1,854,720.00	$927,360.00
Year 3	2438	$341,268,480.00	$1,706,342.40	$853,171.20
Year 4	2243	$313,967,001.60	$1,569,835.01	$784,917.50
Year 5	2063	$288,849,641.47	$1,444,248.21	$722,124.10

Income statement analysis for the in-house solution is as follows:

INCOME STATEMENT ANALYSIS			Initial	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL/AVG
		Sales Production							
SALES PRODUCTION:									
Loans - *Ending Balance*		January 1, Yr 2		$0	$0	$0	$0	$0	
Spread		0		0.00%	0.00%	0.00%	0.00%	0.00%	
Fees as % of Loans				0.00%	0.00%	0.00%	0.00%	0.00%	
Demand Deposits - *Ending Balance*				$0	$0	$0	$0	$0	
Spread				0.00%	0.00%	0.00%	0.00%	0.00%	
Interest Deposits / Liabilities - *Ending Balance*				$0	$0	$0	$0	$0	
Spread				0.00%	0.00%	0.00%	0.00%	0.00%	
TOTAL FIXED ASSETS				**$0**	**$0**	**$0**	**$0**	**$0**	
Accumulated Depreciation				**$0**	**$0**	**$0**	**$0**	**$0**	
NET ASSETS - Period End				**$0**	**$0**	**$0**	**$0**	**$0**	
Average Assets				**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Revenue Factors									
Net Interest Revenue				0	0	0	0	0	0
Household Revenue				1,008,000	927,360	853,171	784,918	722,124	4,295,573
Total Revenue Factors				1,008,000	927,360	853,171	784,918	722,124	4,295,573
Expense Factors									
Salaries - *Adds to Staff*	Avg Salary →	$105,000		192,500	216,300	222,789	229,473	236,357	1,097,419
Total # FTE	Year 1 Start Mo: July	2		2.00	2.00	2.00	2.00	2.00	
Benefits		24.00%		46,200	51,912	53,469	55,073	56,726	263,380
Incentives	% of Salary →	15.00%		28,875	32,445	33,418	34,421	35,454	164,613
Hardware/Software expense items			0		0	0	0	0	0
Marketing									0
Training/Travel			0	0	0	0	0	0	0
Non-capitalizable resources			1,275,825	0	0	0	0	0	1,275,825
Hardware maintenance			0	0	0	0	0	0	0
Software maintenance - Yodlee			0	150,000	150,000	150,000	150,000	150,000	750,000
Telecom charges			0	0	0	0	0	0	0
Cornerstone/Account Fee			0						0
Legal				0	0	0	0	0	0
Contigency		40.00%	190,000	0	0	0	0	0	190,000
Deprec/amort - 3 yr	Deprec Mo. Yr 1	6	0	0	0	0	0	0	0
Deprec/amort - 5 yr	Deprec Mo. Yr 1	12	0	0	0	0	0	0	0
Deprec/amort - 10 yr	Deprec Mo. Yr 1	12	0	0	0	0	0	0	0
Total Expense Factors			1,465,825	417,575	450,657	459,677	468,967	478,536	3,741,237
Net Income Statement Impact Before Taxes and Opportunity Cost			**-1,465,825**	**590,425**	**476,703**	**393,494**	**315,950**	**243,588**	**554,336**
Tax Effect			-570,206	229,675	185,437	153,069	122,905	94,756	215,637
Net Income Statement Impact After Taxes			**-895,619**	**360,750**	**291,266**	**240,425**	**193,046**	**148,832**	**338,699**
Opportunity Cost									
Initial Cash Outlay			53,796	55,770	57,817	59,939	62,138	64,419	353,879
Average Cashflows			-16,435	-26,249	-14,285	-4,528	3,426	9,699	-48,373
Tax Effect			14,533	11,484	16,934	21,555	25,504	28,832	118,842
Total Opportunity Cost			22,828	18,037	26,598	33,856	40,060	45,286	186,664
Net Income Statement Impact			**($918,447)**	**$342,713**	**$264,668**	**$206,569**	**$152,986**	**$103,546**	**$152,035**

Highlights of the income statement analysis are as follows:

- Two full time technology resources are included in this analysis with an estimated salary of $110M plus benefits
- Software maintenance is estimated at $150M per year. This is ongoing license/maintenance costs associated with data integration and aggregation.

Subjectively Evaluate the Risk of the Investment

There are certainly risk implications inherent with any online offering that houses confidential financial information. Cyber security is always top of mind when designing, building, and implementing financial advice offerings. However, the assumption in this scenario is that this product offering will be built based on agreed upon best practices to ensure this offering is equally secure as current offerings if not more secure.

There are other risk that should also be considered such as brand identity, product positioning, and the potential to cannibalize current offerings. Early offerings in the robo space were not affiliated with financial institutions. However, today many banks and RIA's are either building solutions or partnering to offer a white label capability. It will be important to ensure the project leverages and builds upon the strength of the BOK Financial brand. In addition, careful consideration around how the product is initially positioned is important. The product cannot be all things to all segments so the key will be to get a successful product launched to meet the mass market/mass affluent segments and then continually iterate new capabilities that will in time also meet demands of higher level customer segments. These later capabilities must be designed to both meet the needs of customers while also be created to serve as another tool for advisors; not a replacement thereof.

Indicate if the Investment Is or Is Not Worthwhile

Both the in-house development offering and the white-label partnership with Black Rock are worthwhile investments, at least they both provide positive cash flows results over a five year period. The penetration into the mass affluent market was built on conservative numbers. Specifically, the analysis kept the total mass affluent customers static for this analysis. Given that the mass affluent customer segment is the fastest growing segment, based largely on the number of baby boomers retiring on a daily basis, one could expect the total penetration to be larger than currently calculated. If this proves true it would drive the profitability of the new offering even higher. This conservative approach was taken because there was some concern with the average account balance of $140,000 that was used in the analysis. While these numbers have been discussed and validated with Black Rock there are still concerns that these balances are higher than could be expected. As such, more accounts with lower account balances would drive higher profitability but not at the same growth curve as having the higher average account balance.

Non-Financial Impact

Identify Logistical and Organizational Hurdles

While a robo advisor solution will likely compliment the wide range of products currently offered by BOK Financial it also presents some challenges that must be addressed in order to have a successful, viable product. One challenge facing the organization will be pace of change required to remain viable in the online advice market. BOK Financial has not historically been a bank that is progressive with technology. A Robo Advisor platform will challenge this position as the organization offers advice solely through an online platform. The risk is that the customer's primary means of engagement will be with online vs. an advisor. If the advice platform does not remain relevant, continually offering sound investment solutions and predicting future needs, AUM growth and customer retention will be at risk.

Another hurdle will be in defining the overall marketing strategy for the robo advice platform. This platform could have the capability to serve multiple customer segments. Initially, the base offering would best serve the mass/mass affluent segments via a purely digital and online delivery. As certain customers in these segments begin to acquire wealth and move towards the affluent, high net worth segments, there will be a need to compliment the online solution with human advisors. Careful consideration must be given to ensure that more robust technology is not provided to these segments while overlooking the higher customer segment levels. In addition, there is risk to the advisors if clients are provided a blended solution, part robo and advisor, and the robo solution return consistently beats that of the advisor. Further, another key risk will be in defining the overall product offerings and how the robo advisor solution is used in conjunction with human advisors as the organization delivers advice to higher income wealth segments. There could also be some resistance to this delivery model as some advisors could fear this encroaches on their business.

Overcoming These Hurdles

One of the keys to delivering a successful online technology platform and making ongoing investments to ensure it remains relevant is to build out a robo advisor ecosystem. Specifically, BOK Financial must properly staff a team comprised of technologist, marketing, and product branding resources. This will ensure resources remain focused on progressing the product and not become distracted by other technology/product engagements such as acquisitions, core platform upgrades, etc…

The initial launch of the robo advisor platform will be focused on the mass/mass affluent markets and provide a purely digital experience. This is primary due to the belief that the fundamentals of the system should be the initial focus and getting a product to market in a timely fashion will ultimately deliver higher revenue. The team will take an iterative approach and look to roll out new and enhanced functionality at least three times per year. Through this approach the firm will be able offer more complex capabilities to higher customer segments and eventually provide a consistent digital experience to all BOK Financial customers. For example, a future offer could consist of offering an online planning tool that customers interact with both by themselves as well as with an advisor. The goals identified in the online plan could then be translated into a financial plan that would likely consist of some passive management (robo platform) and some active management (advisor).

Defining the delivery of this product is key to ensuring it is a compliment to existing offerings versus cannibalizing them. It is expected that some retail advisors could view the robo platform as a threat to their business. However, what both the firm and advisors should consider is that this new offering is lower cost advice model. With this new offering retail advisors would have the option to move over lower balance accounts over to the robo platform to receive passive advice and allow the advisors to focus on more profitable active advice driven business.

Conclusion

Developing a robo advice platform capability to improve personal financial management will further round out and compliment the broad mix of financial services offered by BOK Financial today. It will create a new, lost cost channel for offering investment advice. In doing so it will create another opportunity to collaborate with customers as they manage their financial well-being in a digital capacity. Finally, this product will create another tool for advisors looking to create holistic investment solutions for a potentially broad mix of customer segments.