Report on Digital Investment Advice

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A REPORT FROM **THE FINANCIAL INDUSTRY REGULATORY AUTHORITY**

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Introduction

Technology has long played a central role in financial services innovation. It continues to do so today as many firms in the securities industry introduce new digital investment advice tools to assist in developing and managing investment portfolios. FINRA undertook a review of selected digital investment advice tools to assess these developments.

The observations and practices in this report are drawn from FINRA's discussions with a range of financial services firms that provide or use digital investment advice tools, vendors and foreign securities regulators as well our regulatory experience. This report uses the term "financial services firms" to include both broker-dealers and investment advisers. The rules discussed in this report apply to broker-dealers. The effective practices we discuss are specifically intended for FINRA-registered firms, but may be valuable to financial professionals generally.[1]

The adoption of digital investment advice tools has stimulated discussions about the role of financial professionals and the evolving relationship between financial intermediaries and their clients. What role will financial professionals play in conjunction with digital services in providing investment advice? To what degree will investors rely primarily on digital investment advice? How well can software know a client? Can the skill, knowledge and service provided by well-trained and ethical financial professionals be incorporated in software? Can that software provide sound personal advice, especially for clients with more complex advice needs?

Without venturing to answer these questions, what is clear is that the role technology plays in supporting investment advice to clients will increase at many securities firms.[2] With that in mind, FINRA issues this report to remind broker-dealers of their obligations under FINRA rules as well as to share effective practices related to digital investment advice, including with respect to technology management, portfolio development and conflicts of interest mitigation. The report also raises considerations for investors in evaluating investment advice derived entirely or in part from digital investment advice tools.

This report does not create any new legal requirements or change any existing broker-dealer regulatory obligations. Throughout the report, we identify practices that we believe firms should consider and tailor to their business model.

Questions/Further Information

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A Note on Terminology

As used here, digital investment advice tools (also referred to as digital advice tools) support one or more of the following core activities in managing an investor's portfolio: customer profiling, asset allocation, portfolio selection, trade execution, portfolio rebalancing, tax-loss harvesting[3] and portfolio analysis. These investment advice tools can be broken down into two groups: tools that financial professionals use, referred to here as "financial professional-facing" tools, and tools that clients use, referred to here as "client-facing" tools. Client-facing tools that incorporate the first six activities—customer profiling through tax-loss harvesting—are frequently referred to as "robo advisors" or "robos."[4]

Figure 1: Investment advice value chain

* Functionally typical in financial professional- and client-facing digital investment advice tools
** Functionally typical in financial professional-facing tools only

A Brief History of Digital Investment Advice

Financial professionals have used digital investment advice tools for years. These tools help financial professionals at each point in the value chain described above, for example, to develop an investor profile, to prepare proposals and sales materials, to develop an asset allocation or to recommend specific securities to an investor. Those recommendations may be for individual securities, a customized portfolio or a pre-packaged portfolio for investors with a given profile. In addition, digital tools can help develop recommendations to rebalance investors' portfolios on a periodic basis or to support tax-loss harvesting. The tools financial professionals use may be developed by their firms, acquired from third-party vendors by their firm or, in some cases, acquired by the financial professionals themselves.

In the late 1990s, the landscape of investment tools available directly to investors began to expand. Some firms started to make asset allocation tools available online. The landscape expanded further in 2005, when NASD Interpretative Material (IM) 2210-6 became effective, allowing broker-dealers to make "investment analysis tools" available to investors. FINRA defined an investment analysis tool to be an "interactive technological tool that produces simulations and statistical analyses that present the likelihood of various investment outcomes if certain investments are made or certain investment strategies or styles are undertaken."[5]

Following the 2008 financial crisis, a number of new entrants began offering a wide range of digital financial tools directly to consumers, including investment advice tools. Many of these firms had their roots in the technology industry and brought new perspectives on the role of technology in financial services. The client-facing digital investment tools these firms developed offer aspects of the functionality previously only available to financial professionals. The degree of human involvement in client-facing tools varies substantially. Some firms rely on a purely digital interaction with clients while others provide optional or mandatory access to a financial professional.

In many cases, securities industry participants are responding with digital investment advice strategies of their own. Some participants are developing or acquiring client-facing investment advice tools while others are developing or acquiring financial professional-facing tools to enhance their ability to serve clients and compete more effectively. Some of these latter tools include advanced analytic tools—*e.g.*, to assess customer risk tolerance or portfolio risk—and in some cases presentation interfaces that enable the financial professional to present information to clients online. Vendors frequently position these tools as providing the basis for financial professionals to conduct more in-depth, sophisticated discussions with their client.

Governance and Supervision

Governance and supervision of investment recommendations are recurring topics of FINRA guidance and are equally relevant to digital investment advice tools. We focus here on governance and supervision in two areas: 1) the algorithms that drive digital investment tools; and 2) the construction of client portfolios, including potential conflicts of interest that may arise in those portfolios.

Algorithms

Algorithms are core components of digital investment advice tools. They use various financial models and assumptions to translate data inputs into suggested actions at each step of the advice value chain. The methodology by which the algorithm translates inputs into outputs should reflect a firm's approach to a particular task, *e.g.*, profiling an investor, rebalancing an account or performing tax-loss harvesting. If an algorithm is poorly designed for its task or not correctly coded, it may produce results that deviate systematically from the intended output and that adversely affect many investors.

For this reason, it is essential that firms effectively govern and supervise the algorithms they use in digital-advice tools. At the most basic level, firms should assess whether an algorithm is consistent with the firm's investment and analytic approaches. For example, a number of client-facing digital investment advice tools are based on precepts from Modern Portfolio Theory[6] and use a passive, index-based approach to investing based on the risk tolerance of the client, while others incorporate active management of investment portfolios. Not surprisingly, the outputs and investment advice from algorithms developed based on these approaches are likely to be different.

Even when client-facing digital advice tools take a similar approach to investing, implementation of methods for specific investing tasks, for example asset allocation, may produce very different results. Cerulli Associates compared the asset allocation for a notional 27-year-old investing for retirement across seven client-facing digital advice tools. Equity allocations ranged as high as 90 percent and as low as 51 percent; fixed income allocations ranged from 10 percent to 40 percent. (*See* Figure 2.) A *Wall Street Journal* analysis found similar disparities.[7, 8]

Figure 2: Asset allocation model comparison[9]

Asset Class	Digital Adviser A	Digital Adviser B	Digital Adviser C	Digital Adviser A	Digital Adviser D	Digital Adviser E	Digital Adviser F
Equity	90.1%	72.0%	51.0%	84.0%	60.0%	69.0%	72.2%
Domestic	42.1%	37.0%	26.0%	34.0%	30.0%	47.0%	28.9%
U.S. total stocks	16.2%	22.0%		34.0%		47.0%	13.0%
U.S. large-cap	16.2%		8.0%		19.0%		13.0%
U.S. mid-cap	5.2%						
U.S. small-cap	4.5%		18.0%		11.0%		2.9%
Dividend stocks		15.0%					
Foreign	48.0%	35.0%	25.0%	50.0%	30.0%	22.0%	43.3%
Emerging markets	10.5%	16.0%	13.0%	25.0%	9.0%	9.0%	17.0%
Developed markets	37.5%	19.0%	12.0%	25.0%	21.0%	13.0%	26.3%
Fixed income	10.1%	13.0%	40.0%	10.0%	21.5%	11.0%	15.0%
Developed markets bonds			15.0%		2.5%		4.1%
U.S. bonds	4.9%	6.0%	25.0%	10.0%	12.0%		10.9%
International bonds	3.6%						
Emerging markets bonds	1.6%	7.0%			7.0%		
Other	0.0%	15.0%	9.0%	6.0%	10.0%	16.0%	12.8%
Real estate		15.0%	9.0%	6.0%	5.0%		12.8%
Currencies						2.0%	
Gold & precious metals					5.0%		
Commodities						14.0%	
Cash					8.5%	4.0%	

Asset Allocation Models for a 27-Year-Old Investing for Retirement, September 2015

Source: Cerulli Associates

Note: Columns may not total to 100% due to rounding.

These examples highlight the importance of firms 1) understanding the methodological approaches embedded in the algorithms they use, including the assumptions underlying the potential scenarios on expected returns, and the biases or preferences that exist in those approaches and 2) assessing whether these methodological approaches reflect a firm's desired approach. These considerations apply both to the internal development of digital advice tools and third-party digital advice tools that firms acquire or private-label.

A look at two other areas of digital investment advice—customer risk tolerance assessment and portfolio analysis—reinforces the need for broker-dealers to establish and implement effective governance and supervision of their digital investment advice tools. FINRA reviewed several tools designed to help financial professionals understand investors' risk tolerance. In some cases, these tools also analyze the alignment of investors' portfolios with their risk tolerance and propose conforming changes to bring the portfolio into alignment. These tools vary considerably in approach to these tasks. (*See Observations on Practices* beginning on page 6 for a discussion of some of these approaches.) Good governance involves understanding if the approach to assessing customer risk tolerance is consistent with the firm's approach.

FINRA also reviewed tools to help financial professionals and their clients understand the impact of potential shocks to clients' portfolios, for example from an oil price fall, a global recession or a geo-political crisis. Careful governance would include understanding the analytic approaches that are used in these tools, including the assumptions that are made, about the impact of the shock events on the correlations in various asset price movements, among other things.

Developing an understanding of the algorithms a tool uses would also include understanding the circumstances in which their use may be inappropriate. For example, applying a tax-loss harvesting algorithm to one account of a married client where both spouses have multiple investment accounts may be detrimental. Without a full view of the couple's portfolio, the algorithm may generate unusable realized losses.

Principles and Effective Practices: Governance and Supervision of Algorithms

Digital investment advice tools are dependent on the data and algorithms that produce the tools' output. Therefore, an effective governance and supervisory framework can be important to ensuring that the resulting advice is consistent with the securities laws and FINRA rules. Such a framework could include:

- **Initial reviews**
  - assessing whether the methodology a tool uses, including any related assumptions, is well-suited to the task;
  - understanding the data inputs that will be used; and
  - testing the output to assess whether it conforms with a firm's expectations.
- **Ongoing reviews**
  - assessing whether the models a tool uses remain appropriate as market and other conditions evolve;
  - testing the output of the tool on a regular basis to ensure that it is performing as intended; and
  - identifying individuals who are responsible for supervising the tool.

FINRA reinforces that a registered representative using a digital advice tool to help develop a recommendation must comply with requirements of the suitability rule and cannot rely on the tool as a substitute for the requisite knowledge about the securities or customer necessary to make a suitable recommendation.

Broker-dealers are required to supervise the types of business in which they engage. As a component of this supervision, broker-dealers should consider the nature of the advice provided, and to the extent this advice derives from digital investment advice tools, review of these tools would be useful.

In addition to the effective practices discussed above, firms should be able to address such other questions as: 1) Are the methodologies tested by independent third parties? 2) Can the firm explain to regulators how the tool works and how it complies with regulatory requirements? 3) Is there exception reporting to identify situations where a tool's output deviates from what might be expected and, if so, what are the parameters that trigger such reporting?

In the context of a financial professional-facing system, the following questions are also relevant: 1) What training or testing does the firm require before a financial professional may use the tool? 2) What discretion does the financial professional have regarding testing different scenarios and assumptions? 3) Does the firm review financial professionals' recommendations that are inconsistent with the tool's output?

Observations on Practices

Based on FINRA's observations,[10] a number of entities use some form of an investment policy committee to 1) oversee the development and implementation of algorithms; 2) participate in the due diligence on third-party tools; or 3) evaluate scenarios used in firms' portfolio analysis tools. Depending on the entity, this group may be part of the broker-dealer or an affiliated entity.

For example, one firm allows registered representatives to use financial professional-facing digital advice tools, but requires all such tools to undergo an in-depth vetting and approval process. The result is that the firm permits most registered representatives to use only two firm-approved digital advice tools. The approval process for these tools includes a rigorous review by both compliance and technology staff. This review covers internal testing and vendor testing of the software to ensure that elements such as questionnaire scoring and results perform as expected. Also, these tools are incorporated into the firm's technology architecture and are protected by requirements for user entitlements and vetted to function within the firm's internal browser as added protection from cyberattacks. The tools are tested daily as part of the firm's "ready for business" testing.[11]

While some firms prohibit registered representatives from using digital investment advice tools without the firm's prior review and approval, others do not. We observed a firm that, in addition to allowing registered representatives to use certain pre-approved tools, also allows registered representatives to add tools that are not reviewed by the firm. The absence of a process to review such tools raises concerns about a firm's ability to adequately supervise the activities of registered representatives who use these tools, and is not consistent with the effective governance and supervision practices described above.

Client Portfolio Construction and Monitoring, and Conflicts of Interest

In addition to their role with respect to algorithms, firms should also establish governance and supervision structures and processes for the portfolios digital investment tools may present to users. Many of these tools match investors to a pre-packaged portfolio of securities based on their profile, *i.e.*, investors with a conservative profile are placed in a conservative investment portfolio and investors with an aggressive profile are placed in an aggressive portfolio. Among the firms FINRA reviewed, most establish between five and eight investor profiles, although some firms have significantly more. In this context, the decision about the characteristics that make a portfolio suitable for a given investor profile is extremely important. (We discuss this in the *Investor Profiling* section beginning on page 8.)

The construction of portfolios may raise concerns about conflicts of interest. In the context of retail brokerage services, two categories of conflicts are particularly relevant to digital investment advice: employee vs. client and firm vs. client conflicts.[12] Purely digital client-facing tools eliminate the first of these conflicts because financial professionals are not involved in the advice process. Hybrid digital platforms—those that include a role for a financial professional in providing advice—may face these conflicts, depending on the incentive structure for the financial professional. Firm vs. client conflicts, however, may remain present for both financial professional- and client-facing digital advice tools, for example if a firm offers products or services from an affiliate or receives payments or other benefits from providers of the products or services.

Principles and Effective Practices:
Governance and Supervision of Portfolios and Conflicts of Interest

An effective practice for firms is to establish governance and supervisory mechanisms for the portfolios that a firm's digital investment advice tool may propose. This mechanism would:

- determine the characteristics—*e.g.*, return, diversification, credit risk and liquidity risk—of a portfolio for a given investor profile;
- establish criteria for including securities in the firm's portfolios (these can include, for example, fees, index tracking error, liquidity risk and credit risk);
- select the securities that are appropriate for each portfolio (or if this is done by an algorithm, oversee the development and implementation of that algorithm as discussed above);
- monitor pre-packaged portfolios to assess whether their performance and risk characteristics, such as volatility, are appropriate for the type of investors to which they are offered; and
- identify and mitigate conflicts of interest that may result from including particular securities in a portfolio.

The review mechanism should include staff who are independent of the business, and who can advise on both overall portfolio investment strategy and the selection of individual securities.

Observations on Practices

As with the oversight of algorithms, the broker-dealers and other firms with which FINRA spoke typically use an investment policy committee, or equivalent body, to construct and review both the customer profiles and pre-packaged portfolios that may be offered to clients through digital investment advice tools. In some cases, the members of the committee sit in an affiliated legal entity while in others they sit within the entity. Many client-facing digital advice tools use Exchange-Traded Funds (ETFs) in creating their portfolios, and common criteria for their selection include cost, index tracking error, liquidity and bid-ask spreads.

Approaches to managing conflicts of interest that arise from security selection vary. Some financial services firms offering client-facing digital advice tools seek to avoid conflicts by not offering proprietary or affiliated funds or funds that provide revenue-sharing payments. Others follow a vet and disclose approach. Some of the principles that underlie FINRA Rule 2214 are applicable to conflicts that may arise in connection with a digital investment advice tool. Specifically, broker-dealers should disclose if the digital advice tool favors certain securities and, if so, explain the reason for the selectivity and state, if applicable, that other investments not considered may have characteristics, such as cost structure, similar or superior to those being analyzed.

Investor Profiling

Understanding a customer's investment objectives and the specific facts and circumstances of the customer's finances—developing an investor profile—is essential to providing sound investment advice. FINRA believes that core principles regarding customer profiling apply regardless of whether that advice comes from a financial professional or an algorithm.

Principles and Effective Practices: Customer Profiling

Customer profiling functionality is a critical component of digital advice tools because it drives recommendations to customers. Effective practices for customer profiling include:

- identifying the key elements of information necessary to profile a customer accurately;[13]
- assessing both a customers' risk capacity and risk willingness;[14]
- resolving contradictory or inconsistent responses in a customer profiling questionnaire;
- assessing whether investing (as opposed to saving or paying off debt) is appropriate for an individual;
- contacting customers periodically to determine if their profile has changed; and
- establishing appropriate governance and supervisory mechanisms for the customer profiling tool (addressed in the *Governance and Supervision* section beginning on page 3).

Customer Profiling Information Requirements

A key question in developing a customer profile is: What information is necessary to build a customer profile with sufficient information to make a sound investment recommendation? FINRA has defined the necessary minimum body of information that broker-dealers are required to collect in its know your customer and suitability rules. FINRA Rule 2090 (Know Your Customer) requires broker-dealers to use reasonable diligence to know the essential facts concerning a customer at account opening and thereafter. When making a recommendation, FINRA Rule 2111 (Suitability) requires a broker-dealer to use reasonable diligence to obtain and analyze a customer's investment profile, which includes, but is not limited to, "the customer's age, other investments, financial situation and needs, tax status, investment objectives, investment experience, investment time horizon, liquidity needs, risk tolerance, and any other information the customer may disclose to the member or associated person in connection with such recommendation." The suitability rule also notes that "the level of importance of each factor may vary depending on the facts and circumstances of the particular case."

As a general matter, the financial professional-facing tools FINRA observed could be used to gather a broad range of information about a customer. Some tools enable the financial professional to include information about a customer's overall portfolio rather than a single account, information about a spouse's account, retirement income—*e.g.*, Social Security and pension—and more detailed information about a client's financial condition, *e.g.*, about expenses. Most fundamentally, though, financial professionals can ask the client questions to gather supplementary information and develop a nuanced understanding of the client's needs. The effectiveness is, of course, driven significantly by the skill of the financial professional.

By contrast, client-facing digital advice tools rely on a discrete set of questions to develop a customer profile. The tools FINRA reviewed seek answers to between four and twelve questions, generally falling into five broad categories: personal information, financial information, investment objective, time horizon and risk tolerance. (*See* Appendix for a sample of questions three client-facing digital advisers asked at the time of FINRA's review.)

Customer-specific Suitability in a Digital Investment Advice Context

There are several areas of concern regarding digital advice tools, including whether they are designed to 1) collect and sufficiently analyze all of the required information about customers to make a suitability determination; 2) resolve conflicting responses to customer profile questionnaires; and 3) match customers' investment profiles to suitable securities or investment strategies. While many of these concerns can be resolved through interaction with a financial professional, the following questions may help assess whether a tool's output meets the customer-specific suitability obligation:

- Does the tool seek to obtain all of the required investment profile factors?
- If not, has the firm established a reasonable basis to believe that the particular factor is not necessary?
- How does the tool handle conflicting responses to customer profile questions?
- What are the criteria, assumptions and limitations for determining that a security or investment strategy is suitable for a customer?
- Does the tool favor any particular securities and, if yes, what is the basis for such treatment?
- Does the tool consider concentration levels and, if so, at what levels (*e.g.*, particular securities, class of securities, industry sector)?

Assessing Risk Tolerance

Risk tolerance is an important consideration in developing a customer profile and an investment recommendation. Risk tolerance can be considered along at least two dimensions: risk capacity and risk willingness. FINRA-regulated broker-dealers are obligated to consider both in assessing a customer's risk tolerance.[15] Risk capacity measures an investor's ability to take risk or absorb loss. This can be a function of an investor's time horizon, liquidity needs, investment objectives and financial situation. For example, a 25-year-old customer opening an account for the purpose of retirement likely has a greater risk capacity than a 25-year-old investing to finance graduate school education in three years.

Separately, a customer's risk willingness measures the customer's attitude towards risk. For example, a customer who is willing to absorb a potential 20 percent loss over one year in return for a higher upside potential has a higher risk willingness than a customer focused on principal protection. Problems can arise when risk willingness exceeds risk capacity.

Observations on Practices

FINRA observed firms taking a wide range of approaches to assessing a customer's risk tolerance. We focus here on two approaches: 1) those that seek to measure risk willingness and 2) those that measure risk in a portfolio in relation to the investor's risk tolerance.

There are a variety of approaches to assessing an investor's risk willingness. At the most basic level, some firms ask investors to self-assess by selecting from pre-set ratings, typically ranging from "conservative" to "aggressive."

Some approaches to assess risk willingness are scenario based and may draw on an investor's actual experience. For example, one client-facing digital advice tool asks the following questions: "Have you ever lost 20% or more of your investments in one year?" (Yes/No) followed by, for a yes answer, "In the year I lost 20% of my investments, I: a) sold everything; b) sold some; c) did nothing; d) reallocated my investments; or e) bought more."

Other approaches ask the investor to respond to hypothetical questions. One digital investment advice tool presents investors with questions regarding the amount of money they would be willing to risk to achieve a certain gain. Investors can use a slider bar to adjust the potential loss and gain to the level they are comfortable with. A different risk assessment tool asks the user to select a mix of two securities along a hypothetical budget line. The tool asks the user to make these selections multiple times for different budget lines and then aggregates the users' responses to assess various attributes of the user's risk tolerance.

Some of the vendors that offer risk tolerance assessment tools combine them with portfolio analysis tools. One vendor's tool, for example, evaluates the alignment between a customer's risk tolerance and the securities holdings in their portfolio.

Still other vendors offer tools that allow financial professionals to select from a variety of scenarios to perform "what if" risk analysis on their clients' accounts. Examples of these "what if" scenarios include emerging markets experiencing a hard landing, the Chinese economy slowing down or the U.S. credit rating being downgraded.

Contradictory or Inconsistent Answers

In the course of answering customer profiling questions, a customer may provide contradictory responses, which firms should seek to reconcile. This can be done through discussions with the customer or, in a purely digital environment, by making a customer aware of contradictory responses and asking additional questions to resolve the inconsistency.

FINRA observed firms that averaged contradictory responses or that used the more conservative of the contradictory responses. Averaging is a poor practice, as it can result in a customer being placed in a portfolio that exceeds his or her risk tolerance. If a firm does not reconcile the customer response, taking the more conservative response is a better approach than averaging because it reduces the chance of unacceptable losses. However, even with this approach, the customer could end up with a portfolio that does not reflect their desired risk.

Invest, Save or Pay Off Debt?

A threshold question for individuals considering opening an investment account is whether investing is an appropriate step. In some cases, they may be better served by paying off debt or saving.

An effective practice is for firms to develop a sufficient understanding of a client's financial situation to make clients aware when investing may not be appropriate for them, and FINRA observed some firms that do this. One of those firms serves a mass market client base with investable assets ranging between $5,000 and $100,000. This firm asks potential clients about their monthly net income—*i.e.*, income after expenses—to help determine if investing is an appropriate option. Another firm serves a generally more affluent client base and uses questions about investor time horizon and risk tolerance to determine if a client's profile is too conservative to invest. In addition, while not directly addressing the question of whether an individual should be investing, a third firm's frequently asked questions urge customers to maintain sufficient savings to cover at least six months' worth of expenses.

Modifying Customer Profiles

FINRA-regulated broker-dealers are required to maintain essential information about their customers pursuant to FINRA Rule 2090. As firms develop their digital strategies, some may opt to allow customers to modify their profiles online. If investors frequently change their profile, an effective practice is for broker-dealers to contact the investor to understand why the investor is making these changes.

Appropriateness of Digital Advice[16]

An effective practice is for firms to ask questions that would determine if an individual's advice needs cannot adequately be met solely through a digital approach. For example, a purely digital tool might not have the capability to provide a client who wishes to manage multiple investment accounts and multiple investment objectives on an integrated basis. In those instances, the client could be referred to a financial professional as part of the advice process.

Rebalancing

Rebalancing an investment portfolio is necessary to maintain a target asset allocation over time. Rebalancing becomes necessary as the composition of an investment portfolio naturally drifts away from its intended target or when the target itself changes. Drift occurs when the constituent securities in a portfolio perform differently, which can lead to over or under weighting asset classes. This could arise, for example, through market volatility in a particular asset class or security.

Principles and Effective Practices: Rebalancing

Effective practices for automatic rebalancing include:

- explicitly establishing customer intent that the automatic rebalancing should occur;
- apprising the customer of the potential cost and tax implications of the rebalancing;
- disclosing to customers how the rebalancing works, including:
  - if the firm uses drift thresholds,[17] disclosing what the thresholds are and whether the thresholds vary by asset class;
  - if rebalancing is scheduled, disclosing whether rebalancing occurs monthly, quarterly or annually;
- developing policies and procedures that define how the tool will act in the event of a major market movement; and
- developing methods that minimize the tax impact of rebalancing.

One method to rebalance a portfolio uses customer cash flows. A digital advice tool may use multiple sources to rebalance a portfolio, including deposits, dividends, reinvestments or even withdrawals. Typically, a firm would use investment inflows and outflows to restore the target allocation of the investment portfolio; the firm uses customer contributions to purchase under-weighted asset classes and withdrawals from over-weighted asset classes. Generally, using dividends and reinvestments to rebalance a target allocation is effective when portfolio drift is minimal within an account since dividends and reinvestments would typically not be large relative to the size of the position.

In cases where cash inflows and outflows are insufficient to attain the target allocation, some digital advice tools may simply reallocate assets already within an account to achieve the targeted weightings. Reallocating assets invested in an account would typically involve the purchase and sale of assets, potentially exposing a customer to commissions and, in a taxable account, capital gains or losses.

The triggers for rebalancing vary among the client-facing tools FINRA reviewed. One firm uses a bright line threshold of 3 percent portfolio drift to initiate a rebalancing. Portfolio drift is monitored daily. By contrast, another firm's investment management committee determines the allowable drift on an *ad hoc* basis in response to market events. Similarly, two other firms monitor customer portfolios and periodically rebalance them as needed, but without stating specific drift parameters.

Depending on threshold limits and the frequency with which it conducts a rebalancing review, a digital tool could execute numerous rebalancing trades. The following questions may help assess rebalancing issues that could arise:

- Does the tool permit automatic rebalancing?
- What are the triggers for a portfolio rebalancing by the tool?
- How often does rebalancing occur?
- Does the rebalancing include the possibility of adding or removing a particular security, thereby requiring another customer-specific suitability analysis?
- Would the rebalancing result in excessive commissions or lead to adverse tax treatment?

Training

Training and education are crucial for individuals who use digital investment advice tools. Some of the financial professional-facing tools FINRA observed can deliver sophisticated analytics, but using them effectively and communicating with clients about their output is dependent on the financial professional understanding the assumptions that go into the analytics and the potential limitations on the results.

Principles and Effective Practices: Training

Effective practices include training financial professionals on:

- the permitted use of digital investment advice tools;
- the key assumptions and limitations of individual tools; and
- when use of a tool may not be appropriate for a client.

It is also an effective practice to assess the adequacy of any training by third-party vendors.

Observations on Firm Practices

Most firms require financial professionals to participate in a training program before they are permitted to use a digital investment advice tool. This training varies from tool-specific training to training embedded in a firm's standard suitability training. In addition, some firms offer *ad hoc* training at the request of a financial professional.

Third-party vendors of digital investment advice tools often play a role in training staff on their tools. The vendors with which FINRA spoke typically offer one-on-one introductory training sessions with financial professionals to ensure they understand how to use the tool and how to position the output for customers. Some vendors also offer live training events once or twice a week for financial professionals, for example, to learn more about the methodology that supports a tool. In addition, some vendors offer *ad hoc* or follow-up training, although sometimes this is available only on a paid basis.

Lessons for Investors

The use of digital investment advice tools adds nuances to the questions investors should ask and information investors should obtain and understand in opening and maintaining an investment account. We elaborate on some of those considerations here.

Sound investment advice rests on a robust understanding of an individual investor's particular needs and circumstances. Investors should evaluate whether their financial services firm gathers sufficient information and asks sufficient questions to understand their needs and risk tolerance, and whether these factors are reflected in the advice they receive. If an investor believes that relevant information is not being taken into consideration, the investor should raise this with the financial services firm before making investment decisions.

Investors should be aware that the advice they receive about allocating assets and building a portfolio depends significantly on the investment approach embodied in the algorithms and underlying assumptions used by a digital advice tool. To the degree possible, investors should familiarize themselves with the investment approach and key assumptions so that they understand how recommendations for securities and asset allocations are derived.

Since conflicts of interest may exist in the investment advice they receive, investors should evaluate whether those conflicts compromise the objectivity of that advice. Digital investment advice tools do not necessarily eliminate conflicts of interest. Conflicts could include, for example, commission payments and other incentives for a registered representative in a financial professional-facing context, and revenue sharing or sale of proprietary or affiliated products for a firm in a client-facing context.

As with any account, investors should understand the specific services they will receive and their cost. In this regard, investors should inquire about all costs associated with the services offered or provided, including costs generated from third parties, such as mutual fund management fees.

Since some accounts offer features such as rebalancing and tax-loss harvesting, investors should understand how these services will be performed. If an investor's account will be automatically rebalanced, investors should know whether this will occur based on a time schedule, *e.g.*, quarterly; based on a trigger such as portfolio drift, *e.g.*, if part of the account is more than five percent out of balance; or some other method. Investors should be aware of what safeguards, if any, exist if there are sudden, sharp market movements such as those that occurred during the May 2010 Flash Crash. Rebalancing may also generate expenses or tax liabilities, so investors should inquire into the financial consequences of this activity.

Conclusion

Digital investment advice tools will likely play an increasingly important role in wealth management, and investor protection should be a paramount objective as firms develop their digital investment advice capabilities. Firms need to establish and maintain an investor protection foundation that accounts for the considerations raised by digital investment advice. One key element of that foundation is understanding customer needs. Another is using tools with sound methodological groundings, and a third is understanding those tools' limitations. FINRA trusts that the effective practices outlined in this document will help firms advance investor protection objectives in their use of digital investment advice tools.

Appendix

Comparison of Customer Profiling Questions at Three Client-Facing Digital Advisers[18]

Digital Advice | **TOOL 1**	Digital Advice | **TOOL 2**	Digital Advice | **TOOL 3**
1. **I'm saving in this account because** • I want to prepare for retirement. • I'm saving for major upcoming expenses (education, health-bills, etc.). • I'm saving for something special (vacation, new car, etc.). • I need a rainy day fund for emergencies. • I am retired or want income for expenses. • I want to build long-term wealth.	1. **What are you looking for in a financial advisor?** • I'd like to create a diversified investment portfolio. • I'd like to save money on my taxes. • I'd like someone to completely manage my investments, so that I don't have to. • I'd like to match or beat the performance of the markets.	1. I am ____ years old and am Not Retired/Retired.
2. **I have ____ understanding of stocks, bonds and ETFs.** • no • some • good • extensive	2. **What is your current age?** • ____ years	2. My annual income is_____.

Digital Advice | **TOOL 1**	Digital Advice | **TOOL 2**	Digital Advice | **TOOL 3**
3. When I hear "risk" related to my finances, ___ • I worry I could be left with nothing. • I understand that it's an inherent part of the investing process. • I see opportunity for great returns. • I think of the thrill of investing.	**3. What is your annual pre-tax income?**	3. I am not new/new to investing.
4. Have you ever lost 20% or more of your investments in one year? • Yes • No	**4. Which of the following best describes your household?** • Single income, no dependents • Single income, at least one dependent • Dual income, no dependents • Dual income, at least one dependent • Retired or financially independent	4. Select your first goal to begin: • Safety Net • Retirement • General Investing
5. In the year I lost 20% of my investments, I ____ • sold everything. • sold some. • did nothing. • reallocated my investments. • bought more.	**5. What is the total value of your cash and liquid investments?**	

Digital Advice | **TOOL 1**	Digital Advice | **TOOL 2**	Digital Advice | **TOOL 3**
6. When it comes to making important financial decision ... • I try to avoid making decisions. • I reluctantly make decisions. • I confidently make decisions and don't look back.	**6. When deciding how to invest your money, which do you care about more?** • Maximizing gains • Minimizing losses • Both equally	
7. I am _____ years old.	**7. The global stock market is often volatile. If your entire investment portfolio lost 10% of its value in a month during a market decline, what would you do?** • Sell all of your investments • Sell some • Keep all • Buy more	
8. My initial investment is ______.		
9. One year from now I would be comfortable with my initial investment fluctuating between _____ and _____.		
10. I plan to save an additional _____ per month.		
11. I need the money starting in _____ years for _____ years or rest of life.		
12. Which account type would you like to open?		

Endnotes

1. Many FINRA-registered broker-dealers are also registered as investment advisers.

2. The Aite Group projects that global spending on digital wealth management initiatives will triple, rising from $4 billion in 2015 to $12 billion by 2019. *See* Aite Group, *Wealth Management Incumbents' Digital Strategies*, Sophie Louvel Schmitt; November 2015; p. 4.

3. Tax-loss harvesting is a method to reduce capital gains tax exposure by selling one or more securities that can generate tax losses to offset capital gains. Typically, securities that are sold are replaced with securities that provide similar market exposure.

4. There is no standard definition of the activities that a "robo advisor" performs, but the tools FINRA reviewed performed these activities.

5. The material in IM 2210-6 has been substantially incorporated in FINRA Rule 2214. FINRA conditioned the offering of these tools on a firm making certain specified disclosures. *See* FINRA Rule 2214.

6. Modern Portfolio Theory was introduced by Professor Harry Markowitz in a March 1952 *The Journal of Finance* article titled "Portfolio Selection."

7. *See* "Putting Robo Advisors to the Test," *The Wall Street Journal*, April 24, 2015.

8. These examples relate to client-facing tools, but the same type of disparities could occur in financial professional-facing tools.

9. Cerulli's analysis was completed in September 2015. Since then, firms may have changed their asset allocation models, added asset classes or subtracted asset classes. To make a side-by-side comparison, Cerulli grouped the investment vehicles recommended as closely as possible to the classes identified in the chart. For example, if the digital adviser uses a Real Estate Investment Trust (REIT) ETF, the percent allocated to that ETF will be represented in the Real Estate asset class. This does not mean other digital advisers do not have exposure to Real Estate: They may be obtaining their exposure through equity investment vehicles. Refer to *The Cerulli Report: Direct Firms and Digital Advice Providers* for a more detailed description of the methodology used to compare firms.

10. FINRA conducted its review in 2015. Firms' practices may have changed since that time.

11. Ready-for-business testing refers to testing the firm does each morning to ensure that its systems are operating correctly.

12. Firm vs. client and employee vs. client conflicts exist when the incentive structures for the firm or employee may compromise the objectivity of recommendations clients receive. For further discussion *see* FINRA's *Report on Conflicts of Interest*.

13. This is an obligation for broker-dealers pursuant to FINRA Rule 2111.

14. This is an obligation for broker-dealers pursuant to FINRA Rule 2111.

15. *See* FINRA Rule 2111 (Suitability) and FINRA *Regulatory Notice 11-25*, p. 4.

16. For a discussion about the application of a fiduciary standard to client-facing digital advice, *see* speech by SEC Commissioner Kara M. Stein, *Surfing the Wave: Technology, Innovation, and Competition*, Remarks at Harvard Law School's Fidelity Guest Lecture Series, November 9, 2015.

17. "Drift threshold" refers to the allowable divergence from an asset allocation. When the drift threshold is exceeded, the portfolio will be rebalanced to bring it back in line with the target asset allocation.

18. These questions may have changed since FINRA's review.

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