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Data Sciences In Wealth Management:
The "Hybrid Robo-Human"
Software Assisted Advisors

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Abstract

In this paper we synthesize our experiences with experimentation around customizing and applying select advanced data science algorithms to a software assisted wealth management advisor (aka. the hybrid "Robo-Human" advisor, or Robo-Advisors) capability. Specifically we address how data science can be used to segment customers' wealth management requirements by needs and preferences and develop a semi-automated and customized advice offering. We address how historical client data relating to customer investment goals, advisory decisions and market performance within the Wealth Management Ecosystem (WME) can be leveraged to build models for Robo-Advisors that unleash existing information within the firm towards direct sources of additional income.

Current Models have Challenges

Whilst wealth management firms are reacting to the growth potential enabled by the new information and digital technologies, several challenges remain, as wealth management firms lag behind larger investment banks and hedge funds ondigital and Advanced Analytics Capabilities (AAC). The last 15 years has seen many advances on the bank services side with shift in channel preferences but wealth management firms have been more cautious when facing some of the major challenges facing the industry:

First is the rising Customer expectations and technology driven expectations

The rise of the highly informed and socially connected customer where technology innovators set standards of interactions and value like Google, Yahoo Finance and Apple are impacting the traditional financial institutions. Even the most passive and patient customer has now become active and demanding by seeking financial services that are

• Aggregated and coordinated

• Informed and empowered

• 24/7 Digital/Omni-channel

• Value addedand differentiated

• Coherent and simple

Second is the threat of substitution

Service innovators in wealth management have been downplayed and dismissed as niche services for started homes. Very recently, companies such as WealthFront, Betterment, Learnvest have together raised more than $150Million in venture funding. Their market share is still very low when compared to the total market share of household investable assets but they are growing at exponential rates. For example, WealthFront grew its asset based by 100% in 2013. These companies are demonstrating that the core of constructing and implementing a passive portfolio rebalancing strategy can be commoditized at dramatically low costs. There is little doubt this current movement has a direct parallel to the era of the Web-based discount brokerages that transformed how people bought and sold stocks or the introduction of index fund that transformed the world of stockpickers.

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Third is the growing cost and regulatory pressure

Scaling the wealth management business with decreasing incremental cost has become an imperative. The high touch model and increased distribution of wealth requires innovative approaches to manage the cost of management. Increased regulatory pressures in various unexpected offshore jurisdictions created by the fallout of 2008 lead to additional overheads.

Fourth is the ability to right size service models

Every customer and their needs are different and one size does not fit all. Ability to customize or rapidly tailor bespoke financial service offerings based on customer needs and preferences is critical for sustainability and growth. The current models for service and pricing lack the flexibility of right sizing models to suit customers needs and preferences.

With state of the art fast evolving, various ventures are looking at expanding their wealth management services over multiple dimensions, as described in the figure below, which represents a non exhaustive snapshot of the US market – being one of the fastest moving in this field.
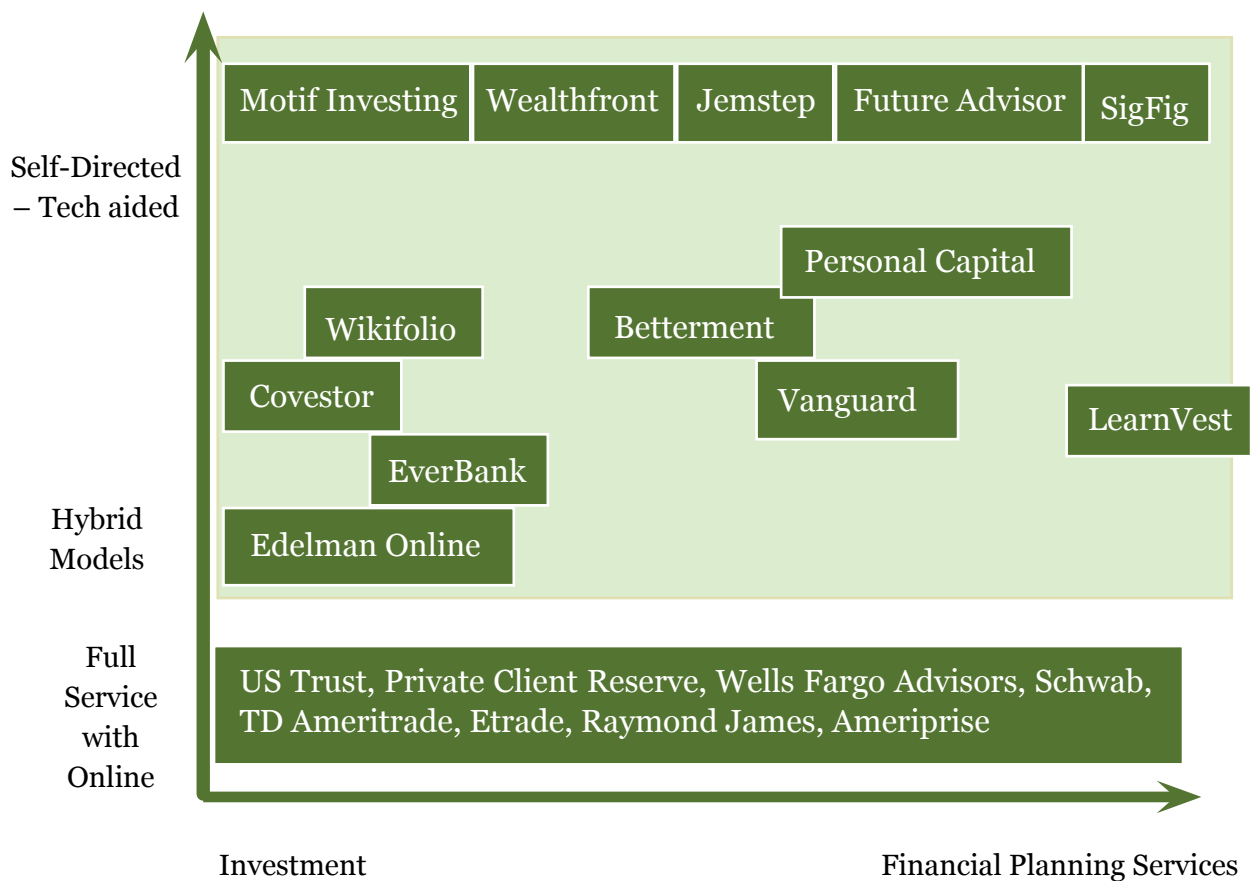

Fig 1 – Landscape – US View – Adapted from SEI

Rationale for the Robo-Advisor and the Economic Value projections

The high net worth financial services and advisory market is exploding exponentially in various parts of the world, and specifically in the expanding economies of Brazil, Russia, India and China that is drastically underserved at the moment. The number and quality of the advisors servicing this segment is both ill-equipped to manage the segment growth and not abreast of the latest information technology and software tools required. The challenge has been for the players to be able to provide an effective solution at a competitive price.

Currently the pricing of services or commissions around the offered financial products is not commensurate to the skillsets required to offer high quality services. This leads to either the smartest advisors moving out of the system or the ones remaining in the system taking on larger client numbers and subsequently not able to deliver the quality of advice required or incorrectly positioning or and mis-selling products.

Although there have been sustained efforts in this direction to increase the technology component within the entire workflow, in order to reduce the per client effort for advisors, this would allow for increasing the capabilities of advisors to manage a larger number of clients without diluting the quality of professional advice given. But until now these efforts have so far met with limited success.

Another important factor is that there are large numbers of advisors who are in the financial advisory services who lack comprehensive skillsets and capabilities to handle either the increased client volume and/or the complexity of bespoke demands from clients.

One more challenge that the industry is dealing with is the lack of standardization of solutions and services offering. There is significant amount of subjectivity involved in the current process of client fact finding, assessment and analysis of the situation and proposition of a possible solution. Whilst a certain degree of subjectivity provides some flexibility of structuring a solution with appropriate customization, the wealth management industry suffers to some extent from an excess flexibility with large variations within the solutions offered for similar client profiles and backgrounds.

This point brings us to the core ethos behind why Robo-Advisors? Here the expectation from the solution is that enough intelligence will be built into the system so as to be able to handle complex client profiling. Comprehend the data captured by the advisors and be able to intuitively prod for more data from clients as may be required for a better assessment and analysis and structuring the solution. The requirement goes beyond simple data capturing and processing. This will need to be an assistive tool, which will partner with the advisors and interact with all types of client diversity coupled with varied financial advisory needs and still be able to structure the most optimal tailored financial solution.

In our view, the Robo-Advisor concept is one of the best suited to revolutionize and impact the financial advisory business, specifically within wealth management. The key to success of the concept will be determined by the quality of the proposition and how it will be effectively positioned within the existing framework and how it can then be projected and implemented so as to enhance the value of the existing wealth management products.

In particular, and of specific interest, the emerging world wealth management market is quite heterogeneous but there is a specific pattern in the evolution of the advisory practice in most of these markets and there is fair amount of homogeneity in the behavioral pattern of the clientele, as well as their needs and expectations.

The 1980s represented a transformational period for Financial Service Providers where Information Technology systems virtually transformed how they conducted their business. The 1990s was the era of online banking where we saw a dramatic shift in how institutions of all forms sold and serviced their customers. The 2000s represented a gradual maturity and shift towards the multi-channel banking. Today, financial services providers are looking the opportunity to reinvent themselves by transforming existing Business Intelligence and datewarehouse architectures by leveraging Big Data techniques for various analytics applications that in turn will have a direct impact on every aspect of their business from customer engagement, operational efficiency and risk management. All revenue, operational efficiency and risk management decision making within the business can be infused and optimized with Big Data analytics.

Our team have recently been analyzing novel data science applications as a collection of advanced intelligent data analysis techniques, such as evolution of machine learning and data mining models to resolve practical industry challenges, with various experimentations on specific problems within wealth management as a specific case study in this context. This is timely and opportunistic, given that data science has made the big leap from being a research topic into a set of tools accessible in various shapes and forms to different industry verticals and optimized to resolve some of their more challenging problems.

Wealth management firms can expect several positive outcomes from their forays into this area that include:

1. Market share growth through penetration of mass-affluent market in a cost effective way

2. Reduce incremental cost of managing additional wealth

3. Increase advisor productivity by augmenting advisors with machine learning and data science models

4. Improve of both internal and external anomaly detection

5. Address expectations of customer in this age of the customer.

Data Management in the Financial World – Snapshot

To achieve the stated goals above, we opportunistically leverage the fact that concurrent trends are converging simultaneously, when it comes to data management overall and the specifics seen in the financial world. A brief snapshot is presented here.

First is the maturity of data management models

We are witnessing the fast adoption of novel architectures used to store and access large data sets (Hadoop, MapReduce, HDFS, Yarn, etc. – commonly known as Big Data models), as well the commercial availability of various cloud deployment architectures (OpenStack, vCloud, Cloudstack, AWS, etc.). This is removing significant logistical obstacles to embracing management

of large data structures. The move is likely to be even more significant moving forward, given the immense number of contributions of the open source community in this area. The key here is convergence onto universally adopted platforms that scale with market demand versus a proliferation of incoherent and diverse platforms that have existed previously and not coped with existing client demand.

Second is the evolution of data sciences

This applies to the large set of data analysis models in a broader sense, and specifically machine learning and mining algorithms that are more accurate and computationally tractable, that can leverage distributed cloud-based computing models. Current developments in Deep Learning, for example, illustrate how an older field of neural networks achieved breakthroughs in accuracy when its algorithm improvements were fueled by much increased computational power. Taking advantage of the introduction of new computing models, such as algorithms parallelization, GPUs and alike, then porting that to distributed cloud compute models, not only the existing algorithms have been optimized to run better and faster, but a number of additions and optimization have been developed and run in a computationally tractable way.

Third is data availability

Leveraging compute and storage architectures that are increasingly scalable to selectively and dynamically process large volumes of data, relying on various models of data capture, via sensors, devices, and management interfaces. Large data sets influence algorithm choices by easing the risks of over-fitting, which leads to better generalizable insights. The sheer size of data available is likely to increase, either as front-end data in real time or backend data stored as historical patterns. In the financial world specifically, data collection architectures have evolved in a way that allows for data to be captured fast enough for deeper analysis, and software-based data management architectures in a way that data can be queried, received and presented to relevant data processing models. Along with this capability, adaptive security and privacy management models will become possible, as well as data aggregation and anonymization techniques that can make it easier to expose data sources to trusted third parties for further analysis.

Acceleration of data management initiatives in the financial world

Along with the trends listed above, one specific reason why such a good opportunity has presented itself to leverage new data science technologies within the financial applications world is that the lead financial institutions are right now in the process of putting in place specific data management and IT transformation models. This in turn enables potentially new aspects of data availability, presentation, scalability and reliability.

Like various information technology users, financial institutions are, or will soon be considering enhancing their data infrastructure to help build data solutions which will optimize their ability in identifying, capturing, and managing data to provide actionable, trusted insights that improve strategic and operational decision making, resulting in incremental revenues and a better customer experience. The current challenges of the existing platforms mostly affect the ability of operations teams' to provide reliable service levels for the IT data collection processes critical for the business, including the scalability of the data platforms to perform effectively as the business data volume and messaging grows exponentially. As such, the desired goal is to create a solid foundation architecture that is able to provide the optimal functional capability and a platform

to overlay additional applications such as real-time business intelligence and data science on-demand (DSOD) as a service capability.

In the specific context of wealth management, this evolving data collection and management process is augmented by the introduction of sophisticated intelligent data analysis models, focused on trend spotting, behavioral modeling, predictive analysis and various other techniques aiming at automating and/or optimizing a portion of what wealth managers have been doing operationally.

Robo-Advisor Use Cases and the Maturity Path

Wealth management entities have been slow to uptake next generation digital capabilities and the current service models in existence are not scaling to accommodate neither growth or customer expectations in various parts of the world, where different characteristics can be observed in the most developed eco-systems and those less sophisticated within the emerging markets. There is a unique opportunity for firms to not only build advanced digital capabilities but pilot newly developed software driven "Robo-Advisor" business models. Just having the best human advisor will not be a sustainable competitive advantage in the future.

Decision sciences combined with smart design and visualization capabilities can lead to newer business models that directly address the current challenges facing the firms. Based on our experiences we have identified a series of steps that the wealth management firms could take to grow their market share and enhance customer loyalty:

• Analyze customer needs and preferences through segmentation. Apply a segmentation lens to prioritize digital and Robo-Advisor roadmap – decision sciences can augment existing customer segmentation capabilities at firms by augmenting external sources of data and creating customer 360 models. Historical data in firms can be used for learning and building models that will provide additional insights to firm about their customers.

• Develop software-based advisor ("Robo-Advisor") and develop hybrid business models where Robo-Advisor work complementary with human advisors – the capability matrix for Robo-Advisor are several depending on customer needs and fit to business and locale. Decision sciences can help build these capabilities, which includes:

    o Software based asset allocation and portfolio rebalancing with visualization

    o Tax-loss harvesting algorithms

    o Advanced visualization to enable aggregation and goal based reporting

    o Develop machine-learning algorithms from firm's existing historical data of customer profile, investment preferences, declared goals and asset allocation.

    o Deploy Robo-Advisor in assisted modalities

Xona Partners (Xona) is a boutique advisory services firm specialized in technology, media and telecommunications. Xona was founded in 2012 by a team of seasoned technologists and startup founders, managing directors in global ventures, and investment advisors. Drawing on its founders' cross functional expertise, Xona offers a unique multi-disciplinary integrative technology and investment advisory service to private equity and venture funds, technology corporations, as well as regulators and public sector organizations. We help our clients in pre-investment due diligence, post investment life-cycle management, and strategic technology management to develop new sources of revenue. The firm operates out of four regional hubs which include San Francisco, Paris, Dubai, and Singapore.

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