CHRISTENSEN INSTITUTE

TATA CONSULTANCY SERVICES

BANKING ON DISRUPTION:

Wealth management in the machine age

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FOREWORD

Society has made significant progress owing to technology. The steam engine helped to transform manufacturing and transportation thereby heralding the Industrial Age. Electricity brought lighting and power to nearly every facet of life. Computing and internet transformed the exchange of information. All of these technologies have enabled innovations that have solved an array of problems people face and dramatically improved our quality of life.

Now, we are in the midst of a large scale shift from the internet economy to a Digital Consumer Economy. This economy is distinguished by connections between consumers, consumers and machines, and between machines themselves. Further, it is characterized by business models that ease the exchange of goods and services. In the near future, innovations created through the combination of emerging technologies (such as big data and analytics, cloud, mobility & pervasive computing, social media, AI and robotics) promise to transform many industries including banking, healthcare, energy, retail, government, and security. We believe these innovations will have three broad areas of impact. First, they will lead to changes in organizations' business models. Second, they will lead to the rise of new firms. Finally, and most importantly, they will have a direct impact on society, as people will have access to solutions that were unthinkable even a few years ago.

In this context, Tata Consultancy Services, a leading IT services, consulting and business solutions organisation and the Clayton Christensen Institute have collaborated to produce a series of articles and whitepapers that explore the future of industries through the lenses of a set of fundamental theories developed by Harvard Business School Professor Clayton Christensen. The theories offer if-then statements for how the world works—so executives and leaders who find themselves in different situations can leverage their knowledge of these theories to predict what actions will yield what results, in each circumstance. These theories include Disruption Theory, the Theory of Jobs to Be Done, and Modularity Theory. In the current era of technological change, the objective is to apply these theories in order to solve problems facing businesses and societies.

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Finally, I wish to thank Bob Moesta, President and CEO of the Rewired Group, for expanding my knowledge of the practical applications of Jobs to Be Done Theory.

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EXECUTIVE SUMMARY

For those who lack extensive knowledge of financial markets and economics, managing wealth can be an overwhelming experience. With high minimum investment amounts and exceedingly high management fees, wealth management has traditionally been reserved for the wealthy. It is within this context that robo-advisory services emerged roughly ten years ago, seeking to simplify wealth management for consumers.

Enabled by a shift to passive investing, robo-advisors pose a competitive threat to the companies that have historically offered wealth management services. Due to their low-cost model, they are well suited for investors looking to simplify the process of investing and managing wealth. However, while they attempt to build additional products and services catered to the needs of managing wealth, they will face steep competition from established organizations. Already, firms like Charles Schwab, Vanguard, and BlackRock have launched their own robo-advisory solutions in order to remain competitive in the changing landscape.

Robo-advisory solutions are at a distinct disadvantage to wealth management firms since they are reliant on investment instruments that are controlled by established firms. Thus, disruption appears unlikely. However, entrants can still thrive by diversifying their offerings to include all aspects of financial planning and wealth management. In addition to focusing on growth, traditional wealth management firms advise their clients on where to free up capital needed for investment, and how to protect it through measures such as insurance or savings. To date, robo-advisors focus solely on growth. By expanding their offerings, robo-advisors will be better able to help investors.

At the same time, established organizations cannot sit idly by expecting to maintain their market dominance. To survive the rise of robo-advisors, incumbent firms will likely choose one of two strategic paths:

1. Use robo-advisory services as a means to cater to existing customers in order to defend current market share.
2. Use robo-advisory services as an engine of growth by reaching out to people who have historically been unable to access wealth management services. This would be in addition to addressing the existing customer base that finds traditional services overshoot their needs.

Investing money has historically been one of the surest ways to generate wealth and financial security. Yet many people cannot afford to hire a traditional wealth management firm, and they lack the time and expertise to invest on their own. Thus, while traditional wealth management firms will continue to lead in this space, robo-advisory solutions represent an exciting opportunity to bring more people to the table. Everyone has financial goals they wish to achieve. As the wealth management industry continues to transform and orient itself towards affordability and accessibility, these goals will become more attainable for more people.

While traditional firms will continue to lead in this space, robo-advisory solutions represent an exciting opportunity to bring more people to the table.

INTRODUCTION

Financial technology (FinTech) solutions today are challenging the status quo of how customers manage their money. Thanks to firms like Venmo, Lending Club, Simple, and Moven, consumers now have more ways to maximize their money compared to just a decade ago. FinTech is also changing the way customers invest.

Making sound investment decisions has traditionally been a complicated process. The ability to generate attractive returns on investment has been restricted to a set of people who are knowledgeable about financial markets. The only other option has been to compete against luck and hope that poorly informed bets pan out. The FinTech world is working to solve this problem by creating solutions that use technology to automate what a financial advisor would usually do with investments—allocate assets and oversee them periodically. This new focus on technology cuts out the cost associated with having expert financial advisors, thus allowing the tech-based solutions to be much cheaper than traditional wealth management methods. Such automated investment solutions are known as robo-advisors.

WHAT ARE ROBO-ADVISORS AND HOW DO THEY DIFFER FROM WEALTH MANAGEMENT FIRMS?

Robo-advisors are algorithms that invest and manage money on behalf of an investor, based on the goals and time horizon of the investor. The way these systems work is simple. The algorithm asks the investor a set of questions to understand some basic parameters related to the objectives of the investor, such as expected returns and risk-taking capacity. Using the customer's unique answers, the algorithm then works out an optimal investment strategy and recommends the asset classes that are most likely to help the investor achieve his or her goals. Investments are made in exchange traded funds (ETFs)[1] and an algorithm monitors and churns the allocation periodically to achieve the target set by the investor. Each of these ETFs follows a certain index and holds a variety of different asset classes such as stocks and bonds. The appropriate ETFs are picked from a set of predefined ETFs that help achieve the targets for the investor.

In short, the value proposition of robo-advisors is to make the process of investing less expensive and eliminate the need to understand the complicated universe of investments. Some of the early movers in this space are Betterment, Wealthfront, and Personal Capital.

However, the trend to offer automated investing is also catching on with traditional wealth management firms, such as Fidelity, Vanguard, and Charles Schwab. Unlike entrant robo-advisory solutions, the majority of established firms own and maintain other elements that help deliver their value proposition, such as access to information, research, and access to financial markets and products. These integrations have allowed firms to provide consumers a better return on investment than individual investment decisions. The wide range of services provided allows financial advisors to charge a premium price for their services.

Let us compare pricing. The cost of a robo-advisor is anywhere between 0-50 basis points of the total value of investments annually.[2] On the other hand, financial advisors normally charge above 100 basis points.[3] This fee has an inverse relation with the amount of money invested or overall size of the investments. In other words, as the invested amount increases, the fees decrease. This excludes all the other expenses related to financial instruments used, which are, on average, around 64 basis points of the total value of the instrument in the investor's portfolio.[4] In addition to these fees, some wealth management firms mandate minimum investment amounts or a flat fee that investors must pay.

Due to this premium pricing, many people who would like financial advice are unable to afford it. Solutions like the ones that Wealthfront and Betterment provide not only make investing simple and easy, but also bring down the cost barrier and enable access for the average investor.

IS THIS DISRUPTION IN THE MAKING?

Will this tech-enabled wealth management solution eventually be able to eliminate customers' dependency on humans to manage their money? Are robo-advisors disruptive to financial advisors? The initial moves by FinTech entrants seem to be in the right direction.

The common thread in all Disruptive Innovations is that entrants do not compete with incumbents within the usual performance parameters, nor do they attempt to attract the incumbent's most attractive customer base. Disruptive Innovation starts with either a new basis of competition or a customer base that the incumbent is not motivated to defend. Over time, due to this asymmetry of competition, entrants are able to divert market share from the incumbent.

Incumbent wealth management firms compete to provide above-market return on investments. Based on the time horizon, risk appetite, and invested amount of a given client, financial advisors devise strategies that spread the capital across different investment instruments. Yet it is up to the investor to choose among the proposed investment strategies, which is why he or she will benefit from an understanding of the different investment instruments, their time horizons and historic returns, and how economic conditions influence these returns.

Someone who is looking to invest with a target amount in mind, rather than looking for above-market returns, may find this process complicated and time consuming. Enter robo-advisors, who do not compete with incumbents on the traditional performance parameter (seeking above-market return on investments). Instead, robo-advisors look to simplify investing. By asking a set of basic questions, an algorithm determines the time horizon and risk appetite of the investor and comes up with an optimal investment strategy. Using this approach, the investor can still work with little knowledge of financial markets and instruments.

Furthermore, robo-advisors' target customer group is not the "premium" customer base made up of individuals who are more knowledgeable about finance and investing. The target market of the robo-advisor is customers who lack investing experience and/or cannot afford to hire a financial advisor. While entrants seem to be making ground, will they be able to eliminate the need for financial advisors in the end? Will the task of investing be managed by machines in the future? We try to answer these questions through the lens of Disruptive Innovation.

What is causing this trend? Based on our analysis of the solution architecture and business model employed by robo-advisors, the underlying investment strategies of robo-advisors are not new to the investor community. While the technology may be new, the strategy has existed for quite some time—robo-advisors simply use technology to improve existing methods. Our analysis shows that this shift towards utilizing less expensive technological solutions is, in fact, what is driving the growing popularity of robo-advisors.

To explain further, we need to explore the two most prominent strategies of investing, and the difference between them. Broadly, these two strategies are based on the time horizon of investment and how frequently the investment portfolio is churned.

Active Management – In active management, the investor (or the financial advisor on behalf of the investor) continually looks for opportunities to buy and sell investment instruments to lock in short-term gains. The advantage of this actively monitored investing is that losses are minimized and small incremental profits are easily locked in. However, the downside of this strategy is that the transaction costs of buying and selling eat into the profits, due to the high frequency of buying and selling.

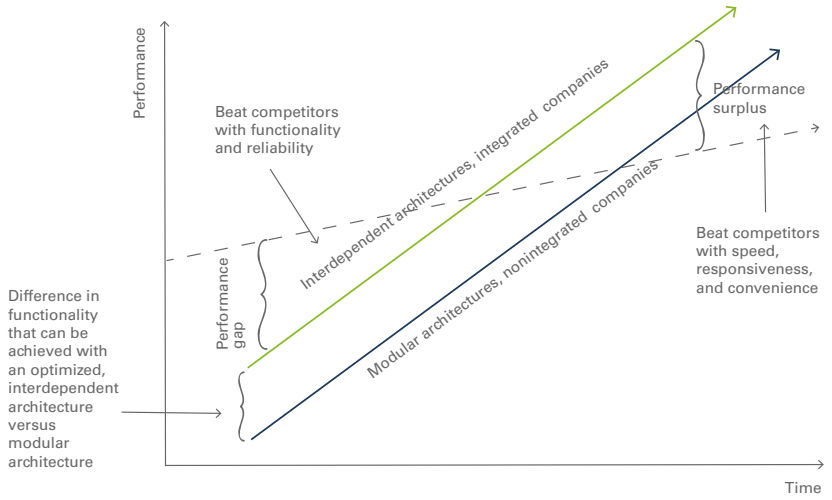
Passive Management – Passive investing is the slow and steady approach to building wealth. In this form of investing, the investor (or the financial advisor on behalf of the investor) buys into an asset class and holds it for a long time before reaping the returns. This form of investing maximizes the profits by minimizing buying and selling, thereby reducing the transaction costs. On the other hand, since it is not actively managed, the investor bears

the risk of losing all accumulated profits at once due to some unforeseen event that may cause a downturn in that asset class. To minimize risk, investors usually split their investments into multiple small investments under the same asset class.

The value proposition of financial advisors has been to actively manage the funds of investors and provide them better returns than passive investing. In doing so, the advisor community makes its profit by charging a fee for the service. However, recent studies suggest that investors today are shifting more towards a passive form of investing in search of lower transaction costs.[5] While such costs may be lower, the risk of losing profits by strictly matching a single set of instruments is comparatively high, since the investors have figuratively put all of their eggs in one basket. Why would consumers accept higher risk of loss in passive investment in search of lower cost?

We explain this phenomenon using Modularity Theory, which explains how the rate of improvement in a product or service can outpace the ability of consumers to absorb those improvements. In doing so, the product or service loses the ability to command a premium price.

Figure 1. Different product architectures work in different circumstances



Interdependence and Modularity

Entrant products and services are often built around an integrated or proprietary architecture in which the design and performance of one subsystem has an impact on the design and performance of other subsystems. This architecture enables product designers to fine-tune different subsystems of the product or service to engender better and better performance. As performance improves, the ability to command higher prices continues until the incremental enhancements in performance surpass the ability of the average consumer to absorb it (represented by the dotted line in **Figure 1**). In other words, once the performance of the product crosses the "good enough" level for mainstream customers, the willingness to pay a premium for the incremental performance enhancements steadily declines. Only those who are not yet satisfied with the current performance of the product or service—the most demanding customers—will continue to pay a premium for the enhanced performance.

At this stage in the product's life cycle, focus now shifts to what is "not good enough" in the value network of the product, changing the basis of competition. The new basis of competition becomes speed, customizability, and, ultimately, price. A proprietary architecture is a huge obstacle to competing on the basis of speed and customization. The fact that each subsystem is dependent on the design and performance of every other subsystem makes it difficult to quickly configure products per customers' needs. In such a situation, a modular product architecture is the solution to meet consumer expectations. In a modular architecture, such as the setup of a lamp, the different subsystems come together across a set of standard interfaces. The subsystems have little or no design and performance dependency on other subsystems, enabling one light bulb to be subbed out for another.

Modular architecture causes a slight decrease in performance compared to integrated architecture. However, customers usually happily accept this performance decrease in exchange for customization, speed-to-market, and price. The ability to quickly put together different standard components is a major advantage when it comes to customization and speed, as evidenced by what happened in the computing industry.

In the early days of computing, due to the complicated product design of mainframe computers, the ability to command attractive profits was dominated by integrated computer manufacturers like IBM and Hewlett Packard (HP). However, as computers became more reliable for mainstream use, and speed and customization commanded the best prices, profits gradually shifted to component manufacturers like Microsoft and Intel, which employed a modular strategy. In essence, the focus shifted from end-products (computers) to subsystems like microprocessors and operating systems, which up to that point had not been good enough.

A decrease in performance caused by a modular architecture does not have to last, however. When the performance of the product hits the "good enough" level, the ability to command attractive profits requires that the focus shift to either improving the product's components or enhancing the customer experience. The key insight here is that different product architectures work in different circumstances, demanding shifts in focus. However, in reality, most product architectures are integrated around some combination of the two.

Interdependence and Modularity in the wealth management industry

Historically, to earn an attractive return on investment, an investor benefited from having access and skills related to financial markets. Knowledge about how financial markets work, knowledge of economics, access to a market for trading, skill with tools of financial analysis, and up-to-the-minute information are just a handful of things a savvy investor needed. This made the process of investing complicated and time consuming. In addition, investment decisions were often overridden by human emotions.

As discussed earlier, financial advisors have traditionally possessed all elements of the value network (such as information, tools, knowledge, and access to financial markets) and have aimed to simplify the process of investing. This has allowed advisors to offer better return on investments than individual investors and, with above-average return on investment as the basis of competition, financial advisors have been able to command premium pricing for their services. However, as passive investing becomes increasingly popular, it seems that the historical value proposition of financial advisors may have less appeal for average consumers who find that passive investing is suitable enough to meet their demands.

The key insight here is that different product architectures work in different circumstances, demanding shifts in focus. However, in reality, most product architectures are integrated around some combination of the two.

According to *The Financial Times,* "the assets of passive U.S. equity vehicles crossed the 40 percent mark of total U.S. equity fund assets, up from 18.8 percent a decade ago."[6] Why? As in many cases of overshooting the "good enough" performance marker, consumers are migrating to lower-cost instruments. In addition, it is becoming increasingly clear to investors that it is difficult for advisors to outperform the broader indices, as the fees charged by advisors reduce profits. With the help of robo-advisors, individual investors are able to point to the performance-defining component responsible for better returns, and predict and verify how it interacts with other subsystems.

This leads us to believe that the current offerings of financial advisors may be gradually losing their value among investors. The old, high-cost, integrated approach to wealth management may still appeal to some investors, but is not attractive for those with less wealth to manage.

Controlling the performance-defining component

Unlike the most demanding consumers within wealth management, for the average consumer, the basis of competition is price, customization, and speed to market. According to Modularity Theory, this allows focus to shift to integration of products that are "good enough." These integrations can occur in either the consumer-facing entity (to customize products as per the consumer's requirements) or the performance-defining subsystem.

In the case of robo-advisors, we find attempts to integrate along the customer-facing dimension. Robo-advisors shift the focus of investment from earning an attractive return towards meeting each customer's unique goals. In other words, the value proposition of robo-advisors in the world of wealth management is to provide customization for individual investors.

When it comes to performance-defining components, there are two elements critical to achieving success: first, the financial instruments (ETFs) and second, the algorithms that monitor and shift the investments from one instrument to the other to achieve the targeted returns.

The value proposition of robo-advisors in the world of wealth management is to provide customization for individual investors.

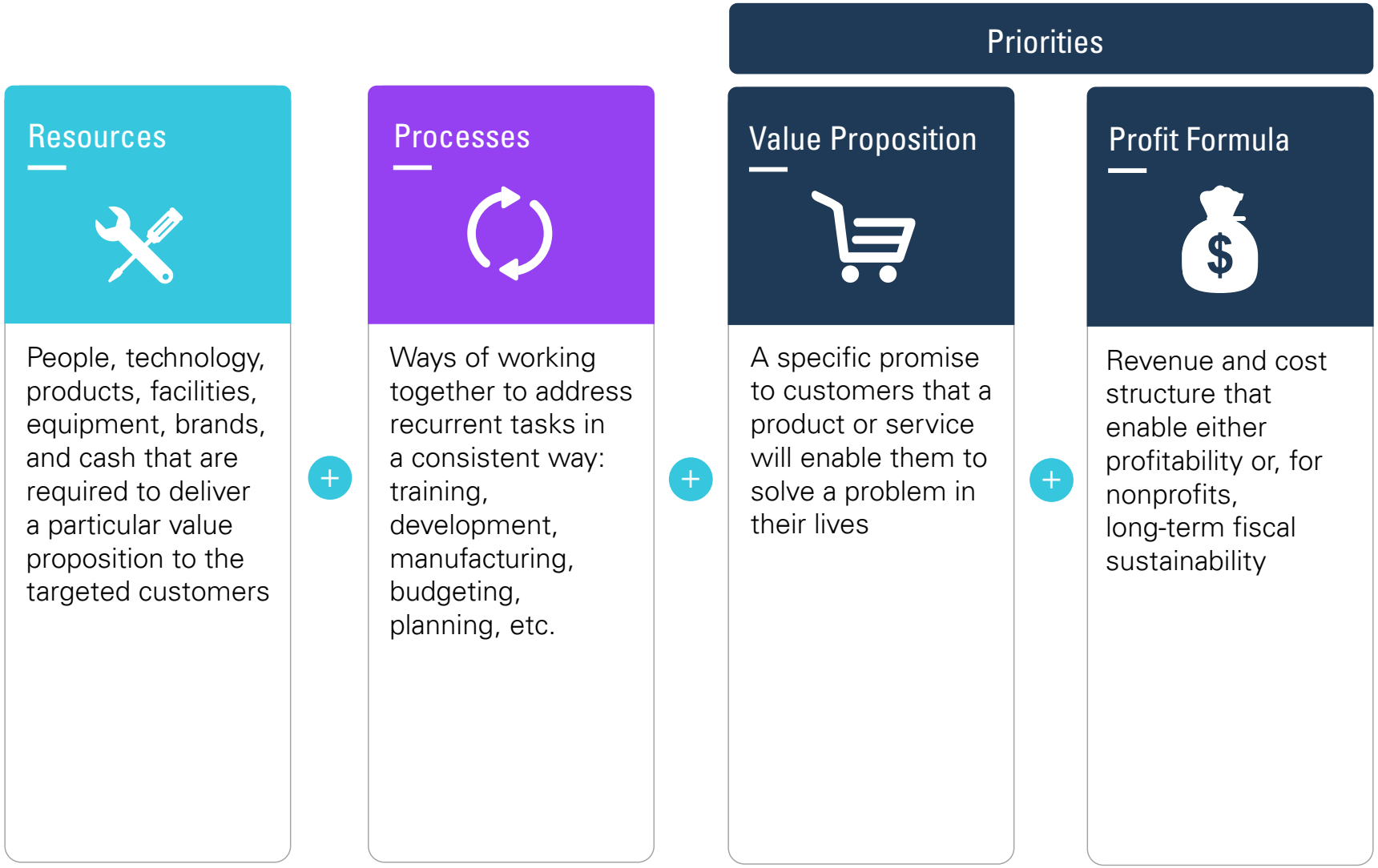
The entrant controls one of the performance-defining components (the algorithm) and the ability to tailor investments to each customer. However, the most important performance-defining component is the financial instrument (ETF), which is not under the control of the entrant. The ETFs on which the algorithms are based are owned by incumbent wealth management firms such as Vanguard and Charles Schwab.

Looking at the situation through the lens of Disruption Theory, the ability to meet targeted returns depends principally on the performance of the ETFs as the volumes of robo-advisors grow. Many customers will eventually start choosing solutions based on which ETFs are used to achieve the targeted returns. In such a situation, the ability to command attractive profits would eventually migrate from robo-advisors to the firms that own the ETFs, much like in the computing industry, where profits migrated to component manufacturers such as operating system manufacturers and microprocessor manufacturers.

The competitive advantage of a robo-advisor's business model

Before addressing the competitive advantages of robo-advisors, let us compare their business model to that of the traditional financial advisor. The four basic elements of a business model are shown in **Figure 2.**

Figure 2. Basic elements of a business model



If we observe carefully, we find that robo-advisors use nearly the same business model as any other wealth management firm. The only difference in the case of robo-advisors is the use of technology to automate the process of investing—that is, instead of an advisor allocating the investments to various financial instruments, they are allocated by the algorithm.

The cost savings achieved by avoiding the involvement of financial advisors is passed on to the consumers in the form of lower fees. There is an additional savings when using low-cost investment instruments. Combined, this represents a major cost savings over traditional wealth management firms like Vanguard and Charles Schwab. However, just having a low-cost advantage does not mean that disruption is inevitable. Disruption progresses only when the incumbent is not motivated to defend the customer base that the entrant targets.

Determining asymmetric motivation

Disruption is a process by which entrants take away market share from the incumbent due to asymmetry of motivation—in other words, the process of disruption progresses only when the entrant is not motivated enough to defend the customer base under attack. However, in wealth management, incumbents do seem to have adequate motive to defend their least profitable customers. Over the last few years, a majority of incumbent wealth management firms have adopted technology solutions to create low-cost offerings that compete with entrants. Some of the examples are BlackRock's FutureAdvisor and Vanguard's Personal Advisor Services.

All of these follow a similar business model while offering low-cost, goal-based investing solutions to their investors. As these firms own and manage the performance-defining component (ETFs), it is not difficult for them to invest in technology to create a low-cost solution for their least demanding customers. Moreover, as incumbents own and have the ability to create new ETFs, and each ETF is based on a different index, they can offer a wide range of solutions and choices to their customers. Put simply, the ability to customize strategy for an investor is potentially even greater for incumbents than entrants.

In short, the obligatory asymmetry of motivation seems to be missing when it comes to disrupting the wealth management industry. Instead, as long as incumbents control the performance-defining component in the systems, they are better positioned to customize investment strategies for their investors. An entrant's ability to cause a significant dent in the market share of an incumbent, we predict, will be fairly limited.

Disruption is a process by which entrants take away market share from the incumbent due to asymmetry of motivation—in other words, the process of disruption progresses only when the entrant is not motivated enough to defend the customer base under attack.

ON THE HORIZON

What's next for incumbents?

Existing wealth management firms appear to have the upper hand in this competition. However, our analysis suggests that there will be two kinds of players that emerge from this competition: the first set are those who opt for solutions like robo-advisors to defend their customer base; the second set are those who will go after a new customer base to create new demand while simultaneously defending their traditional customer base.

The first set of wealth management firms, pushed increasingly by investors to move to lower-cost investment solutions, will be forced to create something similar to entrants. The objective here will be to prevent the loss of customers to the competition. In such a scenario, customers will migrate to the new lower-cost investment solutions to stop paying the traditional premium prices. Some demanding customers might continue to be willing to pay a premium in search of higher returns. With the majority of investors switching over, however, it is not difficult to imagine that the average revenue per user for such firms will take a major hit. With the overall volumes remaining constant, the revenues and gross margins of such wealth management firms will likely dip. The only way out for such firms will be to reinvent their business models.

On the other hand, the second set of firms will continue to offer traditional financial advisors, and add new lower-cost investment solutions. They will also work to capture new consumers who did not previously have access to financial services due to lack of funds or knowledge. As with most Disruptive Innovations, the technology behind new wealth-management solutions lowers the barriers of both cost and knowledge. While these firms may see a dip in the revenues due to existing customers migrating to lower cost solutions, the drop in revenue will be supplemented by an increase in volumes from a previously nonconsuming population. In the long run, these firms will see returns for their investment by tapping into a much larger market. Of course, this will require a rethinking of the firm's business model.

What's next for entrant robo-advisors?

Traditional wealth management for retail investors involves three phases: planning, protection, and growth. In the planning phase, investors work to free up the capital needed for investment. This phase often involves seeking financial advice, creating a household budget, and planning for taxes. The next phase, protection of assets, can involve purchasing health, life, or auto insurance; starting a retirement savings; or even accumulating assets like real estate and precious metals. In the growth phase, investors might buy certificate of deposits; accumulate real estate assets; buy precious metals; or invest in stocks, mutual funds, and index funds.

Choosing instruments of growth and then churning them to achieve maximum growth can be a complicated process. Robo-advisors offer a fresh and simplified approach. However, their offerings are narrowly focused, limited to investing in securities using ETFs. Other asset classes like commodities, precious metals, and real estate are largely untapped.

There have been attempts made by a few entrants to address the planning stage by offering tax loss harvesting. However, these offerings have been limited. If entrants are to compete with the incumbents, they would be wise to explore offerings that address these untapped phases of wealth management, while targeting new consumers. According to a recent survey,[7] only four out of ten Americans have a savings they can fall back on in the event of an emergency. Perhaps the area of household budgeting could prove profitable for entrants. Likewise, entrants might consider offering cheaper insurance options, similar to the wholesale club giant, Costco, which negotiates less expensive insurance for its members than if they were to purchase it individually.

In addition, entrants may want to address the growth phase by including other asset classes (such as real estate and precious metals) in their offerings. Adding new services and options for consumers would help entrants cover the different aspects of financial planning and wealth management while their low-cost business model could provide a significant cost advantage compared to incumbents. However, it remains to be seen if entrants are able to look beyond their current offerings and diversify.

CONCLUSION

New entrants in wealth management have indeed challenged what is possible when it comes to investing. While their technology is the driver behind this industry transformation, they are not merely replacing financial advisors with robo-advisors. The robo-advisor can enable investing at a much lower cost, and entrants seem to be targeting investors whom traditional wealth management firms were not originally motivated to serve. However, the investment strategy on which this technology solution is built is not something new.

So-called "passive investing" has existed for many years, but the recent shift in customer preference to low-cost instruments and passive strategies is working in favor of robo-advisory solutions. While robo-advisors' lower cost and orientation towards simplicity have the potential to turn nonconsumers into consumers, robo-advisors remain at a disadvantage in comparison to established firms. The performance-defining subsystems (ETFs) of these solutions are owned and controlled by incumbent firms, enabling them to adopt the same technology to compete with entrants. Moreover, incumbents are motivated to defend their customer base rather than flee. Together, these factors shift the balance in favor of established firms.

The fact that traditional wealth management firms are able to compete with new entrants, however, does not mean that these firms can continue conducting business as usual. Our analysis shows that the firms who come out on top will fall under two categories. The first category will be wealth management firms that adopt robo-advisors in an effort to defend their least profitable customers from competition. The second category will consist of those who defend their traditional customer base while also using robo-advisors to reach out to people who have not had access to wealth management services. It is this second group that will lead as new models of robo-advisory services cater to the needs of a wide range of customers.

Finally, if entrants are to compete with the incumbents, they will need to expand their offerings to include all three phases of wealth management.

While robo-advisors' lower cost and orientation towards simplicity have the potential to turn nonconsumers into consumers, robo-advisors remain at a disadvantage in comparison to established firms.

The advantages offered by robo-advisors—simplicity and low cost—may be short lived given that incumbents control one of the critical performance defining components and are responding to the competition by building similar solutions. To survive competition from incumbents, entrants need to focus on new value propositions for their target customers and become a one-stop-shop for all financial planning and wealth management needs.

NOTES

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About the Institute

The Clayton Christensen Institute for Disruptive Innovation is a nonprofit, nonpartisan think tank dedicated to improving the world through Disruptive Innovation. Founded on the theories of Harvard professor Clayton M. Christensen, the Institute offers a unique framework for understanding many of society's most pressing problems. Its mission is ambitious but clear: work to shape and elevate the conversation surrounding these issues through rigorous research and public outreach.

About Tata Consultancy Services (TCS)

Tata Consultancy Services is an IT services, consulting and business solutions organisation that delivers real results to global business, ensuring a level of certainty no other firm can match. TCS offers a consulting-led, integrated portfolio of IT, BPS, infrastructure, engineering and assurance services. This is delivered through its unique Global Network Delivery Model™, recognised as the benchmark of excellence in software development. A part of the Tata group, India's largest industrial conglomerate, TCS has over 387,000 of the world's best-trained consultants in 45 countries. The company generated consolidated revenues of US $17.6 billion for year ended March 31, 2017 and is listed on the BSE (formerly Bombay Stock Exchange) and the NSE (National Stock Exchange) in India.

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Aroop Gupta is a Visiting Research Fellow at the Christensen Institute from Tata Consultancy Services. Aroop's research at the Institute focuses on Disruptive Innovation within the banking and finance industry. For more than seven years, Aroop has worked for Tata Consultancy Services, with a focus on program management for IT consulting projects for banking and financial service clients.


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