InvestorScope

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*Modernizing discretionary investing through
a comprehensive and integrated interface.*

Aaron Sekhri, Matthew Appleby, David McLaren and David Khavari

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Team

Aaron Sekhri - Speaking, Writing, Design
David Khavari - Management, Development
David McLaren - Development, Documentation
Matt Appleby - Design, User Testing, Documentation

Problem and Solution Overview

Most individual investors practice discretionary trading, meaning they make investment decisions based upon both technical (prices, earnings etc.) and non-technical (news, market sentiment etc.) factors. Today, this information is spread across a number of old and disjointed websites. The resulting decisions are most often made with incomplete information, thus harming decision-making quality. We propose a new, aggregated interface for discretionary investing, including an interactive stock chart with clickable news events highlighted at various price points, a side panel for a live, auto-populating news feed, and direct links to fundamental indicators and SEC forms. We believe this will solve the major problems in this area, by bringing relevant content to what is now a purely visual stock chart.

Contextual Inquiry Customers

Bridge: A senior at Stanford, Bridge is vice-president of the Stanford Investment Club, as well as an avid stock investor, primarily in the technology sector. He practices fundamental investing with an interest in technical metrics such as price/earnings. He is relatively new to investing, having only managed his own portfolio for two months, His academic background is primarily in computer science and symbolic systems, specifically focusing on artificial intelligence. He has no formal investment training other than his club experience. He is friends with a team member.

Jason: Jason is also a senior at Stanford. He has been personally investing for many years, primarily in equities. He also works professionally as an associate at Alsop Louie Partners, an SF-based venture capital firm. Academically, he has a strong background in product design and development. He comes

from a family of investors and will presumably bring some strong opinions to our contextual inquiry interview. He is also a personal friend of the team.

John: A senior majoring in economics, John began investing during his junior year in high school, and since has steadily increased the amount he puts aside to experiment with. He has no formal investment training; all of his knowledge of investing comes from his parents, classes in peripheral areas, and readings from the Internet. He characterizes his approach as "trial and error." However, his lack of knowledge does not imply a lack of commitment. He is actively trying to learn, and has invested sums in the low five digits in public equity markets.

Howard: An investment manager at a major mutual fund based in Boston, MA. He has worked as a financial analyst, a portfolio advisor, and finally as a founding partner and portfolio manager. We choose to interview Howard due to his extensive experience in the industry and the personal connection we could make with him. He studied economics at University of Exeter in England and then moved to the US. His expertise is in foreign markets. All of these aspects made him an ideal additional interview.

Contextual Inquiry Results

Bridge is a moderately serious investor with an almost exclusive interest in technology stocks. In Bridge's investing process, he looks at sector he's interested in, checks big companies he knows (Google, Yahoo! etc.) on Yahoo! Finance focusing on price charts, then examines some fundamentals like P/E ratios and dividends. Doesn't even look at SEC filings. Then checks out Google News, just doing random keyword searches pertaining to the company, looked at two articles and then had seen enough.

To keep up on his currently held stocks, Bridge checks his Fidelity account, about which he says, "at the end, all that matters is what I'm actually getting." This would imply that our solution may benefit from connecting to brokerages. He thinks that news should be in chronological order and feels that he trusts Google News as an aggregator. He is in favor of a curated list of sources as well (WSJ, The Economist etc.) and he thinks he would value it enough to use every single day if it were free, but doesn't think he would pay for it.

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John is a casual investor, and during our master-apprentice session, we were able to get a sense of how he invests, the tools he uses, the processes he goes through and the inefficiencies and problems which occur and hinder him. John's methodology for choosing stocks to invest would strike many as idiosyncratic, but it is a natural outcome of how he thinks about investing to begin with.

John invests because he wants to have a stake in companies he believes in, trusts, and is interested in. His dominant method of discovering/sourcing new companies to invest in is

simply to do more research into companies that he comes across in his daily life, or companies associated with his interests.

After he learns about a new company, he will delve into its financials and assess whether he believes it will make for a good investment. Note that he first must find some affiliation to the company, and then judges whether it merits an investment. For example, his love of planes and aviation led him to investing in Boeing, and his fondness for cars led him to striking a position in Tesla. For John, an appreciation of the company and its business is primary, and its financials are secondary.

The tasks John carries out after the discovery phase are quite intuitive: he researches articles online for additional insight (his main sources are Yahoo Finance, CNN, Seeking Alpha, and Ameritrade - he will use less traditional sources like Twitter when appropriate however). He then uses Ameritrade to get an understanding of the company's raw financials; seldom will he refer to an SEC filing or the like. Once he has done his research, he will take a position in the company through his Ameritrade brokerage. The size of that position is a function of his available capital and his confidence in the bet.

He describes himself as a passive investor, changing or modifying positions once every three weeks on average. The application he trades on allows him to create rules that will automatically execute trades when prices reach certain levels, and he appreciates this functionality given that he does not check his portfolio often enough to execute the trades himself.

He is pleased with his task flow and processes as they currently are. However, two critical aspects that are absent from his user experience are the lack of timely, relevant notifications, and too many "business school terms". His first complaint is that he is not able to receive timely notifications about prices movements or breaking news that will affect his portfolio. His second is that too often Ameritrade uses terms which are unfamiliar to him, which forces him to appeal to resources like Investopedia. These are two concerns that we used as a launchpad for our brainstorm.

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Jason's invests mostly for fun. His major investments were made 2.5 years ago and 1 year ago and since then he has mainly just kept up with his holdings and made small changes. Often he considers buying a new stock and then abandons the idea for simply investing more in his currently held stocks.

He starts by investing in the industry he knows, Telecom, because he worked at Qualcomm two summers ago. He is invested in Qualcomm but also in their competitor Broadcom. He believes that if one's stock suffers the other will probably succeed, increasing the security of these investments.

He uses his dad's login info on a website called Morningstar to do this research. Once he looked up a list of the top 30 mutual funds and looked each one of them up on Morningstar to determine which to invest in. He paid careful attention to the fund descriptions, top holdings, investment styles, and analysis by the Morningstar analysts. This research led him to discover the Yacktman Mutual Fund. Of all of his investments, he seemed most proud of his investment in Yacktman, probably because he felt most autonomous in his decision making process.

Jason often mentioned that he doesn't "really know many industries" so he just invests in what he knows. He feels that, because of the financial security provided by his parents, he is able to invest a significant portion of his saving in the stock market with relatively little risk. He puts about 50% of his income into his investment portfolio and tries to put his entire tax return into the portfolio as well. He uses Google News as an aggregated source for news on his holdings. He also reads articles and analysis written by Goldman Sachs and other big investment banks.

During our discussion we started sketching together since I had my notebook ready for him. He drew a map of stocks and their relationships with each other. For example, he drew a bubble with YACKX (the stock quote for Yacktman) and a connection to Coca Cola because Yacktman has CocaCola as one of its holdings. He also drew social connections between stocks. He added a connection that mentioned that one of his friends also owned Coca Cola stock. Although this could be seen as a preemptive solution to a non-problem, it did provide some interesting insight in how Jason would like to discover stocks.

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In a skype session with Howard, we discussed his investing process. I told him about the master-apprentice model and asked him to teach me his investing mindset and goals. The

most important insight from Howard on this front, was that he doesn't view his tools as the most important aspect of his investing process. They simply keep him up to date on his fund's watchlist. His research is much more fundamental than news and analysis. He and his partners do personal research on each of the companies they invest in. They seek to determine a company's "profits and how they will grow" using data, such as the price to earnings and price to cash flow numbers, as well as an intuition built up over years of following the world markets. They also discuss, among the partners, how the world is changing, what the long term economy will rely on, and which industries will succeed or fail. They look for "multi-dimensional changes in commerce and industry." However, he acknowledged that, even after strenuous research and long conversations, arguments, and reflection, "it is still only ever a guess." "A highly educated guess, but a guess nonetheless."

After learning a bit about his investing process, I asked him if he thought it was valuable for young people to learn about investing or even if it was important for them to have experience investing themselves. He said that it is indeed important, but he finds it much more important that young people, even those still in their teens, learn the basics of personal finance first, then the importance of long term investments, including the stock market.

Howard is passionate about the flaw he sees in the US and UK education system. He says, "mortgages and finance should be on the same level of importance as geography and maths." Learning about personal finance is, "as important as learning about the physical world." He feels that, "its almost like a conspiracy to allow finance companies (included in the discussion were banks, creditors, insurers, etc.) to take advantage of consumers who were never educated on personal finance." He cites terms of leases, mortgages, credit cards, cell phone contracts and insurance policies as life necessities which are inherently difficult to understand and therefore easily used to intentionally confuse the average consumer.

After he brought up this problem, I began asking him personal finance questions that I thought I knew the answers to. It turns out there are many more underlying insights with even the simplest aspects of personal finance, which, when explained well, lead to a greater understanding of the economy of the world, not just your own finances.

Howard is an incredibly knowledgeable investor who expressed many of his views on investing in succinct and easily understandable terms. For example, he explained that, "investing is essentially differed spending," and that "money is eroded by inflation." He also reiterated to me the basic economic concept of "Investments = Savings". At the core of this concept is the fact that saving money now, whether in the form of a low interest savings account or in the stock market, leads to future economic growth through lending, borrowing, and investing. Our economy is based on using savings for investing in new growth. This concept, however obvious to those who study economics (and many who don't), is not obvious to the average consumer and perhaps should be. His discussion led me to a realization that Howard steadfastly agreed with. That the addition of a thorough and practical education program in personal finance and the basics of capitalistic economies would lead to a new generation of adults, who hold a much

better understanding of their own finances and the economy as a whole. The effect would trickle up through the US economy by increasing the amount of money held in savings and investments and the number of people who are financially self reliant.

Common Takeaways

- Our interviewees see a consistent lack in available information for the casual investor
- They often invest without a large amount of deep information
- They invest in what they know
- Terminology and rhetoric surrounding investing is often seen as a barrier to entry to deeper understanding

Unique Takeaways

- Some exhibit a relatively passive interest in their stocks after the initial investment
- Personal finance education may be an important missing element for many adults

Task Analysis Questions & Answers

1. Who is going to use the system?

The customers will be casual discretionary investors. These are not tools for power-users or professionals; the tools we devise are for average investors who are investing amounts primarily in the five figures. We are aiming for this product to reach customers who are educated, self-motivated, eager to learn and even more eager to discover new stocks that they otherwise would not have. The customers in question are probably students or young working professionals who have little to no formal training in the art and science of investment management.

2. What tasks do they now perform?

There are a multitude of tasks that these casual discretionary investors perform. They start with discovery, which involves actually finding a security that they are going to further research. This discovery process can take many forms. From the interviews, we learned that some customers find stocks by talking to friends and family; others like to look at their interests and see which securities are related to their own activities and passions. Other customers find stocks by randomly browsing news sites, and happening upon interesting investment opportunities. Whichever way they found stocks, we observed that there was no rigorous, systematic way customers tried to find investment opportunities. With our application, we hope to change this. We envision students performing the discovery task in a more systematic, thematic way, whether it's by listing interests for our recommendation engine to promote certain new opportunities to them, or whether it is by offering customers a graph of all of the companies

related to the ones they have already taken positions in, or even a detailed, interactable table by which they can discover securities through different metrics.

After the discovery process comes the research process. Customers usually appeal to news and finance websites to do research. They generally look at qualitative factors first, and then move on to qualitative measures. The websites they use are in the same categories as Yahoo Finance, Seeking Alpha, Dealbook, etc. However, they do not generally research in greater depth than described. For instance, they do not generally look at 10-K forms, which are the forms that publicly listed companies must submit to the Securities and Exchange commission to give a summary of its financial performance and outcomes. We hope to expand this task to include a more rigorous assessment of relevant resources, such as prospectuses issued by banks, to further inform our customers' investment decisions.

Once the research process is completed, the customers will actually make the investment decisions via their online brokers.

3. What tasks are desired?

There are a variety of tasks desired; some wish the financial information they received and consumed was vastly less technical. Some hoped that the would be able to get notifications about how their positions are doing periodically, because they are fundamentally passive investors. Some even wished that they could use some application to learn more and learn from their successes and mistakes to improve their performance through the application itself.

4. How are the tasks learned?

Predominantly, through online resources and trial and error. Because none of our customers are supposed to have any substantial investment training, they must learn the discovery task and how to improve on it through individual initiative, which often amounts to reading online. Additionally, our customers look at investment not only as a means to enrich themselves but also to learn, and so they experiment often, changing strategies and tactics regularly to see which are the most fruitful.

5. Where are the tasks performed?

We interviewed our principal customers in their rooms because that is where they work on their investment processes. They are mostly doing research and discovery in their rooms, and are doing the actual investing on their computers or phones, as they are all subscribed to brokerages that have a mobile presence. We hope that later they will be able to carry out more of the discovery and research on mobile, making it easier for them to take advantage of investment opportunities.

6. What's the relationship between customer & data?

There is a strange relationship here with customers and data. There is an immense amount of data regarding any given security, but it is disparate, and difficult to aggregate easily and simply. Additionally, customers are looking at important price data only after they have looked at qualitative data. Customers investing tens of thousands in stocks will do so on the basis of a few (perhaps under ten even) articles that they read that convince them of the viability of a stock. There is an enormous potential for this relationship to be more actively cultivated, which we hope to do, but currently there seems to be a lot of data that customers do not take advantage off, which they may be worse off for.

7. What other tools does the customer have?

The customer has a variety of tools: online brokerages which offer news briefs about particular stocks, websites offering news about different securities, and power-tools such as Bloomberg terminals, which are available for reservation on campuses like Stanford's (but this is a luxury afforded to very few).

8. How do users communicate with each other?

There is painfully little communication between customers; this is something we may aim to solve by involving a social element in the final application. Right now, there are few ways for a customer to communicate with another, and for users to chafe insights or compare performance, which are features we may implement in our final idea.

9. How often are the tasks performed?

For busy students, evaluating and changing a portfolio is a time-consuming and laborious process that they only revisit quite seldom. Also, given the fact that the customers we interviewed are in this for the long-term, they are wont to performing the mentioned tasks only every few weeks. We hope to make the discovery and research process more engaging and fruitful, so we hope our application will compel users to revisit their portfolios and positions more often.

10. What are the time constraints on the tasks?

Finding the ideal time to purchase a stock is critical in investing, but can only happen with constant attention to prices and news. Therefore our customers treated investment decisions as if there are fewer time constraints than there actually are. We hope our application will engage users more and make them appreciate particularly good times in the market to purchase stocks.

11. What happens when things go wrong?

There is no good way of defining things "going wrong" in the discovery process and research process. When things go wrong in the investing process, (i.e. a position takes a turn for the worse and the customer loses money) that often isn't well-correlated with the decision-making process on a short-term basis, so we don't aim to over-analyze this factor.

Simple: Definitions are critical in an area where there is a great deal of technical knowledge involved in decision-making, and sometimes the words used in articles and briefs are too technical for average, casual investors. A simple new task would be to offer definitions to the customers for all the technical terms they encounter, which we chose because the feature would allow for learning to happen often and easily.

Moderate: Notifications could help customers make better investment decisions at more ideal times. Suppose customers could learn that there has been some critical news about their investment as soon as it happens, and could rid themselves of that position before they lose money. It would not be a very easy feature to implement but would be very valuable to the customer.

Complex: Recommendation would be our most powerful and most complex feature. Many customers already look for recommendations through articles and opinion pieces, but most are not accustomed to using automated systems such as the one we envision. There are many ways in which we can create recommendations, including on the basis of similarity and differences to currently held stocks. It would be a feature that allows a much more fruitful discovery process, and would be beneficial to the user so he or she is able to diversify his or her holdings.

Three Best Application Ideas

Stock Discovery: Most investors focus on the same group of over-analyzed stocks – a few common examples are Google, Apple, and Tesla. This makes it difficult to outperform because of the efficient market hypothesis, which states that highly sought-after stocks don't provide opportunities to make outsize returns, which has been proven in many academic papers. We propose an application that dynamically helps users discover under-analyzed public companies by a variety of metrics: raw attributes of the stock, user interests, current holdings etc. Furthermore, we were unable to find any noteworthy products in this space, and in our interviews we found that lack of familiarity with a diverse group of stocks was a real issue for our users. We are extremely interested in this idea, and although it will be challenging, we are excited to be involved with what we believe is an important innovation in the field.

Portfolio Visualization: This idea falls in line with our original idea of designing highly visual interfaces that help investors to understand their investments better. We propose an application that shows novel, interactable graphics of portfolio information such as total number of shares, total money invested, percentage of total portfolio returns etc. We are fairly

interested in this project – particularly from a UI perspective – and we feel it is viable, but it may not be highly significant in changing the lives of individual investors.
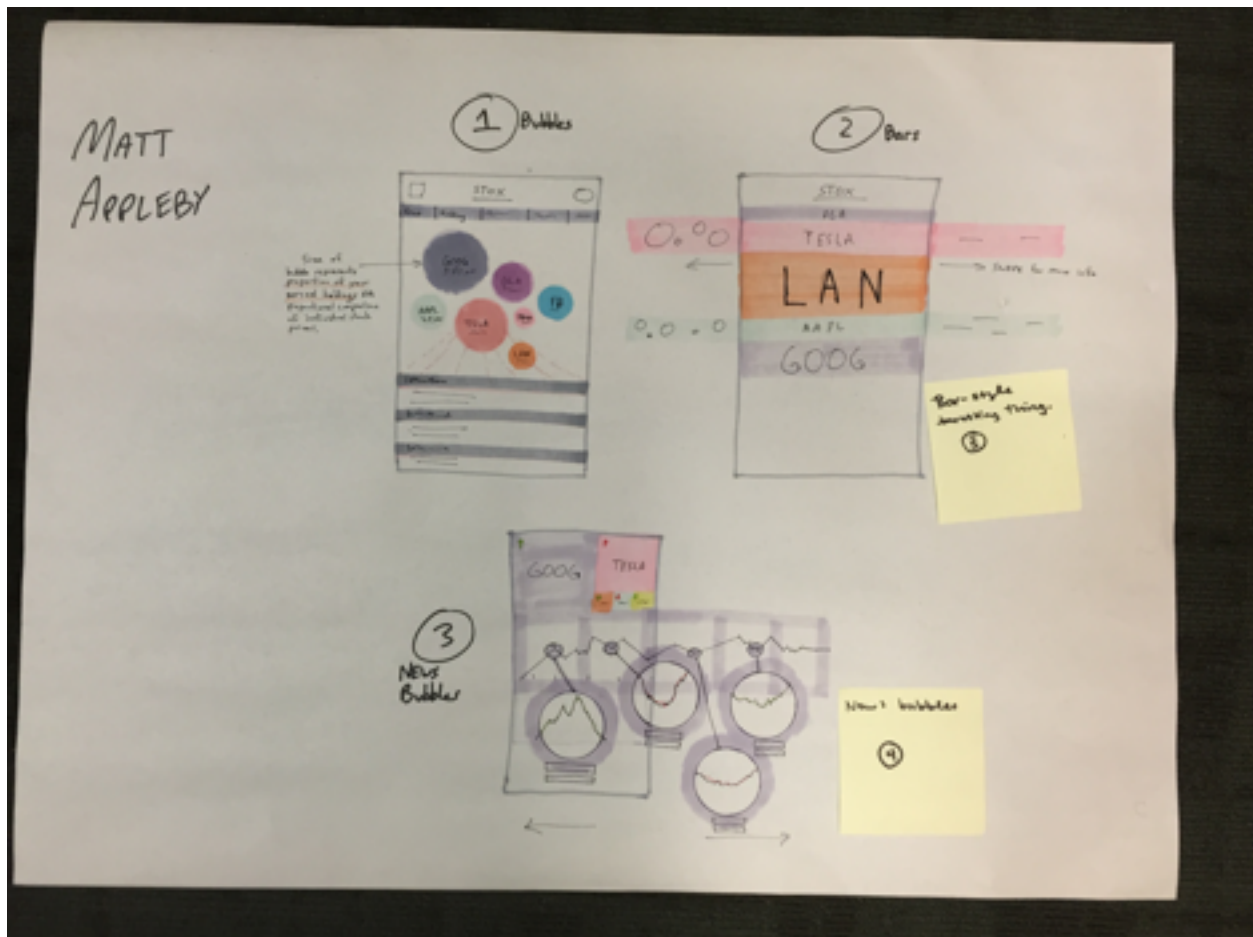
Teaching Investment: Our contextual interview with Howard, the manager of an international mutual fund, helped us realize that many adults in the working world have little or no knowledge of basic financial savvy. We feel it's extremely important to have quality, universally-accessible investment education, and had multiple ideas for how to accomplish this, notably a website focused on an interactive storytelling journey through the world of investment, based around the personal attributes of the customer. However, in ten weeks we felt this would be nigh impossible to implement, and we felt more interest in stock discovery.

Why We Chose Stock Discovery

Stock discovery, we feel, is the most interesting, feasible and significant project that we could undertake this quarter. Through our contextual inquiries, we found that investors often have narrow comfort zones – specific sectors in which they invest exclusively. We found this to largely be the case with Bridge and Jason, and to a lesser extent, John. Of course, Howard,

being a professional, did not fall into this trap, but the point of this project is to help individual investors rather than sophisticated asset managers. It's interesting to us because several members of the group have also had experiences being blindsided by high-performing stocks they had never heard of. Additionally, the signal from the interviews was stronger for this need

than any of the others, so we feel it is likely to be significant to the general population. Lastly, this is a feasible idea – though certainly not an easy one – because it can be as complex or simple as we need it to be for the purposes of this course due to the open-ended nature of what stock discovery is. Below we have included some sketches of our ideas surrounding this theme.