8-2021

The role of trust in advice acceptance from non-human actors

Rahul BANERJEE
Singapore Management University, rahulb.2016@dba.smu.edu.sg

THE ROLE OF TRUST IN ADVICE ACCEPTANCE FROM NON-HUMAN ACTORS

RAHUL BANERJEE

SINGAPORE MANAGEMENT UNIVERSITY

2021

The role of trust in advice acceptance from non-human actors

Rahul Banerjee

Submitted to Lee Kong Chian School of Business in partial fulfilment of the requirements for the Degree of Doctor of Business Administration

Dissertation Committee:

Gerard George (Supervisor / Chair)

Lee Kong Chian Chair Professor of Innovation and Entrepreneurship

Singapore Management University

Paul Robert Griffin

Associate Professor of Information Systems (Practice)

Singapore Management University

Jared Nai

Assistant Professor of Organizational Behaviour and Human Resources

Singapore Management University

Singapore Management University 2021

I hereby declare that this Doctor of Business Administration dissertation is my original work and it has been written by me in its entirely. I have duly acknowledged all the sources of information which have been used in this dissertation.

This Doctor of Business Administration dissertation has also not been submitted for any degree in any university previously.

Rahul Banerjee

22nd July, 2021

The role of trust in advice acceptance from non-human actors

Rahul Banerjee

ABSTRACT

Advancements in technology are now allowing non-human actors in the form of robot-advisors, driverless cars, medical assistants to perform increasingly complex tasks. While technological change is as old as civilization, these non-human actors can do novel tasks. One such task is that they provide advice which is a credence service (Dulleck, & Kerschbamer, 2006). Using a financial services context this thesis studies the role trust plays in advice acceptance.

Robo-advisors are rapidly replacing human financial advisors as the agent-provider for portfolio investment services. For centuries, it was the banker (human financial advisor) who was responsible for providing his investors with advice on what assets to invest in. However, advice acceptance depends on trust and the global financial crisis of 2008 saw a major dip in trust in financial service providers. Financial Advice acceptance from non-human actors is hypothesised to be based on trustor's beliefs on technology, risk aversion, and general trust propensity. It is also based on the Trust Worthiness of the Robo-advisor. Trust Intentions translate into Trust Behaviours.

The proposed model is validated using an online survey where the respondents are provided simulated exposure to a Robo-Advisory process. The study is expected to provide practitioners in the fintech world insights on how to increase adoption. It may potentially assist in the creation of a generalizable across industry model for advice-acceptance from non-human actors.

Table of Contents

1. INTRODUCTION 1
2. THEORY DEVELOPMENT 9
    2.1. Trust in advice acceptance from humans
    2.2. Trust in finance advice acceptance
    2.3. Trust in Technology acceptance
    2.4. Theoretical model; Experience and Trustworthiness
3. HYPOTHESES DEVELOPMENT 23
    3.1. Trustworthiness and Intentions
    3.2. Experience and Intentions
    3.3. Trust Intentions and Behaviours
4. METHODS AND MEASURES 33
    4.1. Methods
    4.2. Scales for experience
    4.3. Scales for Trustworthiness and Trusting Intentions
    4.4. Scales for trust behaviours
5. Data And Methodology 41
6. Preliminary analysis, descriptives and correlations 42
7. Results, conclusions, and implications 52

References 66
Appendix A: Robo-Advisor Demo 76
Appendix B: Actual survey 80
Appendix C: Typical questions asked by a Robo-Advisor 84
Appendix D: Process Macro output and graphs 85
Appendix E: Corelation matrix 87

Acknowledgements

I would like to express my everlasting gratitude towards my supervisor and guide Prof. Gerry George. I owe him perpetual debt for firstly taking me on a student and then generously giving me time over the last five years. For the gentleness with which he encouraged and moulded my thinking towards incorporating academic rigor to my practitioner's mind. Lastly, for his patience and understanding as I juggled the pressures of scaling my start-up which often interrupted the cadence of my studies. I would also very much like to thank Prof. Jared Nai for his invaluable help, especially with the IRB process, Prolific survey and data analysis. Prof. Paul Griffin, for being an inspiration for bankers like me, in showing it is possible to span both the academic and banking world.

If "It takes a village to raise a child", [1] then it certainly takes the entire school to graduate a DBA student. I would like to thank, all my professors and the staff of the DBA program. In particular, I would like to thank Prof. S. Bhattacharya in three different capacities admitting me into the program, as the head of the DBA program as well as teacher. My classmates who were a source of fellowship, and encouragement, Dr Eric Kim & Dr Tiong Kiat Wong.

I dedicate this work to my wife, Ambika and my daughters, for their loving patience and understanding during the late nights and weekends that I spent cooped up in my study. Finally, to my mother, who passed away during the course of my studies. She had led a similar journey of completing her doctorate after I was born. Her last instructions to me were to get it done.

[1] https://en.wikipedia.org/wiki/It_takes_a_village

1. Introduction

Money needs to be invested, for growth and safe keeping. Investment of one's money, is one of the core ongoing decisions in a person's life, but most people are unable to decide for themselves and need external advice. This advice may come from a myriad of sources, self-advised/ informal advisors like friends, relatives, newspapers, co-workers, etc or the advice may come from formal sources like wealth advisors or investment managers. Self-advised individual investors do not invest optimally, typically they own a highly under-diversified portfolio of only four stocks (Barber & Odean, 2000). Whatever be the efficacy of the advice the motives of these informal advisors are beyond reproach.

In contrast, formal sources of advice are omnipresent. Eager bankers and investment advisors, ever willing to provide actual advice on where to invest in lieu of a fee for the advice that they provide.

The recipients of financial advice benefit by having better portfolio diversification and may gain up to half a percentage point in returns (Gaudecker, 2015). Advisors also help in reduction of local bias (a tendency to buy stocks of companies located close to the investors), they also help with reduction in the disposition effect (Hoechle et al., 2017).

The pecuniary motives of the advisor bring to the forefront several issues with the business of providing financial advice. One cluster of issues are around post fee underperformance, where while the fund manager makes better returns pre-fees, post-fee returns are below benchmark. Other issues cited are post advice Sharpe ratio falls significantly and overtrading leading to excessive fees

(Bergstresser et al., 2009; Chalmers & Reuter 2015; Gaudecker, 2015; Hackethal, et al., 2012).

The second cluster of problems associated with acceptance of financial advice is around conflict of interest between the objectives of the advisor (fee maximization) and the advised, products with higher fees to the advisor a sold more aggressively (Hackethal, et al., 2012; Bergstresser, et al., 2009; Mullainathan, et al., 2012).

To summarise, investors who receive financial advice are potentially able to generate better returns as long as they are able choose an advisor who exhibits less of the problems of fee-maximisation and over trading. This is easier said than done.

Against this background it is important to understand the basis for investors choosing their financial advisors. The two most important factors that influence financial advice acceptance are trust and cost (Lachance & Tang, 2012). A number of researchers seem to indicate that among the two factors trust seems to be more important than cost. Similar results were also reported in a study by State Street Global Advisors (2007) reported trustworthiness the single most important factor in the selection a financial advisor. The relatively lower role of cost was also reported in a study of a German brokerage by Bhattacharya et al., (2012) that found only 5% of investors seek advice even when it is free. To be accepted advice needs to be both solicited and paid for (Hung & Yoong, 2010, Gino, 2008)

While share of investors seeking advice has been increasing quite monotonically from the beginning of 20th century till date (Gennaioli, 2014),

there still are large differences in the participation rates of retail investors in the stock market. One of the main determinants of proportion of investment is Trust, not just in the advisor but in the broader financial market. (Guiso et. al. 2008). Trust rather than cost being a key determinant in the decision to invest in stocks is counterintuitive.

A different strand of research shows that either financial literacy or financial advice whether formal or informal is key to investors achieving efficient returns (Gaudecker, 2015). Then why do so many investors suffer from sub-par returns? It turns out that increasing financial literacy is not easy, it is linked to cognitive ability which mostly formed by the time a person becomes a teenager (Agarwal & Mazumder, 2013; Behrman et al., 2012). Hence, the focus shifts to the receipt of financial advice being the key to receiving better financial outcomes.

Delivery of financial advice is expensive as it involves a one-to-one interaction between the advisor and the investor. Unfortunately, receipt of financial advice has been restricted to the wealthier strata of society. Is there a better method to supply financial advice?

The finance industry remained formidable resilient to change for centuries from the advent of modern banking in 1600, till recently. Large, impressive, colonnaded, iconic buildings provided the venue for clients to meet with their financial advisors and to seek their investment advice.

At the end of the last Millenia, the growth of the internet banking gradually started to change the nature of the interaction, particularly for the day-to-day transactions like banking of cheques, remittances or deposit of salaries. higher

order services like investment advisory continued to be delivered via the personalized service. Investors, at least those who could afford it sought advice for their trusted advisors.

Things changed in 2008, when the global financial crises caused a sharp and measurable erosion in the trust in financial services. The overnight collapse of Lehman Brothers and the adverse headlines on the hitherto venerable institutions like Goldman Sachs, Merrill Lynch, Morgan Stanley, Citigroup, AIG caused investing public to revalidate their trust in the entire financial system. The drop in trust was measurable, the respondents expressing a great deal of confidence in banks nearly halved from 42 % in 2007 to 23% in 2010 (Stevenson & Wolfers, 2011). Unemployment rate rose by 5% and movements like occupy wall street brought ordinary people out to protest against the excesses of the banking system. Thru the pain and agony, a new class of financial firms were born called Fintech's.

Fintech is a portmanteau of the words Finance and technology. It was born out of the ire and distrust the people felt towards financial institutions post the financial crisis. The new fintech start-ups offered transparent low-cost financial services, buy using technology that won the trust of people. (Chishti & Barberis, 2016; Goldstein et al., 2019).

Improvements in mobile and computing technology coupled with the realization that trusted financial services are still not easily available to a large segment of society created new business models. Often, these fintech companies bypass the traditional banking system entirely.

The fintech industry is new and encompasses a wide range of activities and technologies that are hard to classify in an elegant manner. In order to address the relative scarcity of the academic research in the field of fintech the Review of Financial Studies used novel method of calling for proposals where the editors use the registered report format to invite proposals (Goldstein et al., 2019). They classify fintech into three broad buckets of blockchain, the disruption in financial services and big data in finance. Blockchain or more broadly distributed-ledger technology (DLT) essentially are a group of technologies that overcome the need for trust in a central authority in traditional finance.

Disruption created by fintech allows non-traditional players to offer financial service. One example is that of peer-to-peer lenders that can process applications quicker than traditional banks. Another example is Robo-advisors, which constitute a sub-group of fintech companies that bypasses the human advisors and use non-human actors provide financial advice. (D'Acunto et al., 2019). Among the various sub-divisions of fintech this thesis focuses on Robo-advisors as the field of study, as it provides a relevant context for the study of advice acceptance from non-human actors.

A Robo-Advisor is a fully automated web or mobile based financial advisory service that invests money for individuals into a portfolio of assets, typically mutual funds and ETF's based on the individuals risk profile (Sironi, 2016; Jung et al., 2018). Their key benefit is lower cost that allows them to reach a wider audience. Investors who don't have enough accumulated wealth so as to receive financial advice from traditional wealth managers can avail of robo-advisors.

A Robo-Advisor represents a discontinuous change in the evolution of financial advice, instead of relying on humans for advice, it is a computer program that suggests where one should invest. The method that Robo-Advisors follow is first they ask a series of profiling questions to gauge an investment goals, time horizon and risk profile (Appendix C). Then they use modern portfolio theory to suggest an investment portfolio for the client/ individual investor (Abraham. et al., 2019). Based on the responses to the questions, the Robo-advisory firm suggests a portfolio for investment. Typically, the portfolio is restricted to ETFs. The typical usage is that investors invest regularly, with monthly investments being a popular periodicity.

As we seen in the previously referenced studies, cost and trustworthiness are the two most important characteristics when it comes to choosing a financial advisor. Ex-ante Robo-Advisors deliver advice at a lower cost due to the absence of human intervention. They are available round the clock and from the comfort of one's home. They have also a lower threshold, for example a World Bank study by (Abraham, et al., 2019) states that the minimum wealth required by Bank of America with a private financial advisor is $25,000 whereas it is only $5000 for their robo-advisor. The same study also provides evidence that the cost of Robo-Advisor as low as a 16% of a human investment advisor.

Another key benefits that they deliver diversification and the resultant reduction in portfolio volatility (D'Acunto, et al., 2019). The same study also reported a reduction, but not elimination in its entirety of other investment biases, like disposition effect, trend chasing and rank effect (Shefrin & Statman, 1985; Barber & Odean 2008, 2010; Hartzmark, 2014)

Robo-Advisor like any new technology has received its share of criticism as well. In USA, regulators like the SEC (2015) have cautioned investors,

> *If the automated investment tool does not allow you to interact with an actual person, consider that you may lose the value that human judgment and oversight, or more personalized service, may add to the process*

Other problems of Robo-advisors are that they ask the same few questions and assume that they fit all investors (Abraham, et al., 2019). They have also been criticised for not offering individual advice, having conflicts of interest, failing to minimize costs, and not meeting their fiduciary standards (Faloon & Scherer, 2018).

While the industry has seen viral growth and has spread all over the world it still is a small part of the global asset management industry, representing a little less than USD 8 trillion of AUM. See, Phoon & Koh (2018) for details on the rapid growth of this industry.

Foundations and limitation in the scope of this work

Advice acceptance from non-human actors is an emergent field and by its very nature is cross-disciplinary. This study in particular is rooted in the following three contexts, organizational trust, financial trust and trust in technology. This study aims to systematically study the role of trust in advice acceptance from non-human actors. I seek to study what priors lead to the advice acceptance from non-human actors, what moderator these relationships.

There are many interesting and important avenues that are worthy of study but are not covered in the scope of this paper. For instance, do humans prefer to

receive financing advice from human or non-human actors? We limit the context of advice acceptance to financial services, although there are other contexts where advice acceptance from non-human actors is going to play a crucial role for example driverless cars, medical services, the applications are extensive. It is hoped that some of the findings are generalizable. No attempt is made to study whether robo-advisors indeed provide better financial outcomes vis-à-vis human advisors. For work on Robo-Advisor design refer to (Bartlett, & McCarley, 2019)

2.Theory Building

This thesis investigates the role of trust in advice acceptance from non-human actors. Prior to looking at advice acceptance from non-human actors, three existing and well researched areas are covered to lay the foundation of our study. Firstly, we investigate the role of trust in advice acceptance from human actors and use this field to define some of the key definitions for the remainder of the thesis. Next, we look at advice acceptance in the investment space, focusing on the role of trust. Last, we look at technology adoption and the factors that influence it.

To accept advice you must have Trust, which is a fundamental aspect of societal and organizational behaviour and has been the focus of study from the times of the ancient Greek philosophers. In the context of Ancient Greek thought, two related concepts were identified regarding the concept of belief: pistis and doxa. Simplified, pistis refers to "trust" and "confidence", while doxa refers to "opinion" and "acceptance"[2]**.** Aristotle. (4 BC) in his famous book Rhetoric, talks about trust, wherein he suggests a speaker's ethos (Greek root for ethics) is based on the listener's perception of three things: intelligence; character (reliability, honesty); and goodwill (favourable intentions toward the listener).

2.1 Trust in advice acceptance from humans

The pursuit of a deeper understanding of trust has continued in business studies with researchers defining it as a willingness to be vulnerable and as a multi-dimensional construct (Mayer, et al., 1995); another view is that affect and

[2] https://en.wikipedia.org/wiki/Belief

cognition based trust are the basis of co-operation between managers (Mcallister, 1995). Through the past 2350 years since the time of Aristotle of the study of trust it has primarily focused on the trust among humans.

Mayer, et al., (1995) provide a widely used model of trust in organizations. The model cites a trustor's (the one who trusts) propensity to trust and the trustworthiness of the trustee (the one who is trusted). A notable point about trust propensity is that it is measurable prior to the first interaction with the trustee. Trustworthiness is made up of three constructs of ability, benevolence and integrity.

In brief, ability is a domain specific competence or expertise of the trustor to perform a particular task or in a particular domain. Benevolence is positive intentions of the trustee towards the trustor, and lastly integrity is the compliance or following of a set of rules or principles by the trustee. The main tenet of the model is the concept that the trustor by virtue of agreeing to listen to the trustee exposes himself to the consequences of reposing his faith in the trustee. Another way to interpret this is to think about a trade-off between the gathering of reward (of whatever kind) by taking some risk.

Mcallister, (1995) presents a contemporaneous but different model of interpersonal trust in organizations where the formation of trust is divided into two constructs a cognitive trust and affective trust. The cognitive trust is based on thinking, is with or at least within reason, it is justifiable, or evidence based. Affective trust springs forth from emotions and the feeling of fellowship. They also harbour an expectation that the feelings are mutual.

This thesis focuses on initial trust formation, with experience trust intention get's updated. Without the formation of initial trust, the actual interaction between the trustee and trustor won't take place and trust will not be updated based on experience.

In a human actor setting the longitudinal effect of trust has been studied by (Kim, Ferrin and Rao, 2017). In an ecommerce setting, before the purchase decision is taken, Trust has the dual effect of increasing the perceived benefits of purchase directly and reducing the perceived risk. Post the purchase trust is updated based on the fulfilment of the pre-purchase expectations.

This paper focuses on initial trust, if the level of this initial trust is not high enough, it will not lead to the longitudinal dimension of trust where experience modifies trust. (Mayer, et al, 1995). If adequate trust without interaction is created that the trustor decides to interact then the trustor and then is able to compare his ex-ante expectation with his ex-post experience. The difference may be termed as satisfaction and the trustworthiness is of the trustee is updated.

The pathways of trust formation differ based on the situation, is the decision a small and familiar or is it a big and un-familiar. To put the difference in a topical context, let us take a hypothetical context. A patient visits his regular doctor who recommends a routine flu shot, vs a patient visits a new doctor who recommends an experimental vaccine. It holds to simple logic that the second situation has a lot more at stake. We may up the stakes even higher if the recommendation was coming not from a doctor, but a non-human actor.

A significant link was found between consumer trust an advice acceptance by Barnett (2005), who found that in low stake environment expertise was

dominant trust pathway while benevolence was more important in an emotionally highly stakes environment. (Kahn & Baron, 1995).

2.2 Trust in finance advice acceptance

In the field of finance, advice falls into the category of credence services, where the quality of outcome is hard to judge even post receipt of the service. A study by State Street Advisors (2007) reported trustworthiness the single most important factor in the selection a financial advisor. Another interesting point to note is if the aim of the advice is to increase the above market returns then it is counterintuitive as performance is the least import criteria.

Societal trust in general and towards finance professionals in particular has been measured regularly since 1975 in the general social survey data. After the financial crises of 2007, this trust in financial advisors was significantly damaged and fell to below the level of general trust in people. A more focused survey on financial advice acceptance was conducted by The national financial capability study conducted in the USA conducted a field survey of about 28000 respondents and sought answers to the question, " I would trust financial professionals and accept what they recommend" Lachance, & Tang, (2012) have analysed the survey results and found that trust has a statistically significant relationship with variables like financial literacy, wealth, age and willingness to take risk. They also show trust in a finance professional vs trust in general population are different from one another, the introduction of the "risk" is perhaps what causes the two forms of trust to diverge.

This concept of risk is important to clarify as it refers to two different distinct concepts. the first concept of risk can be defined as the variability of return, for

example stocks returns are riskier than a time deposit in the bank; in a throw of a dice there is risk on the number that is drawn. The second concept is the fear being cheated or defrauded. If one does not trust the company or bank, i.e. one believes that there is a risk of being defrauded then, one would not put in an investment. This second concept is similar to the organization trust literature concept of risk being defined as the willingness to be vulnerable. In the field of finance trust and risk are two distinct and orthogonal attitudes (Guiso, et al., 2008; Barberis, et al., 2006).

Guiso, et al., (2008) isolate the fear of expropriation, or the fact that the investing game has unfair probabilities for the investor is one of the greatest inhibitors to participation in the stock market. Mathematical they establish that even if there is as low as a 2% chance in the mind of the investor of being de-frauded, then his net worth needs to be five times that of an investor who does not perceive any risk.

In contrast to multifactor scales used for propensity in the organizational behaviour field, finance research typically tends to focus on the single question in the World Values Survey, “Generally speaking, would you say that most people can be trusted or that you have to be very careful in dealing with people?”

Multi-level trust has been studied, i.e. both the advisor and the institution bank or broker can be trusted or mistrusted. Both have notable impact on advice acceptance and participation in stock markets (trust behaviours). (Guiso, et al., 2008; Rousseau, et al., 1998). The trust in the officer of a bank is distinct from the trust in the bank. This aspect has the potential to throw up interesting results in our research from non- human actors, where it may be harder to distinguish

between the non-human actor and the bank or broker that is providing the same. Consistent with the model that we are developing and with the concept of trust propensity, finance literature corroborates that trustor prior experience, like education, religion does contribute to differences in trust. (Guiso, Sapienza, and Zingales, 2004, 2006)

A different school of thought around trust in finance, is that it increases comfort or reduces the anxiety around investing in risky (i.e. variable) return. The investor is fearful in taking aggressive (i.e. those with risk) investment decisions himself and needs a trusted financial advisor to tell him what to do. The importance of this school of thought it that the investor is capable of making the decision himself (saving costs) but wishes to off-load decision making to the advisor. In a manner not dissimilar to how we go to a doctor for aliments where we know what the course of treatment will be, instead of self-medicating. Trust mediates the amount that is invested. (Gennaioli, et al., 2015)). This approach sheds light on why fees in the advisory fees in financial service industry have not come down. This model predicts that the advisor will tend to be a "yes-man", supplying advice that the investor wishes to hear. If the advisor is trusted, neither cost nor performance seem to matter much!

A Robo-Advisor is a type of financial advisor and we theorize that like in the case of human financial advisors the formation of higher trust will lead to higher financial investments.

2.3 Trust in Technology acceptance

With the advances of sciences in the last few decades we are now at the cusp of true artificial intelligence robots (AI) becoming a reality. In addition to robo-

advisors, examples abound in driverless cars, medical diagnosis of ailments, natural language processing, physical robots etc. Artificial intelligence is defined as a machine or a robo that is a flexible rational agent that perceives its environment and takes actions that maximize its chances of success at some goal (Russell & Norvig, 2003)

These AI robots are quite different from classical machines as the tasks that they perform are quite often credence services in contrast to traditional technology solutions that performed search tasks like in manufacturing where the output was easily measurable in quality and quantity. The skill set that AI robots seek to compliment or even replace is that of white-collar workers like bankers, doctors, lawyers, etc.

A study by Frey & Osborne, (2013) found that 47% of jobs in America were at high risk of being "substituted by computer capital" soon. Machines have been around from many centuries, but the trust question was not relevant as they had objective measures of performance. The new age robots are and will increasingly be performing task where human beings will be personally vulnerable to the consequences of the AI robot's actions and it will be hard to determine whether the robot did its job well or did not do its job well.

While AI robots have become a reality only recently, they have been a part of popular culture via books and movies for a very long time. They often depict a dystopian world where robots with high ability, stop listening to their human masters and then run amok causing deliberate harm, for example the novel Frankenstein (Shelly, 1818).

Adoption of new technology depends on two aspects perceived usefulness and perceived ease of use. With usefulness having greater explanatory powers and in turn it depends on the experience of the user and his perception of social norm and image. (Venkatesh & Davis, 2000). The paper does not directly study the role of trust, although some of the questions in the scale used are like those in the trust studies. For instance, those of output quality and results demonstrability.

Subsequent work by Gefen, Karahanna, & Straub (2003), integrates trust research with technology acceptance research and finds trust to predict acceptance of new technology. If users believe that the new technology (e-commerce is the setting) wont cheat them, is safe and is conforms with the market, online trust can be built. McKnight, Choudhury, & Kacmar, (2002), have further developed scales for trust in e-commerce. The constructs do have resemblance with the constructs of Ability, benevolence, and integrity in prior trust work (Mayer, et al., 1995).

One of the limitations of older works is that technology has progressed so significantly that today the context of those studies seems simplistic. A problem with technology is that its newness is transitory, in 2020 the iPhone 11 is the latest, 20 years earlier mobile phones were new. Hence it is challenging to measure newness on a global scale, as what is mundane in California (say Tesla cars) may be unheard of in Chittagong.

In a recent meta-analysis on the acceptance of electronically delivery of services by Mou, & Jason, (2017) finds that trust is more important than fear of something going wrong (privacy violations or financial fraud). They also find

trust is directly linked to acceptance of the e-service. This provides us with further basis to believe that trust may be instrumental in the acceptance of financial advice as well.

Lastly, we specifically look at recent literature on adoption of AI or advanced system and find that areas like autonomous cars, medical technology, commercial robots, trust is critical to adoption. (Hengstler, et. al., 2016). Trust in technology and the trust in the firm developing the technology are important to the usage or acceptance of AI technology.

2.4 Theoretical model; Experience and Trustworthiness

Our proposed theoretical model follows the belief, attitude, intention, behaviour progression proposed by Fishbein & Ajzen, (1977). In this model, I seek to show that Trust intentions need to be formed for the advice acceptance behaviours to be exhibited. In turn the formation of trust intentions depends on two distinct priors.

Let us term the first set of priors as trustor experience. This includes the trustors beliefs and attitudes, the sum total of his experiences, from birth till the point he is faced with the choice of whether to accept or not to accept financial advice from a non-human actor. Every person has a rich and nuanced set of experiences and beliefs, we further theorize that most of the variance in trust intentions will come from three constructs. these are, 1) Trust propensity, 2) Technology Propensity and 3) Risk Aversion Propensity.

Trust Propensity, which is the answer to the question "Generally speaking, would you say that most people can be trusted or that you have to be very careful in dealing with people?" this question is asked across countries in the World

Values Survey. The second construct seeks out the Technological propensity of the trustor i.e. is he or she positively or negatively inclined to new technologies. Lastly, risk aversion propensity seeks out the desire to invest in risky assets vs risk free assets. These three collectively are meant to explain the variation in trust formation that is attributable to the trustor.

The second set of priors focuses on the trust-worthiness of the Non-human actor. In the opinion of the trustor, will the Robo-Advisor be able to full fill expectations without causing harm. From a model building perspective we hypothesize that trust-worthiness as three sub-components of ability, benevolence and integrity. Ability is one of the key determinants in the model and is easily transportable into non-human advice setting. Would a Robo-Advisor be able to do what it promises to do. Is it competent to provide investment advice?

Benevolence is defined as the desire to do good to the trustor is the hardest among the three traits to find an apparent fit in an AI robot context. However, benevolence can also be defined as being inverse of the motivation to lie (Mayer et. al., 1995). The fact that it is hard for AI robots to lie can potentially aid in the generation of trust.

Integrity is the adherence of the trustee to a set of principles that the trustor finds acceptable is easier and with many of the AI solutions these sets of principles can not only be easily adhered too but also they are easily personalized and customized by the user. Illustrative examples would include how the Robo-Advisor stores your data, does it follow the conditions that are set by the trustor.

In conclusion, we propose that the trust formation mechanisms will have two priors in trustee experience and the trustor trustworthiness. The following section describes the full model and the underlying hypothesis.

Once trust intentions are formed and the opportunity arises to invest we can observe behaviours. In the Robo-Advisor context, after being exposed to the robo, trust intentions will form. Subsequently, the investor may decide to invest money via the Robo-Advisor or choose to set up an account, i.e. exhibit trust behaviours.

Terms like trust, trustworthiness, have been well studied however various authors and various disciplines have a different definitions. To enhance internal consistency of this thesis and its readability some key terms are defined and the nuances with which they will be used are set forth below.

Trustor is defined as the actor who trusts, in our study the human investor who is desirous seeking the advice of the Robo-advisor. Trustee, is the non-human actor or Robo-advisor. Robo-Advisor is a software, i.e. non-human portfolio advisor that uses advanced technology to provide financial advice to the trustor.

Trust is defined as a willingness to be vulnerable (Mayer, et al., 1995) in an organizational construct, i.e. trust is risky. In financial industry trust may be thought of as the probability of not being cheated (Guiso, et al., 2008). Trust may also be seen reducing anxiety about taking financial risk (Gennaioli, et al., 2015). If trust is defined as a probabilistic belief, it that can be measured by the trust game (Gambetta, 2000; Berg, et al., 1995). McLeod (2015), states that trust is an attitude and lays emphasis on it being warranted, plausible, justifiable, explainable, etc else why should a rational trustor agree to accept advice,

become vulnerable or take risk. Trusting attitude of a trustor in a trustee is specific to a particular task (Hardin, 2002). For example, a citizen of a country trusts the armed forces to keep the country secure, but she may not trust them to win medals in the Olympic.

Trustworthiness is the trustors belief in the trustee fulfilling its promise. To judge the trustworthiness of the trustee the trustor needs some exposure to it. Trust is the probability that someone will perform an actions (Gambetta, 2000). It is important to differentiate between trust and trustworthiness, while trust is an attitude, trustworthiness is a property (McLeod, 2015).

A couple of interesting relationships can be deduced based on the above definitions

a) Different trustors will have different levels of trust in the trustee.
b) Different trustors will have different perceptions of trustworthiness in the trustee.
c) The same trustor may have differing levels of trust in different trustee's

Trust Intentions are the desire of the trustor to accept the vulnerability or to take risk (of being cheated) after having experienced how the Robo-Advisor works and is based on the experiences of the trustor and the trust worthiness of the robo-advisor. To summarize there are two difference sources of variance in trust intentions, variance on account of the trustor (trustor experience) and variance on account of the trustor's perception of the trustee (trust worthiness). Trustor Experience is a multi-dimensional construct that is solely dependent on the trustor, i.e. is independent of the trustee. It is also relatively constant over time as it is based on beliefs, which are updated infrequently.

Trust Intentions are the desire of the trustor to accept the vulnerability or to take risk (of being cheated) after having experienced how the Robo-Advisor works and is based on the experiences of the trustor and the trust worthiness of the robo-advisor.

Risk, is the amount of money that is proposed to be invested acts like a moderator between intention and actual investment. This is not to be confused with risk aversion propensity. It can be also be termed as the size of the bet.

Trust Behaviour, is the observable behaviour to show that trust has been created. In a survey setting it is often quite hard to observe this final and most critical step that make research more useful for practitioners. A certain level of trust must exist below which no trust behaviour is observable. (Mayer, et al., 1995). Based on the context the behaviour may be use for a product or service or it may be the degree or frequency of use. At times the revelation of personal information, one's residential address to do a follow up meeting or a phone number may also be thought of as trust behaviours.

The purpose of this thesis is to study the role of trust in advice acceptance from non-human actors. Our model is based on the assumption that advice acceptance from non-human actors will have some similarity to advice acceptance from human actors, but modified for the trustors prior experiences with investment in financial assets and technology.

Main RQ: The role of trust in advice acceptance from non-human actors

Let us imagine a simple thought experiment, in a futuristic state of the world, participants enter a large experimental tent where non-human actors are offering advice on various professional services, medical advice, legal advice, financial advice, etc. For each type of advice there are many competing offerings, i.e. many types of robo-advisors, robo-lawyers, robo-doctors etc. It is obvious variability in intentions will be observed on account of both participants (trustors) and the robo (trustee).

The participants with the greater trust propensity will end up establishing higher trust intentions more often than other participants with lower trust propensity. Similarly, some robo (trustee), by the nature of their design will see more participants establishing trust intentions than other robo. In our research model, we seek to put the variability on account of trustee into a category called trustworthiness. We parsimoniously seek to put all the stable within trustor factors into experience. Lastly, we study the effect of moderators on the conversion of trust intentions into trust behaviours.

Research Question 1: How does trustworthiness of the non-human actor influence trust intentions

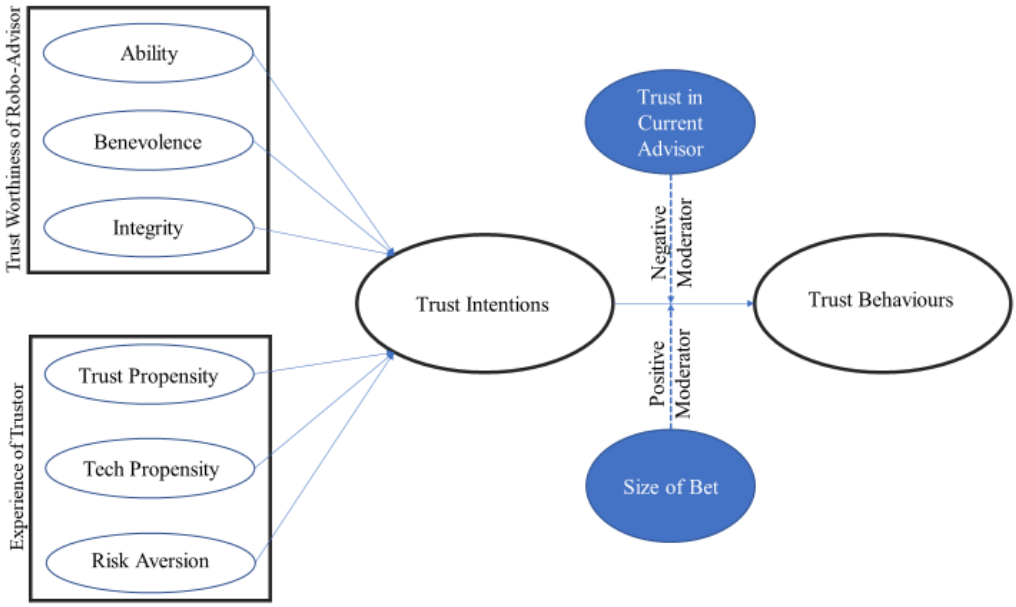
Research Question 2: How does trustor experience influence trust intentions in non-human advice settings

Research Question 3: How do domain experience and size of investment moderate the effect of trust intentions on trust behaviours

3. Hypothesis

Our complete model is presented below in Fig 1. It has three main parts, trustworthiness and trustor experience lead to trust intentions. Trust intentions, moderated by risk and trust in current advisor lead to trust behaviors.

Figure 1, Conceptual Model



3.1 Trustworthiness and Intentions

Mayer, et. al., (1995) have presented that trustworthiness is based on perceptions of ability, benevolence and integrity in (human) co-workers. In this section we seek to develop hypothesis in the non-human setting. Mcknight, et. al (2002) provide a review of literature on trust in e-commerce and find that competence, benevolence and integrity once again are the three primary constructs. Competence has ability as a subset. Lankton, et al., (2016) provide trust in technology, in two phases a pre-experience phase, where expectations are formed and a post use phase where the expectations are updated based to how the technology behaved.

In our definitions in section 2, we looked at trust between a trustor and trustee is in a context. Hence the more our perception of competence in the non-human actor, the higher will be the trust intentions. With the ubiquitous growth of algorithms and Artificial intelligence this is expected to be a positive relationship.

H1A The higher the ability of the trustee, the higher will be the Trust Intentions of the Trustor in Non-Human Advice Settings.

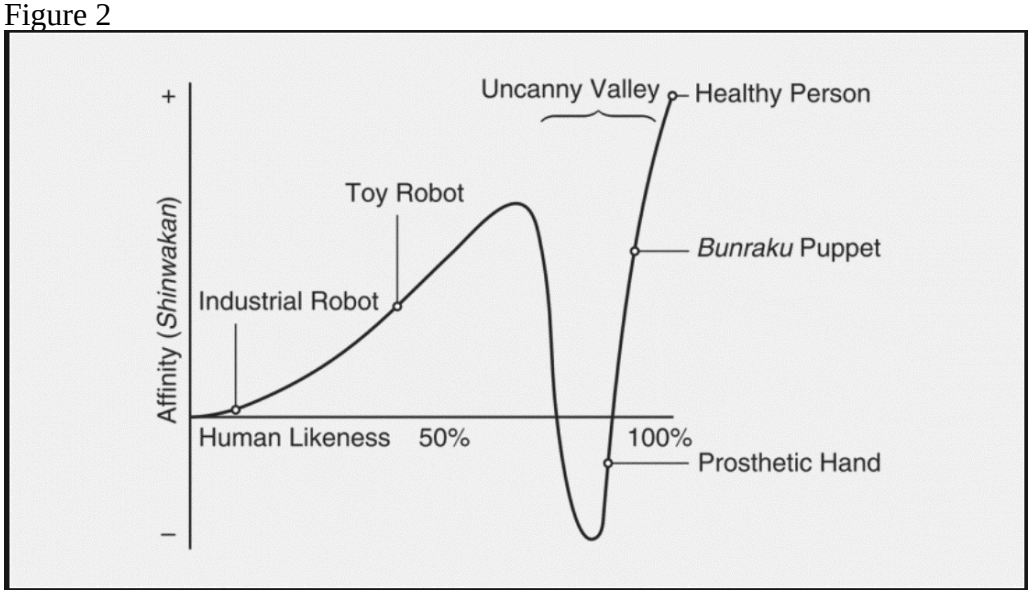
Perceived Benevolence is the trustor feeling that the trustee has good intentions. The word benevolent[3] is formed from the roots of Bene (good) and Velle (to wish). These "wishes" may be strong (volition) or weak (velleity) that is a desire that is not strong enough to translate into action. Malevolent[4] is opposite of Benevolent, which is have Male (ill) and Velle (to wish).

Prior to finding whether the trustor perception of the non-human actors intentions are benevolent or malevolent, it is more important to find whether these types of feelings are at all possible? In-animate objects don't have intentions towards us, but as the objects become more human like do we begin

[3] https://www.merriam-webster.com/dictionary/benevolent#note-1
[4] https://www.dictionary.com/browse/malevolent

to perceive intentions? As the anthropomorphological similarity of a non-human actor rises from a completely industrial design, affinity rises, however when it becomes more human like it dips and gives rise to eeriness or uncanniness (Mori, et al., 2012)[5]. In the five decades since the original work was published, robots have undoubtably advanced in addition an entirely new field of Artificial Intelligence has been developed which is changing many aspects of human life for instance in the fields of transportation, financial services, home services, etc. (Stone et al. 2016).

Figure 2



An increase in the anthropomorphism increases the investment volume in a Robo-Advisor (Adam et al., 2018) as does the presence of personalized recommendations.

These AI artefacts are created by human-engineers and designers, who program them and set boundary conditions (Dignum, 2017)) and hence it is possible that the perceived benevolence is that creator of the AI system? It is indeed possible to induce human feelings of intimacy politeness and other similar feelings from

[5] Originally published in 1970, Energy Magazine in Japanese language

computers (Moon, 2000; Nass, et al., 1999). We hypothesize that benevolence will be a key in advice acceptance from non-human actors.

H1B The higher the benevolence of the trustee, the higher will be the Trust Intentions of the Trustor in Non-Human Advice Settings.

Integrity is that the non-human actor does what it promises and adheres to a set of principles (Grewal & Sambamurthy, 2015). In the Robo-Advisor construct it means that it follows the investment methodology that it promises, and it handles the investment properly. Fees and costs will be transparent, it adheres to the guidelines. Mayer, et al., (1995) suggest that integrity is quite important in initial trust formation as it can be observed prior to experience.

H1C The higher the integrity of the trustee, the higher will be the Trust Intentions of the Trustor in Non-Human Advice Settings.

3.2 Experience and Intentions

Trust intentions depend on the trustor as well, from the day we are born we are shaped by our surroundings, we form beliefs and attitudes that help us to decide whether we should perform a proposed action. In our theory we look at three specific propensities towards, trust, technology and risk aversion of the trustor.

Trust propensity is vital to initial trust formation (Mayer et al, 1995), with its effect weakening as a longitudinal feedback loop updates trustworthiness. In

an unfamiliar context, the trust propensity is the significant prior to trust (Bigley & Pearce, 1998). This propensity is to trust people in general (Mayer & Davis, 1999), and is relatively stable for a given individual. It is defined as disposition (Colquitt, et al 2007; Kramer, 1999).

H2A The higher trust propensity the higher will be the trust intentions

Since the focus of the paper is trust in non-human actors, we need to seek a propensity factor that measures the prior attitude towards technology. But technologies change, there was an era when cars, elevators, aeroplanes where all brand new technologies. More recently the internet, internet banking, mobile phones, blue tooth communication were new. Even within a household we have kids who have been using ipads, from the day they were born, while parents or grandparents may have a different attitude or disposition towards technology.

Technology acceptance models depends on a prior of user motivation towards adoption of the new technology (Davis, 1986). Perceived usefulness and Perceived ease of use are the two primary factors that are further influenced by social norms (Venkatesh & Davis, 2000).

The adoption of a new technology is based on four sub-categories the two positive categories are optimism and proficiency, while the two negative dispositions are dependence and vulnerability, (Ratchford & Barnhart, 2012).

Imagine a set of car owners who find much to their surprise that their cars have a full self-driving capability in addition to the pre-existing human drive. We can

assume that some will use this feature earlier than the others, while some may never use this feature. When a new technology is launched in the market, some people are willing to try it as soon a possible while others wait till it gain mass acceptability. The early adopters have a disposition to try new technologies and they believe that they will gain from it and they are not fearful of the new technology.

H2B) The higher tech propensity the higher will be the initial trust intentions.

Investing money involves risk and all investors don't have the same utility function towards risk as well as the ambiguity that comes with it. (Maccheroni et al., 2005). If we go back to our hypothetical construct of a large experimental tent when investor have an opportunity to play game of chance (let us say, a throw of a dice) where the odds are in their favour will play while others won't. Individuals offer very low values to play experimental lotteries, on average paying only 112 Euros for a 50% chance to win 2500 Euros, however some participants pay above 2500 euros for the same. (Guiso, et al, 2008).

In a standard trust game (Berg, et al., 1995) is set up in the following manner, participants are divided into senders and recipients. Senders are given a small amount of money typically $10. They can either send none, some, or all of the money to the recipient, the organizers triple the money sent (typically) the recipient then has a chance to send back none, some or all the money he sent. The objective of the game is the measure trust and trustworthiness, the game

has replicated in many variants to study the impact on trust of the various game parameters (Johnson, & Mislin, 2011).

The view that we follow is that risk aversion and trust are two independent measures (Houser, et al., 2010; Fairley, et al., 2016; Eckel, & Wilson, 2004). Neuroscience shows that trust and risk are processed in different part of the brain processes (McCabe, et al., 2001). Neuroscience has shown that brain releases the chemical oxytocin when it trusts someone (Baumgartner, et al., 2008). The receptors for this hormone in brain allow us to form a view on predicting other people's behaviour. When the level of oxytosin was measured while playing the Berg trust game, recipients of larger sums showed larger increases in oxytocin (higher trust of sender) and recipients with higher levels of oxytocin sent back larger sums. (Zak, 2017).

Brain experiments have shown that while trust originates from the insula cortex, ambiguity aversion is located in the Broadman 10 area (Camerer, et al., 2005; McCabe, et al., 2001; Rustichini et al., 2002). Therefore, we hypothesise that not only will risk aversion influence initial trust formation but also that it is different from trust.

H2C) The higher financial risk aversion the lower will be the initial trust formation

3.3 Trust Intentions and Behaviours

Theory of planned behaviour (Ajzen, 1991) states that within a specified context perceived intention to perform a certain action predicts the behaviour, with the action is within the control of the actor. in the context of a Robo-Advisor, if a person has strong intention to act on the advice and it is within their control then it is likely that they will perform actions to take that advice.

Hypothesis 3) The higher the initial trust intentions the higher will be the trust behaviours

The purpose for which the trustor expends effort to understand the Robo-Advisor is to be able to invest savings and getting a return above the risk-free rate. This return involves accepting risk (variability of outcomes) from the investment decision and having trusting intentions in the robo-advisor. We also remind ourselves that risk and trust are different constructs (Houser, et al., 2010). A trustor with high trust intentions, but no money to invest, is unlikely to exhibit trust behaviours. Behaviours expend effort, why do that when it is not needed. It is easy to image these stereotypical trustors, a college student with no savings or the non-primary decision maker of the household. The other extreme hypothetical trustor with a lot of money to invest (having won a lottery the previous night or received a special bonus) will have a desire to invest the money provided he has high trust intentions. Lastly, since the decision to trust precedes the decision to invest at very low levels of trust no investments are likely to be done.

In our experimental set up we measure stake as the amount of money (size of bet) that an investor wishes to invest in the advice received. The risk aversion of an individual depends on the size of the bet. The higher the size of the bet the more risk averse then individual becomes (Holt & Laury, 2002). In most research studies the incentives are either hypothetical or small, so the constant risk aversion is a fair assumption. However, in our study the focus is on how to invest one's wealth, therefore it becomes important to study its moderating effect. We put forth the following hypothesis.

> *Moderator 1: The size of bet will positively moderate the relationship between trust intentions and trust behaviours, such that trust behaviour is highest when both the size of bet and intentions are high.*

Guiso, et al., (2008) find that

> *"Compared to those who do not trust, investors who trust their banker a lot are 16 percentage points more likely to invest in stocks (25% of the sample mean)"*

We posit that relationship and trust in current financial advisor will have a moderating influence on whether trusting intentions in the Robo-Advisor translate into actual trust behaviours. If an investor is satisfied with his current financial advisor, he/ she will be reluctant to open a robo-advisory relationship, even though he may have trusting intentions towards it.

The reverse is also hypothesised to hold, if an investor is unhappy with his current financial advice then they will for a given level of trust intention be more likely to open a Robo-Advisor relationship.

M2: Trust in current financial advisor inversely moderates the relationship between Trust Intentions and Trust behaviours, such that trust behaviour is the highest when trust intentions are high and trust in current financial advisor is low.

4. Methods and Measures

4.1 Experimental methodology

An internet survey is designed using survey monkey. It consists of three distinct parts each is administered in sequence. In the first part control, prior experience and propensities questions are asked. The second part the respondents are shown a presentation on how a Robo-Advisor functions see Appendix A, the last part measures the trusting intentions, perceived risk and trusting behaviors towards the Robo-Advisor.

This methodology allows us to demo the Robo and the survey electronically in contrast to doing the demo in a face-to-face setting resulting in our being able to collect a much larger sample size. A small pilot followed by the full survey n=200.

4.2 Scales for Trustor experience

Trust propensity is measured using scales developed by McKnight, et al., (2002) for use in an e-commerce context (Table 1) The scales show high Cronbach's alpha and are sub-divided four sub-constructs of faith in ability, faith in benevolence, faith in integrity and trusting stance. The sub construct trusting stance is similar to the trust propensity scale developed by Mayer & Davis, (1999). Question four under trusting stance often used in finance and economics literature to measure trust propensity is drawn from the World Values Survey/ General Social Survey. If the total length of the survey is too long, then the first three sub-constructs can potentially be removed. Another reason for dropping them is that they test for faith in human attributes. The initial though is to keep

these questions as it would be quite illuminative to contrast faith in humans to faith in non-human actors.

Table 1

Sub-Constructs	Questions
Benevolence	1. In general, people really do care about the well-being of others. 2. The typical person is sincerely concerned about the problems of others. 3. Most of the time, people care enough to try to be helpful, rather than just looking out for themselves.
Integrity	1. In general, most folks keep their promises. 2. I think people generally try to back up their words with their actions. 3. Most people are honest in their dealings with others.
Competence	1. I believe that most professional people do a very good job at their work. 2. Most professionals are very knowledgeable in their chosen field. 3. A large majority of professional people are competent in their area of expertise.
Trusting Stance	1. I usually trust people until they give me a reason not to trust them. 2. I generally give people the benefit of the doubt when I first meet them. 3. My typical approach is to trust new acquaintances until they prove I should not trust them. 4. Generally speaking, would you say that most people can be trusted or that you cannot be too careful in dealing with people?

Ratchford & Barnhart, (2012) have developed scales to test technology adoption propensity, this is measured along four subconstructs of optimism, proficiency, dependence and vulnerability. The advantage of this propensity is that they don't refer to any particular technology and hence can be used for our purpose.

The problem is that the scales have fourteen questions, for the purposes of being parsimonious in our survey we have restricted this to eight questions (Table 2). Question in italics have been deleted. dependence and vulnerability are reverse coded.

Table 2

Tech Propensity	
Sub- Constructs	**Questions**
Optimism	Technology gives me more control over my daily life. *Technology helps me make necessary changes in my life.* *Technology allows me to more easily do the things I want to do at times when I want to do them* New technologies make my life easier
Proficiency	*I can figure out new high-tech products and services without help from others.* *I seem to have fewer problems than other people in making technology work.* Other people come to me for advice on new technologies. I enjoy figuring out how to use new technologies.
Dependence	Technology controls my life more than I control technology *I feel like I am overly dependent on technology.* *The more I use a new technology, the more I become a slave to it.*
Vulnerability	I must be careful when using technologies because criminals may use the technology to target me. New technology makes it too easy for companies and other people to invade my privacy. I think high-tech companies convince us that we need things that we don't really need.

For measuring risk aversion propensity (table 3), we take the basic definition of risk propensity from Guiso, et al. (2008) as the question was shown to have good predictive power. A related but distinct construct of overconfidence is

also used Guiso & Jappelli, (2005). Control questions for prior experience and current usages of financial advisor are also surveyed.

Table 3

Risk Aversion Propensity	
Sub Constructs	**Questions**
Financial Risk Aversion	"Risk is an uncertain event from which one should seek protection" or "Risk is an uncertain event from which one can extract a profit." % directly held stocks, stock mutual funds, corporate bonds, derivatives "Which of the following statements comes closest to the amount of financial risk that you are willing to take when you make your financial investment? (1) a very high return, with a very high risk of losing the money; (2) high return and high risk; (3) moderate return and moderate risk; (4) low return and no risk.
Finance Experience	I have been actively investing in stocks, bonds, or mutual funds for the past

4.3 Scales for Trustworthiness and trusting intentions

We use the scales developed by McKnight, et al., (2002) for measuring trustworthiness (Table 4) of the Robo-Advisor prior to exposure, the standard three sub constructs of ability, benevolence and integrity are measured. Subsequently, the respondents see the Robo-Advisor demo (Appendix 2). Lastly they are ask to respond about their trust intentions regarding the robo-advisor, prior exposure to Robo-Advisors is also checked (table 5), three different sub-constructs are used.

Table 4

Trustworthiness of Robo-Advisor	
Sub Construct	**Questions**
	1. I believe that a Robo-Advisor would act in my best interest.

Benevolence	2. If I required help, a Robo-Advisor would do its best to help me. 3. a Robo-Advisor is interested in my well-being, not just its own.
Integrity	1. A Robo-Advisor is truthful in its dealings with me. 2. I would characterize a Robo-Advisor as honest. 3. A Robo-Advisor would keep its commitments. 4. A Robo-Advisor is sincere and genuine.
Ability	1. A Robo-Advisor is competent and effective in providing investment advice. 2. A Robo-Advisor performs its role of giving investment advice very well. 3. Overall, a Robo-Advisor is a capable and proficient Internet financial advice provider. 4. In general, a Robo-Advisor is very knowledgeable about investments.

Table 5

Trusting Intentions towards Robot Advisor	
Sub Construct	**Question**
Willingness to Depend	1. When an important market event arises, I would feel comfortable depending on the information provided by a Robot Advisor. 2. I can always rely on a Robot Advisor in a tough market environment, 3. I feel that I could count on a Robot Advisor to help with a crucial investment problem. 4. Faced with a difficult legal situation that required me to hire a financial advisor (for a fee), I would use a Robot Advisor. 5. If I had a challenging investment problem, I would want to use a Robot Advisor again.
Follow Advice	1. I would feel comfortable acting on the portfolio allocation given to me by a Robot Advisor 2. I would not hesitate to open an investment account with a Robot Advisor

	3. I would make a Robot Advisor my primary source of investment advice 4. I would confidently act on the portfolio advice I was given by a Robot Advisor. 5, I would feel secure in using the funds suggested by a Robot Advisor.
Subjective Probability of Depending—Give Information	Based on my recent experience with a Robot Advisor 1. I would be willing to provide information like my name, address, and phone number to a Robot Advisor. 2. I would be willing to provide my NRIC number to a Robot Advisor. 3. I would be willing to share my current investment details with a Robot Advisor.

4.4 Scales for trust behaviours

To be able to observe trust behaviours from trust intention, several conditions need to be met, (Ajzen & Fishbein, 1977, Ajzen, 1991) firstly then intention needs be tightly linked, second the time period between the measurement of intention and measurement of behaviour should be low, third the behaviour should be within the control of the actor (trustor). In our context, the first condition is easily met. The real behaviour is to see if actual investments are made via the robo-advisor, in a practical matter this can take days or weeks even for a motivated buyer. During this long delay the initial trust intentions may change, therefore we use a new specific set of questions were prepared to demonstrate behaviour. These questions are designed to elicit information from the respondent that demonstrates his willingness to be vulnerable to correspond with our underlying trust definition. They are also behaviours that are under the direct control of the trustor, to fulfil the third condition listed above.

Table 6

Construct	Trust Behaviours Questions
Trust Behaviours	1. Would you like a copy of the survey results to be emailed to you?
	2. Are you willing to have a representative from Robo-Advisor contact you to explain their products and services in greater detail?
	3. Would u be willing to receive an occasional newsletter from Robot Advisor?
	4. Are you willing to recommend Robot Advisor to a friend, who may benefit from knowing about it?

4.5 Moderators, Trust in existing financial advisor & Size of bet

It is anticipated that this will be an important moderating influence on the trusting behaviour. In continuation with the previous scales, we use the constructs of benevolence, integrity and ability from McKnight, et al., (2002). We use an overall trust question from Guiso, Sapienza, & Zingales, (2008). This overall trust gives a single item to measure trust as is common in finance research (Table 7). Lastly, one question each is asked about prior experience and costs, these are not part of the original scales. Items in italics have been omitted from the final survey to restrict the survey length to acceptable limits. Size of bet is a pair of direct question on the amount to be invested.

Table 7

Sub-Construct	Trust in existing financial advisor Questions
Use	Do you currently use a financial advisor/ banker/ broker to make portfolio investment decisions
	How much do you trust your bank official or broker as a financial advisor for your investment decisions

Benevolence	1. I believe that my current bank would act in my best interest. *2. If I required help, my current bank would do her best to help me.* 3. My current bank is interested in my well-being, not just her own.
Integrity	1. My current bank is truthful in her dealings with me. *2. I would characterize my current bank as honest.* *3. My current bank would keep her commitments.* 4. My current bank is sincere and genuine.
Ability	1. My current bank is competent and effective in providing investment advice. 2. My current bank performs its role of giving investment advice very well. *3. Overall, my current bank is a capable and proficient Internet financial advice provider.* 4. In general, my current bank is very knowledgeable about investments.
Cost	1. My current financial advisor is fair and reasonable in the fees and charges that I have to pay

5. Data and Methodology

Data was collected using Prolific.co[6] and with the Survey Monkey[7] as the collection tool. The data was subsequently analysed using IBM SPSS Statistics. Prolific.co is an online survey tool comparable to M Turk, but with some advantages like better naivety of the respondents (Palan, & Schitter, 2018; Peer, 2017). It is compliant with SMU IRB and GDPR standards. All the respondents were by based out of the United Kingdom and took on average ten minutes to complete the survey with a completion rate of 93%. A token fee of GBP 2 was paid to every respondent. A total of 203 responses were collected. The sample was selected to have only those who were working either part time or full time. The survey methodology had a brief Robo-Advisor demo included as part of the survey, while control, trustor experience, trust worthiness were asked prior to the demo, other questions like trust intentions and trust behaviours were asked subsequent to the demo. Eight respondents who did not see the Robo-Advisor demo were removed from the final analysis. The following initial transformations were carried out, string variables were converted into numeric by removing the currency symbols that a few respondents had entered. Moderation analysis was carried out using the methodology prescribed in model 1 in the Process 3.5 Macro (Hayes, 2017), while the margins command ins STATA[8] was used to carry out additional analysis of the main effects.

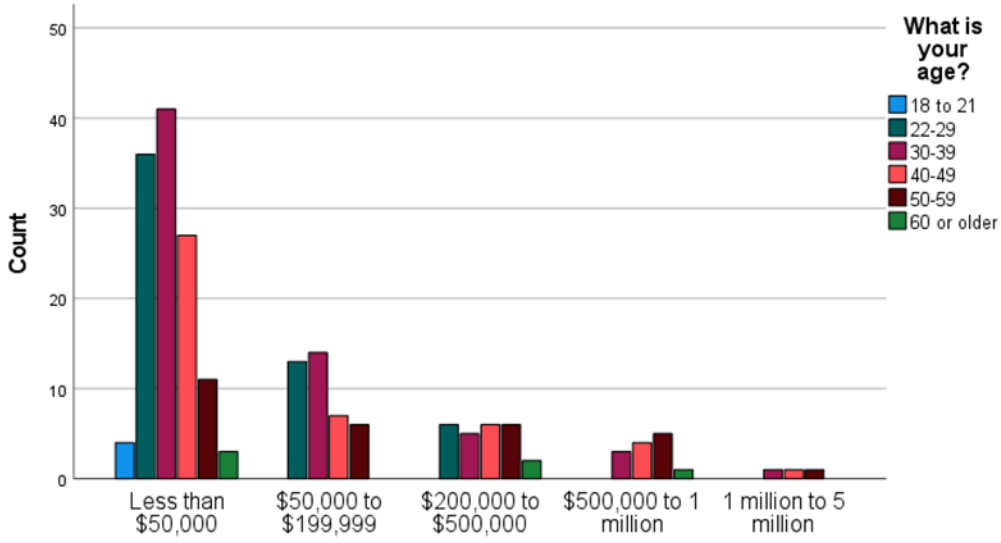
[6] https://www.prolific.co/
[7] https://www.surveymonkey.com
[8] https://www.stata.com/

6. Preliminary analysis, descriptives and correlations

6.1 Control Variables

Standard controls variables of age, gender, annual wealth, total wealth, education levels were asked. The respondents had a median age of between 30 and 39 years, 73% were women, had a median annual income of between GBP 20,000 to 49,000. The median wealth was GBP 50,000 and lastly the median respondent had graduated from college see Figure 3. This data is representative of the United Kingdom and fits well with the target market for Robo-Advisors. The United Kingdom a global fintech centre and hence a good location to conduct the survey.

Figure 3 Household Wealth and Age



6.2 Trust Worthiness of Robo-Advisor

Trust worthiness of the respondent towards the Robo- Advisor was measured prior to the respondents viewing the demonstration of how the Robo-Advisor actually works. Using the previously defined scales, three sub constructs of Ability/competence, Benevolence and Integrity were used. All three sub

constructs display high Cronbach's alpha (α) and were combined into a single construct termed Trust Worthiness that is used for the final analysis,

Figure 4

Trust Worthiness: Descriptive Statistics and Correlations

	n	S.D.	Mean	Items	1	2	3	4
1. Robo Benevolence	203	0.67	2.96	3	(0.7)			
2. Robo Integrity	201	0.63	2.78	4	.68**	(0.77)		
3. Robo Competence	203	0.66	2.58	4	.54**	.62**	(0.89)	
4. Trust Worthiness	201	0.56	2.76	11	.83**	.89**	.86**	(0.89)

** Correlation is significant at the 0.01 level (2-tailed).
Diagonal in brackets represents the α

6.3 Experience of Trustor

Trust propensity was measured via a set four sub-constructs of Benevolence, Integrity, Competence and Trusting Stance, measured on a five-point Likert scale. As seen from Figure 5 the scales show high Cronbach's alpha. All the four sub-constructs were combined to form the main construct of Trustor Trust Propensity towards other humans.

Figure 5

Trust Propensity descriptive Statistics and Correlations

	N	Mean	S. D	1	2	3	4	5
1. Benevolence	203	3.61	0.68	(0.80)				
2.Integrity	202	3.45	0.68	.64**	(0.79)			
3.Competance	202	3.72	0.62	.26**	.32**	(0.80)		
4.Trusting Stance	199	3.76	0.75	.22**	.34**	.16*	(0.82)	
5.Trust Propensity	198	3.63	0.48	.76**	.82**	.60**	.64**	(0.84)

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

3 items per subconstruct 1 to 4

Tech Propensity was measured using two sets of four questions, the first set directly measured propensity and was reversed coded for the analysis so that a higher score showed a higher tech propensity. This scale has a Cronbach's alpha of 0.79. While the second set of questions measured vulnerability towards technology using three items, which had a Cronbach's alpha of 0.64. The two constructs of Trust Propensity and Tech Vulnerability are orthogonal with low corelation between them (r (199) = -.163*, p = .021). The survey also had a single item sub construct for dependence, "technology controls my life more than I control technology", however this was dropped as it substantially reduced poor scale reliability for tech vulnerability.

Figure 6

Tech Propensity & Vulnerability

	N	Mean	S.D.	Items	α
Tech Propensity	202	2.32	0.67	4	0.68
Tech Vulnerability	202	2.32	0.67	3	0.70

Higher scores mean higher positive feelings or lower vulnerability

Risk Avoidance Propensity was measured on a single item scale from 1 to 4 see Figure 7 below, most respondents tend to avoid financial risk Mean= 3.21 s.d. 0.71. It is notable that 88% respondents seek to have no or moderate amounts of risk. Another way to measure attitudes towards risk was to ask respondent to report whether they held any risky assets like stocks, funds or bonds, The average respondent had 12.35% of their wealth invest in risky assets, like stocks and bonds, however 48.8% of the respondents have zero risky investment, therefore for the 51.2% of the population that does invest in risky assets, the average investment is 24.12%. To assist with further analysis, the responses were re-coded into a new variable termed Risky Asset Holding. It was coded

as follows, 0 risky assets =1, 1% to 10% as 2, 11% to 25% as 3; 26% to 50% as 4 and 51% to 100% as 5. See Figure 7.

Figure 7

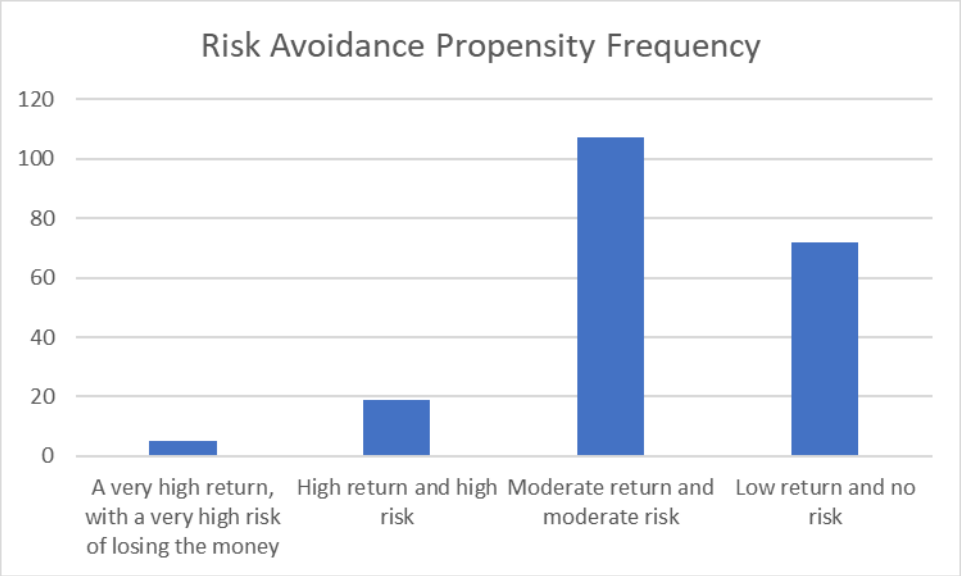


Figure 8

Risk Attitudes: Descriptive Statistics

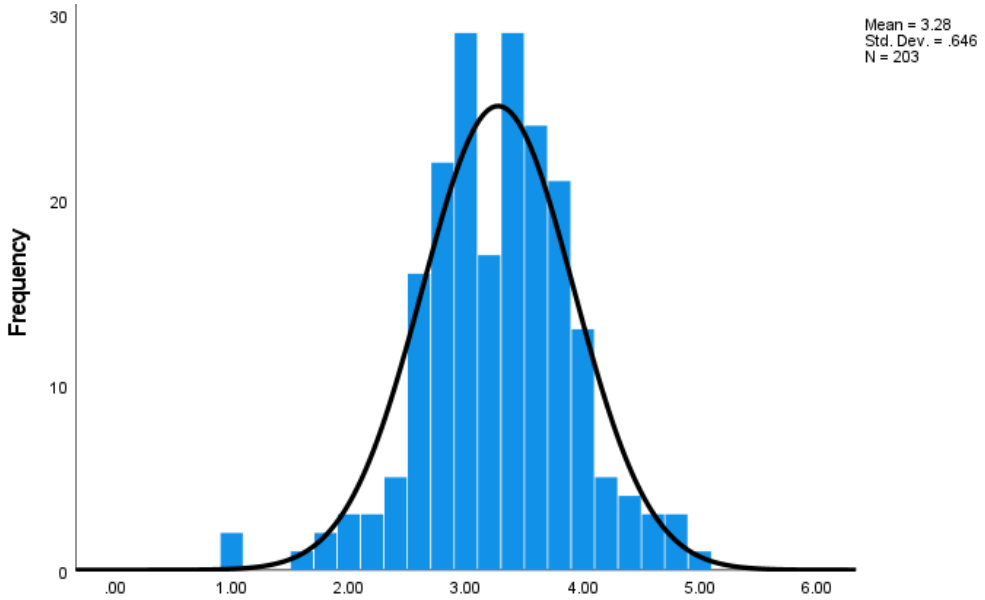
	Mean	S.D.
Risk Avoidance Propensity	3.21	0.71
% Wealth in Risky Assets	12.35	20.81
Risky Asset (Recoded)	2.06	1.28
Risk Experience	1.67	0.91

N=203; Risk Avoidance; higher values mean higher avoidance

A third way of probing attitudes towards risk was by asking for past investing experience, both self-reported proficiency and number of years of risking asset investing experience. A small recode was carried out from a 6-point original scale into a 5-point scale by combing people of more than 5 years of history into one response. These were coded as a new construct of Risk Experience. The scale has an alpha of 0.80. An alternate scale was also considered with the additional item of "do you currently use a financial advisor". However, it led to

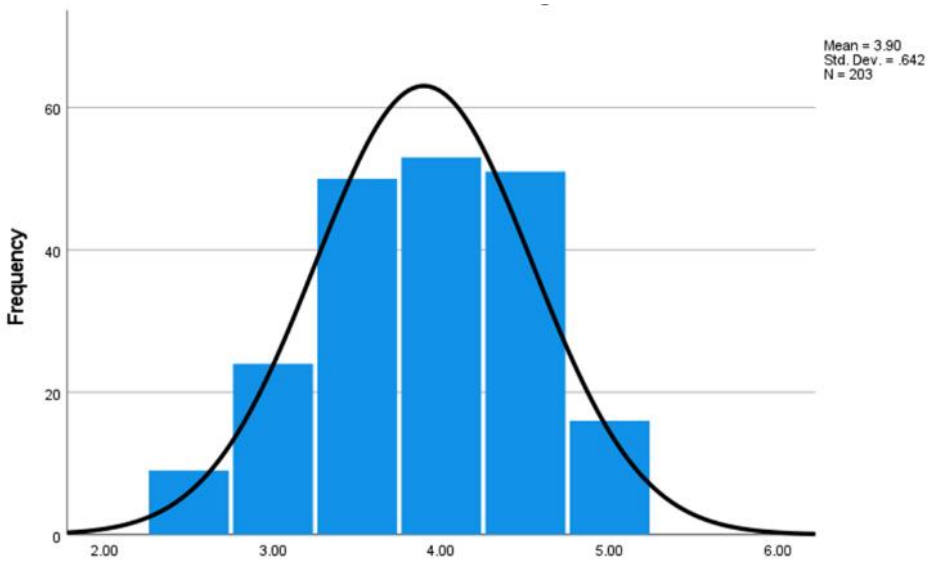
lower reliability, the occurrence of financial advisor at low-income level is quite low and hence it was omitted in Risk Experience. For testing of hypothesis 2b, Risky Asset holding is used in the remainder for thesis.

Figure 9: Financial Literacy



Financial Literacy was tested using five simple questions were asked, one each regarding, simple interest, inflation, bonds, mortgages and stock diversification. The bond question proved to be the hardest with only 12% of the respondents being able to correctly answer. The five financial literacy question were coded as follows, a correct answer was coded as 2 and a wrong answer was coded as 1. These were then combined into a Financial Literacy scale by combing all the five items and rebasing to a five-point scale.

Figure 10: Trust in Banker



Trust in Bank / Banker was tested in the pre-survey trust in bank was measured using a thirteen-item scale, in the final survey a more concise five item scale as used where questions regarding financial advisor were dropped as the pre-test had a low incidence of usage of financial advisors. The construct has an Cronbach's α of 0.81.

6.4 Trust intentions

Figure 11

Trusting Intentions: Descriptive Statistics

	Mean	S.D	1	2	3	4
1. Give Info	2.98	0.90	(0.83)			
2. Willingness to Depend	2.85	0.77	.44**	(0.91)		
3. Follow Advice	2.84	0.78	.59**	.80**	(0.91)	
4.Trust Intentions	2.89	0.70	.74**	.90**	.94**	(0.93)

Valid N=181 for Trust Intentions

Trust intentions were measured after the respondents had seen the demo. A test question to check whether the respondents was asked, the twelve respondents who answered in the negative, were omitted from the analysis. Overall, thirteen questions were asked on trust intentions, a high scale reliability of 0.95 was achieved. Trust intentions were subdivided into three constructs of Willingness to Give Information, Willingness to Depend and Willing to Follow Advice were also created, these sub scales had alpha's of 0.86, 0.91 and 0.93 was measured. For subsequent analysis only Trust Intention was utilized.

6.5 Trust Behaviours & Investment Amounts with Robo (Size of bet)

Respondents were asked about the monthly amount that they would like to invest with the Robo-Advisor, as well as the percentage of future saving that they would like to invest with the Robo-Advisor, 64.5% of the respondents were willing to invest with an average investment of GBP 77 / month. Amount to be invested was recoded into a 5 point scale as follows with the sum invested of (0=1) (1 thru 25=2) (26 thru 50=3) (51 thru 100=4) (101 thru Max=5) into a

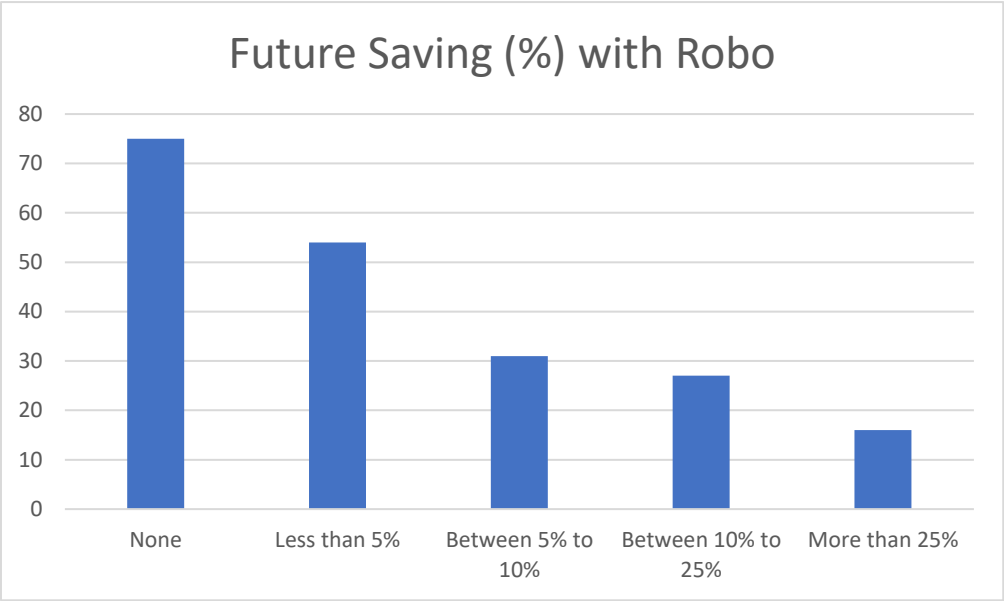


Figure 12

new variable Investment Amount. Expressed as a percentage of future savings an almost identical number of 63 % of the respondents are willing to invest with the Robo-Advisor. Interestingly, 7.9% of the respondents are indicating a willingness to invest a substantial investment of more than 25% with the Robo-Advisor.

One of the hopes for my thesis, was that it be useful to those in the industry, commerce cares about actual behaviour. Several questions were asked that would create actual risk, which is the definition of trust. Asking respondents their willingness to share their email Id, agree to be contacted, refer a friend are all trust behaviours, that could be studied within the constraints of an academic study and various personal data protection laws (PDPA). In business these revelations of personal information are carefully monitored and allow the reclassification of a prospect to a “warm lead” to be pursued further towards a complete conversion.

Trust was investigated using the following five question, amount to be invested via the Robo-Advisor, percentage of wealth to be invested via Robo-Advisor

willingness to receive an occasional newsletter, being contacted by a Robo-Advisor representative, refer the Robo-Advisor to a friend via email. The table below provides the number of people that exhibit positive trust as a percentage.

Figure 13

Trust Behaviours: Descriptive Statistics

	Negative Behaviours	Trusting Behaviours	% Trust
Invest Amount Yes/No	72	131	64.5
Receive Survey*	196	7	3.4
Contacted By Robo	168	35	17.2
Receive Newsletter	158	45	22.2
Refer Friend	139	64	31.5
Share Friends Email	182	20	9.9

*Dropped from Scale

All the binary trust behaviours combined into a construct called Trust Contact, the scale has an alpha of 0.78. The response to whether the respondents would like a copy of the survey was dropped as it had low reliability. The low corelation makes some intuitive sense, the desire to see the results of an academic survey are quite different from the desire to invest with the Robo-Advisor.

Corelation table

	Mean	S.D	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.Trust Propensity	3.63	0.48	--													
2. Tech Propensity	2.32	0.67	-0.13	--												
3. Tech Vulnerability	2.32	0.67	0.02	-.163*	--											
4. Risk Propensity	1.79	0.71	-.274**	-0.03	.177*	--										
5. Risky Asset Investment	2.06	1.28	-.189**	0.04	.149*	.475**	--									
6. Financial Literacy	3.90	0.64	-0.11	-0.09	0.05	.256**	.151*	--								
7.Trust in Bank	3.28	0.65	.347**	-0.12	-0.08	-.142*	-0.03	-0.10	--							
8. Robo Benevolence	3.04	0.67	-0.11	-.194**	.202**	.190**	.304**	0.09	0.02	--						
9. Robo Integrity	3.22	0.63	-0.04	-0.12	.148*	0.07	0.10	.161*	0.06	.676**	--					
10. Robo Competence	3.42	0.66	-0.04	-0.11	0.05	-0.01	0.07	0.07	0.11	.541**	.623**	--				
11. Trust Worthiness	3.22	0.56	-0.08	-.166*	.155*	0.09	.183**	0.12	0.07	.860**	.885**	.838**	--			
12. Trust Intention	2.89	0.70	-0.08	-0.12	.224**	0.12	.154*	0.01	0.08	.590**	.598**	.567**	.676**	--		
13.Investment in Robo	2.20	1.18	-0.11	-0.07	.166*	.318**	.347**	.142*	0.01	.378**	.353**	.317**	.411**	.574**	--	
14.Trust Behaviours	1.81	1.22	-0.02	-0.02	0.13	0.10	.208**	0.08	0.08	.313**	.290**	.229**	.325**	.424**	.436**	--

**. Correlation is significant at the 0.01 level (2-tailed). * at the 0.05 level (2-tailed), N is between 198 and 202 for all items

7. Results, conclusions, and implications

7.1 Trustworthiness of Robo-Advisor and Trust intentions

Table 1

H1 Regression Unstandardized co-eff (B)

DV: Trust Intentions	1	2	3
Age	-0.04	-0.03	-0.03
	(.05)	(0.04)	(0.03)
	[.38]	[.41]	[.41]
Gender	-0.05	-0.02	-0.02
	(.12)	(.09)	(.09)
	[.65]	[.83]	[.85]
Wealth	0.06	0.00	0.00
	(.05)	(.04)	(.04)
	[.25]	[.93]	[.96]
Education	0.06	0.05	0.05
	(.05)	(.03)	(.03)
	[.23]	[.16]	[.17]
Robo Competence (H1A)**		**0.26**	
		(.07)	
		[0.00]	
Robo Benevolence (H1B) **		**.32**	
		(0.08)	
		[0.00]	
Robo Integrity (H1C)*		**0.26**	
		(.09)	
		[.005]	
Trust Worthiness (H1)**			**0.83**
			(0.07)
			[.00]
(Constant)	2.77	0.16	0.15
	(.27)	(0.29)	(.29)
	[.00]	[.58]	[.60]
R^2	.02	.47	.47
F	0.87	31.99	31.99
N	186	186	186
p=	.482	<.001	<.001

Standard errors in parentheses and p-values in square brackets

Table 1 shows the regression model with trust intentions as the dependent variable. Model 1 just has control variables, Model 2 includes three sub-

constructs of trustworthiness, Ability, benevolence, and integrity. The results show that the greater the trustworthiness of the Robo-Advisor, the greater are the trust intentions. I find that all three sub-constructs of trustworthiness positively and significantly predict trust intentions (Ability: B= 0.26, t(186) = 3.45, p < .001; Benevolence: B= 0.32, t(186) = 3.85, p < .001; Integrity ; B= 0.26, t(186) = 2.82, p = .005). Therefore, my hypotheses 1A, 1B, and 1C are supported.

Model 3 reports the statistics by only the main construct of trust worthiness. There was a significant main effect for trustworthiness on trust intentions (B=0.83, F (5, 186) = 31.99, $p < .001$). Trustworthiness also explained a significant proportion of variance in Trust Intentions scores, $R^2 = .46$, p < .001. A one standard deviation increase in trustworthiness of the Robo-Advisor leads to an increase in trust intentions from 2.87 (at mean) to 3.34, representing an approximate 16% increase. Analysing the main effect at the sub-construct level, we find that a one standard deviation increase in Competence, Benevolence and Integrity causes a 6.0%, 7.2% and 5.7% increase respectively.

7.2 Experience of the Trustee

Our theoretical model was based on the premise that the higher the trust propensity of the trustee the higher would be the formation of trust intentions. The results show a non- significant corelation r (187) = -0.07, p = ns, therefore my hypothesis 2a is not supported (B= -0.08, t (187) = -0.75, p < .45). These results, while un-expected are consistent with a recently published meta-analysis (Hancock, 2020) that also states that in human robot interactions the trust propensity does not have a significant with the formation of trust.

Next, we look at our second trustor experience of attitudes towards technology we find that the Tech Propensity is better analysed as two different sub constructs, the first is of positive attitudes towards tech i.e. Tech Propensity and the second is of fear of new technologies or perceived Tech Vulnerability (due to the lower scale reliability of combining these two sub constructs (α=-.389). Interestingly, Trust Propensity and the Technological propensity did to have a significant inverse corelation r (202) =-.163, p=.021. This inverse relationship was also reported by Ratchford & Barnhart, (2012) from where the original reference scales were utilized post modifications. Our results are also consistent with prior studies by (Dimoka, 2010; McKnight & Choudhury, 2006), that trust and the lack of trust are not different ends of a spectrum but rather are two different constructs. This feature makes it similar to the fear of expropriation or cheating when an individual invests in a financial assets (Guiso et. al. 2008).

Tech propensity was not significantly corelated to trust intentions r (190) = -.12, p=ns, although it does have a significant effect on intentions (B=-.18, t(182) = -2.1, p = .03). Technology vulnerability is reverse coded such higher values indicate lower feelings of vulnerability. Our results show that Tech Vulnerability is significantly correlated to both trust intentions r (190) =.22, p=.002 and investments r (190)=.16, p=.01 with the Robo-Advisors. Thus I find that my hypothesis 2b is true (B=.19, t(182) = 2.50, p = .01)

Low financial risk aversion expressed in current investment in risky assets was found to have a significant corelation with trust intentions r (191) =.154, p=.03. Thus I find that my hypothesis 2c is supported (B=.10, t(182) = 2.35, p = .02) Risky asset holding was also found to have a significant corelation with amount

invested with the Robo-Advisor r (202) =.38, p <0.001 as well as with trust behaviours, r (202) =.21, p< .001.

Table 2

H2 Regression co-eff (B)

DV: Trust Intentions	1	2
Age	-0.04	-0.01
	(.05)	(0.05)
	[.38]	[.75]
Gender	-0.05	-0.16
	(.12)	(.12)
	[.65]	[.18]
Wealth	0.06	0.02
	(.05)	(.06)
	[.25]	[.77]
Education	0.06	0.04
	(.05)	(.04)
	[.23]	[.44]
Trust Propensity (H2A)		**-0.08**
		(.11)
		[0.46]
Tech Propensity (H2B)*		**-0.18**
		(0.08)
		[0.03]
Tech Vulnerability (H2B)**		**0.19**
		(.08)
		[.01]
Risk Asset Ownership (H2C)*		**0.10**
		(.04)
		[0.02]
(Constant)	2.77	3.05
	(.27)	(.57)
	[.00]	[.00]
R^2	.02	.11
F	0.87	2.76
N	186	182
p=	.482	.007

Standard errors in parentheses and p-values in square brackets

Overall hypothesis two is described in model 2 in Table 2. There was a significant main effect for trustor experience, F (8, 182) = 2.76, *p = .007*. Overall experience explained a significant variance in Trust Intentions

scores, R^2 = .11, p = .007. A one standard deviation improvement in Tech Vulnerability of the trustor leads to an increase in trust intentions from 2.89 (at mean) to 3.02, representing an approximate 4.4% increase. A one standard deviation increase in the Risky Asset holdings of the trustor leads to an increase in trust intentions from 2.89 (at mean) to 3.02, representing an approximate 4.4% increase.

7.3 Trust Intentions and Trust Behaviours

Trust intentions has a significant corelation with trust behaviours r (190) = .42, p<.001 and with the amount to be invested r (190) =.57, p<.001. Overall regression model is described in model 2 in Table 3. I find that trust intentions significantly and positively predict trust behaviours (B=.76, t(187) = 6.41, p <.001), therefore my hypothesis 3 is substantiated. There was a significant main effect for trust intentions predicting trust behaviours F(5, 182) = 10.54, *p < .001*. Overall explained a significant variance in Trust behaviours scores, R^2 = .23. A one standard deviation increase in trust intentions increase trust behaviours from 1.84 (at mean) to 2.37, representing an approximate 29% increase.

Table 3

H3 Regression co-eff (B)

DV: Trust Behaviours	1	2
Age	-0.05	-0.02
	(.08)	(0.08)
	[.51]	[.78]
Gender	-0.14	-0.10

	(.20)	(.18)
	[.50]	[.57]
Wealth	0.27	.23
	(.10)	(.09)
	[.00]	[.01]
Education	-0.05	-0.10
	(.08)	(.07)
	[.5]	[.17]
Trust Intentions (H3) **		**-0.76**
		(.12)
		[0.00]
(Constant)	1.92	-.20
	(.47)	(.53)
	[.00]	[.71]
R^2	.05	.23
F	2.18	10.54
N	187	187
p=	.07	<.001

Standard errors in parentheses and p-values in square brackets

7.4) Moderators, investment amount and trust in bank

Investment amount (size of bet) was measured using the monthly investment amount that the respondents indicated that they intend to invest with the Robo-Advisor. Investment amount had a significant positive corelation with Trust Intentions r (190) = .574, p<.001; and trust behaviours r (201) =.44, p<.001. Our linear regression model predicts Trust Behaviours using Trust Intentions and Investment amount as independent variables showed significant main effects (see figure 14), with F(6, 187) = 10.56, $p < .001$. the model also explained a significant proportion of variance in Trust behaviours scores, $R^2 = .51$. A one standard deviation increase in Investment amount creates an increase of trust behaviours to 2.12 from a mean of 1.83 or a 16% increase. However, the Investment amount does not moderate the effect of trust intentions on trust behaviours (B=.00, t(188) = .11, p =1), therefore my hypothesis M1 is not

substantiated. The change in R^2 is .00, please see appendix D for Process Macro output and Appendix E for the visual plot of the interaction.

Figure 14

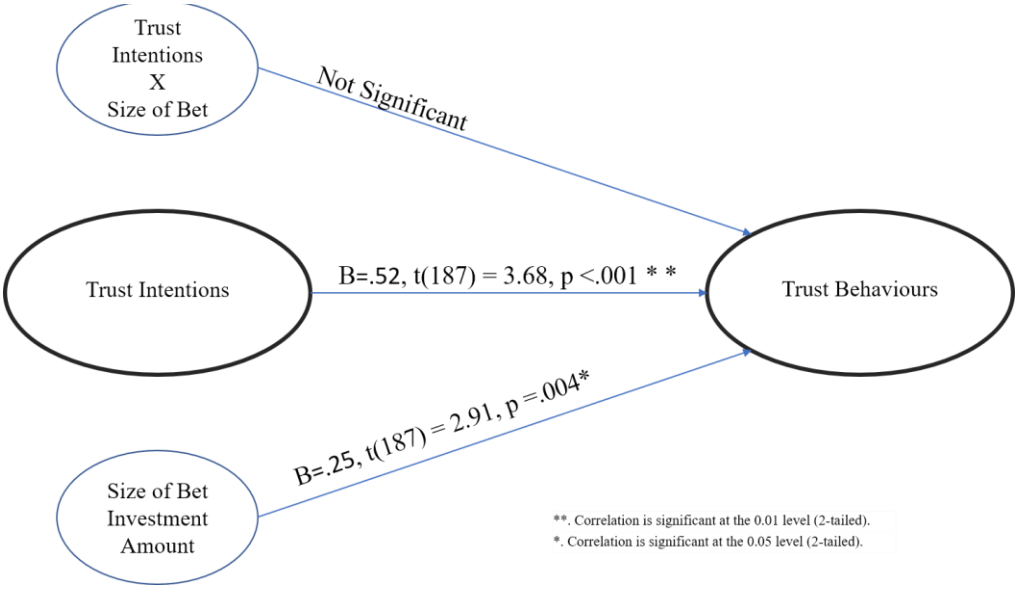


Table 4

M1 Interaction of Trust Intentions with Size of Bet

DV=Trust Behaviours	1	2	3
Age	-0.05	-0.01	-0.01
	(.08)	(.07)	(.08)
	[.51]	[.91]	[.91]
Gender	-0.14	-0.13	-.13
	(.02)	(.18)	(.18)
	[.5]	[.45]	[.46]
Wealth	0.27	0.17	.17

	(.10)	(.09)	(.09)
	[0.00]	[.05]	[.05]
Education	-0.05	-0.09	-0.09
	(.08)	(.07)	(.07)
	[.50]	[.23]	[.23]
Trust Intentions		**.52**	**.52**
		(.14)	**(.26)**
		[.00]	**[.05]**
Size of Bet		**.25**	**.24**
		(0.08)	**(.36)**
		[.00]	**[.50]**
Trust Intentions X Size of Bet (M1)			**0.00**
			(.11)
			[1.00]
(Constant)	1.93	0.00	0.00
	(.46)	(.07)	(.83)
	[.00]	[.91]	[1.00]
R^2	.05	.26	.26
F	2.18	10.55	9.00
p=	.07	<.001	.00

Standard errors in parentheses and p-values in square brackets, N=188

Our second moderator was Trust in bank, as before we studied the effect of bother intentions and trust in bank on trust behaviours, Model 2 in Table 5 below. Surprisingly Trust in bank did not have any significant main effects on trust behaviour or moderation effects Model 3 (B=-.03, t(188) = -.17, p =.86). Thus, my hypothesis M2 is not substantiated.

Table 5: M2 Interaction of Trust Intentions with Trust in Bank

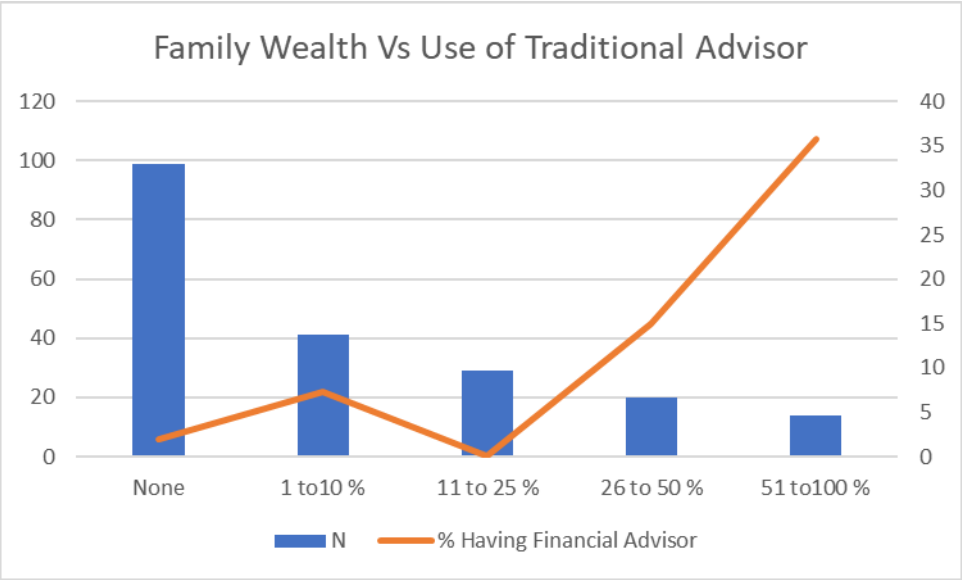
DV=Trust Behaviours	1	2	3
Age	-0.05	-0.21	-0.02
	(.08)	(.08)	(.08)
	[.51]	[.78]	[.76]
Gender	-0.14	-0.088	-0.08
	(.02)	(.18)	(.19)
	[.5]	[.64]	[.67]
Wealth	0.27	.23	.22

	(.10)	(.09)	(.08)
	[0.00]	[.01]	[.01]
Education	-0.05	-.10	-.10
	(.08)	(.12)	(.07)
	[.50]	[.17]	[.17]
Trust Intentions		.76	.87
		(.19)	(.52)
		[.000]	[.75]
Trust in Bank		.08	.16
		(.13)	(.52)
		[.55]	[.75]
Trust Intentions X Trust in Bank (M2)			-.03
			(.18)
			[.86]
(Constant)	1.93	-0.456	-.76
	(.46)	(.69)	(1.88)
	[.00]	[.51]	[.69]
R2	.05	.22	.22
F	2.18	10.97	7.5
p=	.07	<.001	<.001

Standard errors in parentheses and p-values in square brackets, N=188

It is a bit counter intuitive that trust in bank did not show any significant correlation with any constructs, except with Trust Propensity r (198) = .38, p<.001. If the growth of fintech was out of global financial crisis and from a lowered level of trust in the banking sector, then different results were expected. Two potential explanations are offered, the first is that our sample population does not have access to financial service. Our results showed that 64.5% percent of the respondents were willing to start a relationship with a Robo-Advisor, in the sample only 12% percent had access to a financial advisor. Use of financial advice has hitherto been restricted to the wealthy, our data Figure 15 confirms the same. If access to investment is the key then, attitudes towards banker may be less relevant.

Figure 15



The second potential explanation of the lack of correlation between trust in current bank and trust intentions or behaviours could be that the change of the referent of trust from another human actor changes to a non-human actor changes the beliefs of the trustor and therefore leads to different intentions and behaviours. A substantially similar scale, with identical sub constructs of ability, benevolence and integrity was used to test trust propensity towards other people and then trust worthiness of a non-human actor r (202)= -.08, p=ns. See appendix E for the corelation matrix between the subconstructs.

7.4 Wealth Effects and the use of financial advice

Lastly as an additional analysis we look at the usage of Robo-Advisor from another perspective. Family wealth has a significant correlation with investment in risky assets, financial literacy, and experience in risky assets. It seems that once you are in the club of the wealthy a lot of good things happen, access to

financial advice and ability to invest better. For most of our respondents, just being able to invest seems to dominate their decision making without consideration to their current view on their banker. Use of Robo-Advisor is un-corelated to wealth or financial literacy, therefore provide a pathway to commence their investment journey. Use of the Robo-Advisor is still linked to prior experience of investing in risky assets, however the effect is far smaller. This provides hope for the future that the Robo-Advisors may be a useful initiation to the world of financial investments for a majority of the world's population that is currently outside of the club of the wealthy. This initial step is likely to be small 77 GBP/ month but is hoped that it launches an entire generation to the club of the wealthy.

Figure 16

Correlation: Wealth & Use of Robo-advisor

	1	2	3	4	5
1. Wealth	--				
2. Risky Asset Holding	.231**	--			
3. Risk Experience	.403**	.592**	--		
4. Financial Literacy	.309**	.151*	.368**	--	
5. Invest amount Robo	0.119	.218**	.222**	0.133	--

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

7.4 Application and Further Studies

The work done is the thesis can be applied by robo-advisors in order to improve their product design. In particular, by focusing on the reduction of the feelings of tech vulnerability and by tying to increase the perception of benevolence and integrity of their product offers. Financial regulator will find it useful to

continue with their efforts to regulate FinTech's, as the users have lower financial literacy and risk experience.

The work done is this study can be improved by using experiments for testing the theoretical model. With a slightly modified set up this would potentially assist in understanding consumer preference between human and non-actors. It could also permit testing of different features of the Robo-Advisors to test factors that present an increased or enhanced transmission from trust intentions to trust behaviours. Another factors that could be tested in greater detail is the impact of the Robo-Advisor being provided by a new fintech vs via the respondents exiting bank. There is rapid increase in digital banks. Robo-Advisors Are proliferating both in Singapore and globally, each striving to outdo its competitors with better design and better marketing. Our study was limited that only showed a standard Robo-Advisor design. By changing the design of the Robo-Advisor insights on design for maximum transmission from Trust Worthiness to intention and then to behaviours can be obtained.

Lastly, perceived tech vulnerability emerged as an important inhibitor in the formation of trust intentions, how can this be addressed. What would successful interventions look like? It would be useful to know whether branding, licences, certification, or simply situational normality would be most effective.

7.5 Conclusions and implications

This thesis was an attempt to understand the role of trust in advice acceptance from non-human actors, we found that trust is a critical ingredient in the acceptance of advice from Non Human Actors. Both trustor experience and perceived trustworthiness of the non-human actor leading the formation of trust

intentions. Effect sizes for trustworthiness are larger than that for experience. Within experience, Tech vulnerability and risk propensity are significant. Surprisingly trust propensity and trustworthiness have no significant relationship, even at the sub-construct level of ability, competence and integrity and using the same scales. Another, surprising result that the use of the non-human actor is not moderated by our trust in the existing human banker. It would be interesting to research whether these results are context specific or are generalizable to other fields where non-human actors are replacing or enhancing human advisors.

Trust intentions do significantly translate into behaviours, but there is a drop off. For every respondent who was willing to invest with the Robo-Advisor, only a quarter were willing to be contacted by the Rob-advisor. The most encouraging aspect of the study is that there is a healthy potential for acceptance of robo-advice, and this can allow a wider section of the population to access financial advice, even when they lack wealth, previous investing experience or financial proficiency. If the initial trust in non-human advisors is formed, it creates conditions for allowing a larger world population to be served at a low cost.

In conclusion, as we approach the era where the dispensation of advice by non-human actor becomes ubiquitous, trust will play a central role in the acceptance of their advice.

References

Abraham, Facundo and Schmukler, Sergio and Tessada, Jose, (2019). Robo-Advisors: Investing Through Machines. *World Bank Research and Policy Briefs No. 134881.* Available at SSRN: https://ssrn.com/abstract=3360125

Adam, Martin; Toutaoui, Jonas; Pfeuffer, Nicolas; and Hinz, Oliver, (2019). Investment decisions with robo-advisors: The role of anthropomorphism and personalized anchors in recommendations. *In Proceedings of the 27th European Conference on Information Systems (ECIS), Stockholm & Uppsala, Sweden, June 8-14,* 2019.

Agrawal, A., & Chen, M. A. (2008). Do analyst conflicts matter? Evidence from stock recommendations. *The journal of Law and Economics, 51*(3), 503-537.

Agarwal, Sumit, and Bashkar Mazumder, 2013, Cognitive abilities and household financial decision making, *American Economic Journal: Applied Economics*

Aristotle, (circa 4 BC), Rhetoric

Ajzen, I. (1991). The theory of planned behaviour. *Organizational behaviour and human decision processes, 50*(2), 179-211.

Barber, B. M., and Odean, T. (2000) Trading is Hazardous to Your Wealth: The Common Stock Investment Performance of Individual Investors, *Journal of Finance 55,* 773–806.

Barber, B. M., and T. Odean. 2008. All that glitters: The effect of attention and news on the buying behaviour of individual and institutional investors. *Review of Financial Studies 21:*785–818.

Barnett White, T. (2005). Consumer Trust and Advice Acceptance: The Moderating Roles of Benevolence, Expertise, and Negative Emotions. *Journal of Consumer Psychology, 15(2),* 141–148. https://doi.org/10.1207/s15327663jcp1502_6

Baumgartner, T., Heinrichs, M., Vonlanthen, A., Fischbacher, U., & Fehr, E. (2008). Oxytocin shapes the neural circuitry of trust and trust adaptation in humans. *Neuron, 58*(4), 639-650.

Barberis, Nicholas, Ming Huang, and Richard H. Thaler, 2006, Individual, monetary gambles, and stock market participation: A case for narrow framing. *American Economic Review 96,* 1069–1090.

Bartlett, M. L., & McCarley, J. S. 2019 Human interaction with automated aids: Implications for robo-advisors. *Financial Planning Review*.

Behrman, Jere R., Olivia S. Mitchell, Cindy K. Soo, and David Bravo. (2012). How financial literacy affects household wealth accumulation. *American Economic Review, 102*(3): 300-304.

Bergstresser, D., Chalmers, J., Tufano, P., (2009). Assessing the costs and benefits of brokers in the mutual fund industry. *Review of Finance Studies 22,* 4129 4156. doi:10.1093/rfs/hhp022

Bigley, G. A., & Pearce, J. L. (1998). Straining for shared meaning in organizational science: Problems of trust and distrust. *Academy of Management Review, 23,* 405–421.

Broadbent, E., Kuo, I. H., Lee, Y. I., Rabindran, J., Kerse, N., Stafford, R., & MacDonald, B. A. (2010). Attitudes and Reactions to a Healthcare Robot. *Telemedicine and E-Health, 16(5*), 608–613. https://doi.org/10.1089/tmj.2009.0171

Bhattacharya, U., Hackethal, A., Kaesler, S., Loos, B., & Meyer, S. (2012). Is unbiased financial advice to retail investors sufficient? Answers from a large field study. *The Review of Financial Studies, 25*(4), 975-1032.

Berg, J., Dickhaut, J., & McCabe, K. (1995). Trust, reciprocity, and social history. *Games and economic behaviour, 10*(1), 122-142.

Bridging the Trust Divide (2007): The Financial Advisor-Client Relationship *https://knowledge.wharton.upenn.edu/special-report/bridging-the-trust-divide-the-financial-advisor-client-relationship-2/*

Camerer, C., Loewenstein, G., & Prelec, D. (2005). Neuroeconomics: How neuroscience can inform economics. *Journal of economic Literature, 43*(1), 9-64.

Carlson, M., Desai, M., Drury, J. L., Kwak, H., & Yanco, H. (2013). Identifying Factors that Influence Trust in Automated Cars and Medical Diagnosis Systems. *Association for the Advancement of Artificial Intelligence.*

Chishti, S., & Barberis, J. (2016). The fintech book. *The financial technology handbook for investors, entrepreneurs and visionaries.* Retrieved from https://ebookcentral-proquest-com.libproxy.smu.edu.sg

Colquitt, S. (2007). Trust, Trustworthiness, and Trust Propensity: A Meta-Analytic Test of Their Unique Relationships With Risk Taking and Job Performance. *Journal of Applied Psychology*, *92*(4), 909–927. https://doi.org/10.1037/0021-9010.92.4.909

D'Acunto, F., Prabhala, N., & Rossi, A. (2019). The Promises and Pitfalls of Robo-Advising. *The Review of Financial Studies*, *32*(5), 1983–2020. https://doi.org/10.1093/rfs/hhz014

Davis, F. D., (1986). A technology acceptance model for empirically testing new end user information systems: Theory and results. *Cambridge, MA: Massachusetts Institute of Technology.*

Dimoka, A. (2010). What does the brain tell us about trust and distrust? Evidence from a functional neuroimaging study. *MIS Quarterly*, 373-396.

Dignum, V. (2017). Responsible autonomy. arXiv preprint arXiv:1706.02513.

Dulleck, U., & Kerschbamer, R. (2006). On doctors, mechanics, and computer specialists: The economics of credence goods. *Journal of Economic literature, 44*(1), 5-42.

Eckel, C. C., & Wilson, R. K. (2004). Is trust a risky decision? *Journal of Economic Behaviour & Organization, 55*(4), 447-465.

Faloon, M., & Scherer, B. (2018). Practical Applications of Individualization of Robo-Advice. *Practical Applications, 5*(4), 1–4. https://doi.org/10.3905/pa.5.4.262

Fairley, K., Sanfey, A., Vyrastekova, J., & Weitzel, U. (2016). Trust and risk revisited. *Journal of Economic Psychology, 57,* 74-85.

Foerster, S., Linnainmaa, J. T., Melzer, B. T., & Previtero, A. (2017). Retail financial advice: does one size fit all? *The Journal of Finance, 72*(4), 1441-1482.

Fishbein, M., & Ajzen, I. (1977). Belief, attitude, intention, and behaviour: An introduction to theory and research. *Contemporary Sociology (Washington), 6*(2), 244–245. https://doi.org/10.2307/2065853

Fecht, F., Hackethal, A., & Karabulut, Y. (2018). Is Proprietary Trading Detrimental to Retail Investors? *Journal of Finance, 73*(3), 1323–1361. https://doi.org/10.1111/jofi.12609

Frey, C. B., & Osborne, M. A. (2013). The future of employment: how susceptible are jobs to computerisation? *University of Oxford.* Online verfügbar unter https://www. oxfordmartin. ox. ac. uk/downloads/academic/The_Future_of_Employment. pdf, zuletzt geprüft am, 15, 2017.

Gambetta, D. (2000). Can we trust trust. Trust: Making and breaking cooperative relations, 13, 213-237.

Gino, F. (2008). Do we listen to advice just because we paid for it? The impact of advice cost on its use. *Organizational behaviour and human decision processes, 107(*2), 234-245.

Grewal, R., & Sambamurthy, V. (2015). Shaping Up for E-commerce: Institutional Enablers of the Organizational Assimilation of Web Technologies. *MIS Quarterly, 26*(2), 65–89. https://doi.org/10.2307/4132321

Goldstein, I., Jiang, W., & Karolyi, G. (2019). To FinTech and Beyond. *The Review of Financial Studies, 32*(5), 1647–1661. https://doi.org/10.1093/rfs/hhz025

Gaudecker, H.-M.V. (2015), How Does Household Portfolio Diversification Vary with Financial Literacy and Financial Advice? *The Journal of Finance,* 489-507

Gennaioli, N., Shleifer, A., & Vishny, R. (2014). Finance and the Preservation of Wealth. *The Quarterly Journal of Economics*, *129*(3), 1221-1254.

Gennaioli, N., Shleifer, A., & Vishny, R. (2015). Money doctors. *Journal of Finance, 70*(1), 91–114. https://doi.org/10.1111/jofi.12188

Gefen, Karahanna, & Straub. (2003). Trust and TAM in Online Shopping: An Integrated Model. MIS Quarterly, 27*(1), 51. https://doi.org/10.2307/30036519*

Guiso, L., Sapienza, P., & Zingales, L. (2004). The role of social capital in financial development. *American economic review*, *94*(3), 526-556.

Guiso, L., Sapienza, P., & Zingales, L. (2006) Does culture affect economic outcomes? *The Journal of Economic Perspectives 20,* 23–48

Guiso, L., Sapienza, P., & Zingales, L. (2008). Trusting the stock market. *the Journal of Finance*, *63*(6), 2557-2600.

Guiso, L., & Jappelli, T. (2005). Information acquisition, overconfidence and portfolio performance. *London, UK: CEPR Discussion Paper, 5901*.

Houser, D., Schunk, D., & Winter, J. (2010). Distinguishing trust from risk: An anatomy of the investment game. *Journal of economic behaviour & organization, 74*(1-2), 72-81.

Hengstler, M., Enkel, E., & Duelli, S. (2016). Technological Forecasting & Social Change Applied artificial intelligence and trust — The case of autonomous vehicles and medical assistance devices. *Technological Forecasting & Social Change, 105,* 105–120. https://doi.org/10.1016/j.techfore.2015.12.014

Hackethal, A., Haliassos, M., & Jappelli, T. (2012). Financial advisors : A case of babysitters ? *Journal of Banking and Finance*, *36*(2), 509–524. https://doi.org/10.1016/j.jbankfin.2011.08.008

Hancock PA, Kessler TT, Kaplan AD, Brill JC, Szalma JL. (2020) Evolving Trust in Robots: Specification Through Sequential and Comparative Meta-Analyses. *Human Factors. June 2020*. doi:10.1177/0018720820922080

Hardin R (2002). Trust and Trustworthiness, New York, NY: *Russell Sage Foundation*

Hartzmark, S. M. 2014. The worst, the best, ignoring all the rest: The rank effect and trading behaviour. *Review of Financial Studies 28:*1024–59.

Hayes, A. F. (2017). Introduction to mediation, moderation, and conditional process analysis: *A regression-based approach. Guilford publications.*

Holt, C., Laury, S., (2002). Risk aversion and incentive effects in lottery choices. *American Economic Review 92,* 1644–1655.

Hoechle, D., Ruenzi, S., Schaub, N., & Schmid, M. (2017). The impact of financial advice on trade performance and behavioural biases. *Review of Finance, 21*(2), 871-910.

Hung, Angela A., and Joanne K. Yoong, 2010, Asking for help: Survey and experimental evidence on financial advice and behaviour change, *Working paper 714, RAND Labor and Population.*

Johnson, N. D., & Mislin, A. A. (2011). Trust games: A meta-analysis. *Journal of Economic Psychology*, *32*(5), 865-889.

Jung, D., V. Dorner, F. Glaser and S. Morana (2018). "Robo-Advisory." *Business & Information Systems Engineering 60*(1), 81-86.

Kahn, B. E., & Baron, J. (1995). An exploratory study of choice rules favoured for high-stakes decisions. *Journal of Consumer Psychology, 4,* 305-328

Kim, D. J., Ferrin, D. L., & Rao, H. R. (2009). Trust and satisfaction, two stepping stones for successful e-commerce relationships: A longitudinal exploration. *Information systems research*, *20*(2), 237-257.

Kramer, R. M. (1999). Trust and distrust in organizations: Emerging perspectives, enduring questions. *Annual Review of Psychology, 50*, 569–598

Lankton, N. K., McKnight, D. H., Wright, R. T., & Thatcher, J. B. (2016). Research Note—using Expectation Disconfirmation Theory and Polynomial Modelling to understand trust in technology. *Information Systems Research, 27*(1), 197-213.

Lachance, M., & Tang, N. (2012). Financial advice and trust. *Financial Services Review, 21*(3), 209-226.

McKnight, D. H., Choudhury, V., & Kacmar, C. (2002). Developing and Validating Trust Measures for E-Commerce. *Information Systems Research, 13*(3), 334–359. https://doi.org/10.1287/isre.13.3.334.81

McKnight, D. H., & Choudhury, V. (2006). Distrust and trust in B2C e-commerce: Do they differ? *In Proceedings of the 8th international conference on Electronic commerce: The new e-commerce: innovations for conquering current barriers, obstacles and limitations to conducting successful business on the internet (pp. 482-491). ACM.*

McLeod, Carolyn, "Trust", *The Stanford Encyclopedia of Philosophy* (Fall 2015 Edition).

Mayer, R., Davis, J., & Schoorman, F. (1995). An Integrative Model of Organizational Trust. *The Academy of Management Review*, *20*(3), 709-734.

Moon, Y. (2000). Intimate exchanges: Using computers to elicit self-disclosure from consumers. *Journal of consumer research*, *26*(4), 323-339.

Maccheroni, Fabio, Massimo Marinacci, and Aldo Rustichini, 2005, Ambiguity aversion, malevolent nature and the variational representation of preferences, *Working paper, Universit`a Bocconi*

McCabe, K., Houser, D., Ryan, L., Smith, V., Trouard, T., 2001. A functional imaging study of cooperation in two-person reciprocal exchange. *Proceedings of the National Academy of Sciences of the United States of America 98,* 11832–11835

Mayer, R. C., & Davis, J. H. (1999). The effect of the performance appraisal system on trust for management: A field quasi-experiment. *Journal of Applied Psychology, 84*(1), 123–136. https://doi-org.libproxy.smu.edu.sg/10.1037/0021-9010.84.1.123

McAllister, D. J. (1995). Affect- and cognition-based trust as foundations for interpersonal cooperation in organizations. *Academy of Management Journal, 38*(1), 24-59. doi:10.2307/256727

McKnight, D. H., Choudhury, V., & Kacmar, C. (2002). Developing and Validating Trust Measures for E-Commerce. *Information Systems Research, 13*(3), 334–359. https://doi.org/10.1287/isre.13.3.334.81

Mori, M., MacDorman, K. F., & Kageki, N. (2012). The uncanny valley [from the field]. *IEEE Robotics & Automation Magazine, 19*(2), 98-100.

Mou, J., & Jason, D. S. (2017). Trust and risk in consumer acceptance of e-services. *Electronic Commerce Research, 17*(2), 255–288. https://doi.org/10.1007/s10660-015-9205-4

Mullainathan, Sendhil, Markus Noeth, and Antoinette Schoar, (2012), The market for financial advice: *An audit study, NBER Working paper 17929.*

Nass, C., Y. Moon and P. Carney (1999). Are People Polite to Computers? Responses to Computer-Based Interviewing Systems 1. *Journal of Applied Social Psychology 29*(5), 1093- 1109

Palan, S., & Schitter, C. (2018). Prolific.ac—A subject pool for online experiments. *Journal of Behavioral and Experimental Finance, 17,* 22–27. https://doi.org/10.1016/j.jbef.2017.12.004

Peer, E., Brandimarte, L., Samat, S., & Acquisti, A. (2017). Beyond the Turk: Alternative platforms for crowdsourcing behavioral research. *Journal of Experimental Social Psychology, 70*, 153-163.

Phoon, K., & Koh, F. (2018). Robo-advisors and wealth management. *Journal of Alternative Investments, 20*(3), 79–94. https://doi.org/10.3905/jai.2018.20.3.079

Ratchford, M., & Barnhart, M. (2012). Development and validation of the technology adoption propensity (TAP) index. *Journal of Business Research, 65*(8), 1209–1215. https://doi.org/10.1016/j.jbusres.2011.07.001

Rosenthal-von der Pütten, A. M., Krämer, N. C., Maderwald, S., Brand, M., & Grabenhorst, F. (2019). Neural Mechanisms for Accepting and Rejecting Artificial Social Partners in the Uncanny Valley. *The Journal of Neuroscience,* 2956–18. https://doi.org/10.1523/JNEUROSCI.2956-18.2019

Rousseau, D. M., Sitkin, S. B., Burt, R. S., & Camerer, C. (1998). Not so Different After All: A Cross-Discipline View of Trust. *Academy of Management Review, 23*(3), 393–404. https://doi-org.libproxy.smu.edu.sg/10.5465/AMR.1998.926617

Russell, S. J., & Norvig, P. (2003). Artificial intelligence: A modern approach. *Harlow: Pearson.*

Rustichini, A., Dickhaut, J., Ghirardato, P., Smith, K., & Pardo, J. V. (2002). A brain imaging study of procedural choice. *Games Econ. Behav*.

SEC.gov (2015) Automatic Listing tools. *https://www.sec.gov/oiea/investor-alerts-bulletins/autolistingtoolshtm.html*

Shelly, M (1818). Frankenstein

Sironi, P. (2016). FinTech Innovation: From Robo-Advisors to Goal Based Investing and Gamification: *John Wiley & Sons*

State Street Global Advisors (2007) Bridging the Trust Divide. *https://knowledge.wharton.upenn.edu/special-report/bridging-the-trust-divide-the-financial-advisor-client-relationship-2/*

Stevenson, B., & Wolfers, J. (2011). Trust in public institutions over the business cycle. *American Economic Review,* 101(3), 281-87

Stone, P., Brooks, R., Brynjolfsson, E., Calo, R., Etzioni, O., Hager, G., ... & Leyton-Brown, K. (2016). Artificial intelligence and life in 2030. One Hundred Year Study on Artificial Intelligence: *Report of the 2015-2016 Study Panel, 52. Stanford University, Stanford, CA, http://ai100. stanford. edu/2016-report. Accessed: September, 6, 2016.*

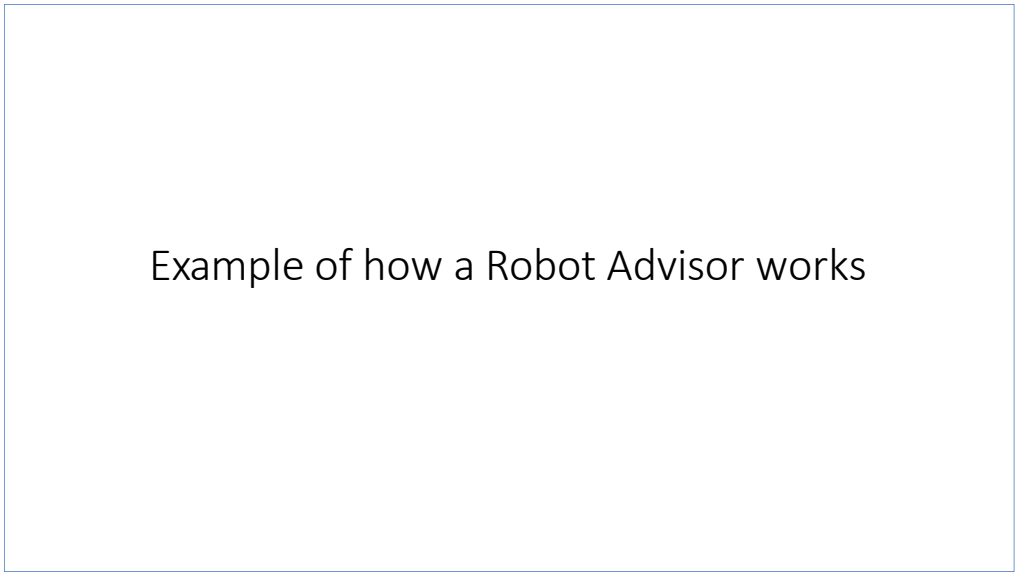
Stolper, O., & Walter, A. (2018). Birds of a feather: The impact of homophily on the propensity to follow financial advice. *The Review of Financial Studies, 32*(2), 524-563.

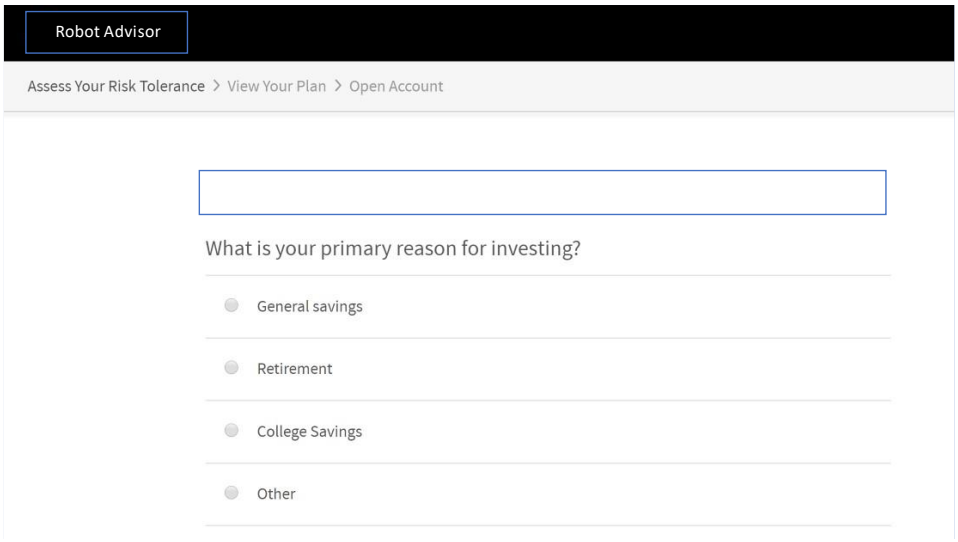
Shefrin, H., and M. Statman. (1985). The disposition to sell winners too early and ride losers too long. *Journal of Finance 40:*777–90.

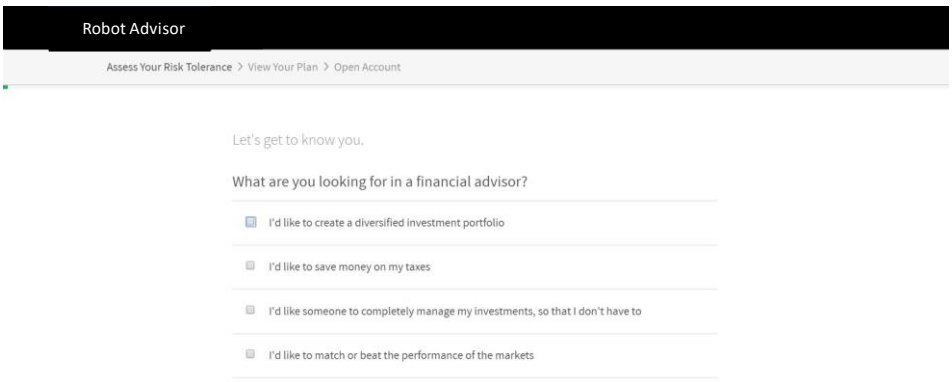
Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management science, 46*(2), 186-204.

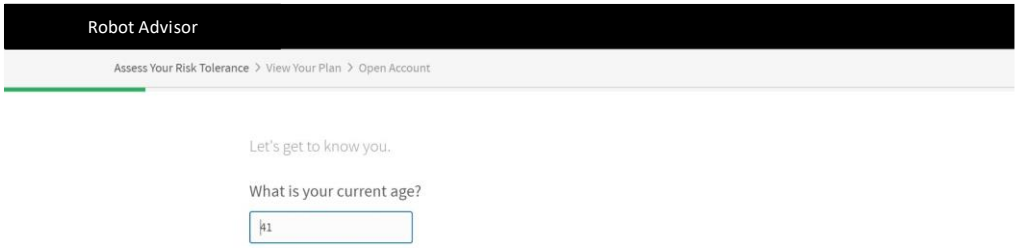
Zak, P. J. (2017). The neuroscience of trust. *Harvard Business Review, 95*(1), 84-90.

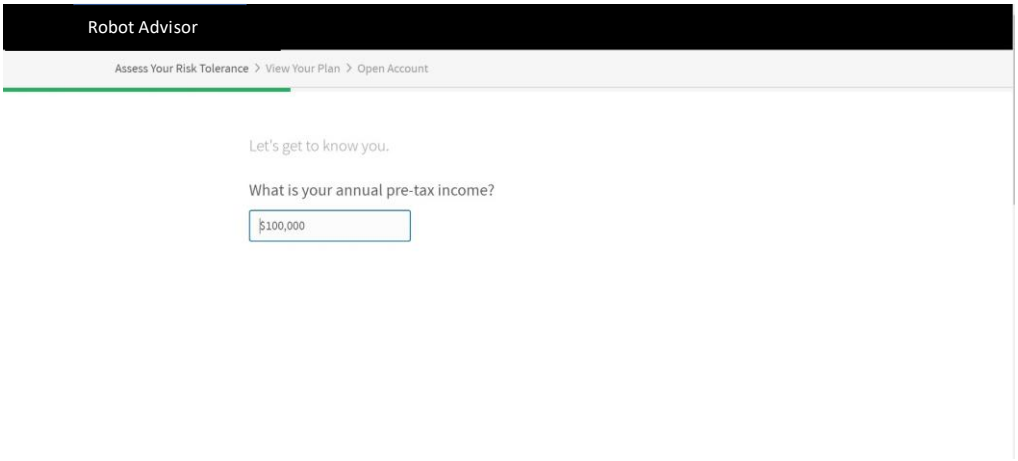
Appendix A: Robo-Advisor Demo

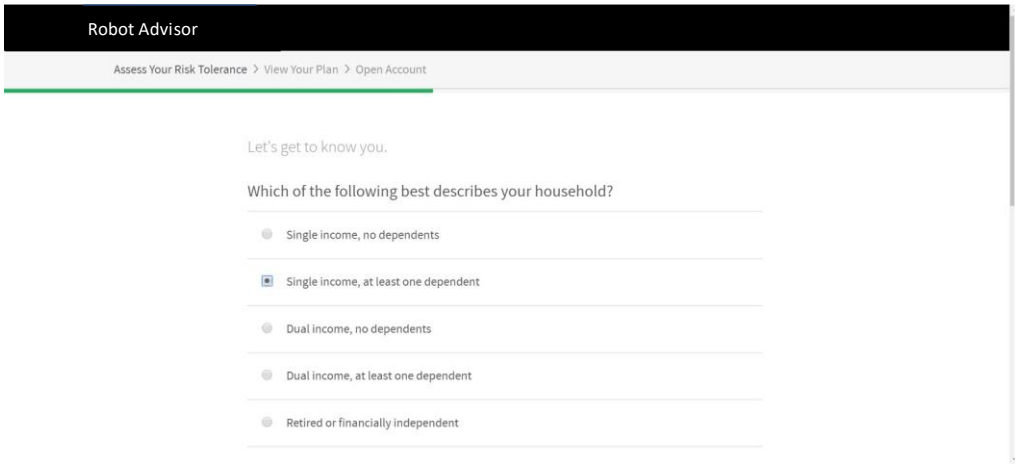


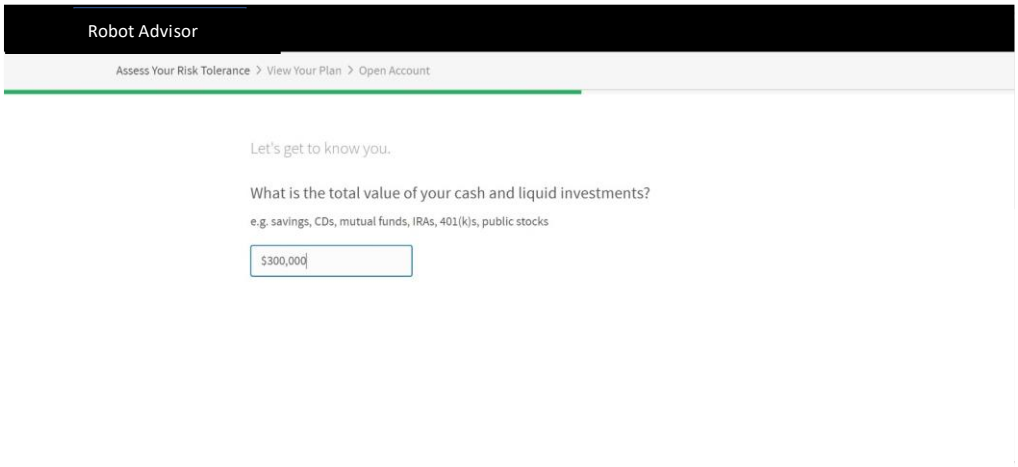


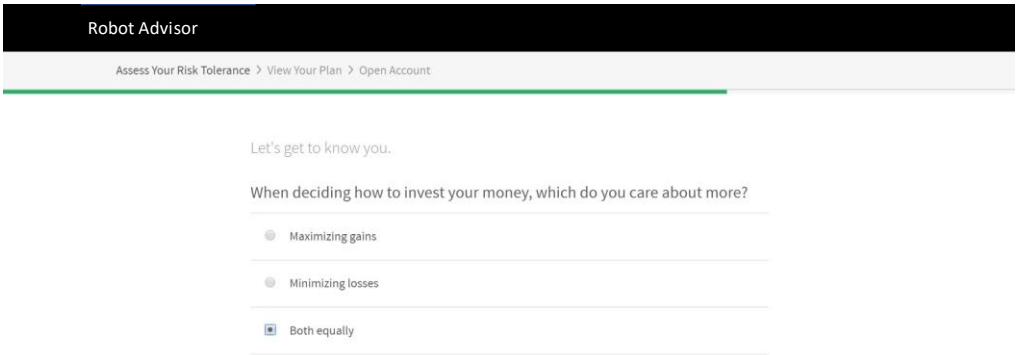


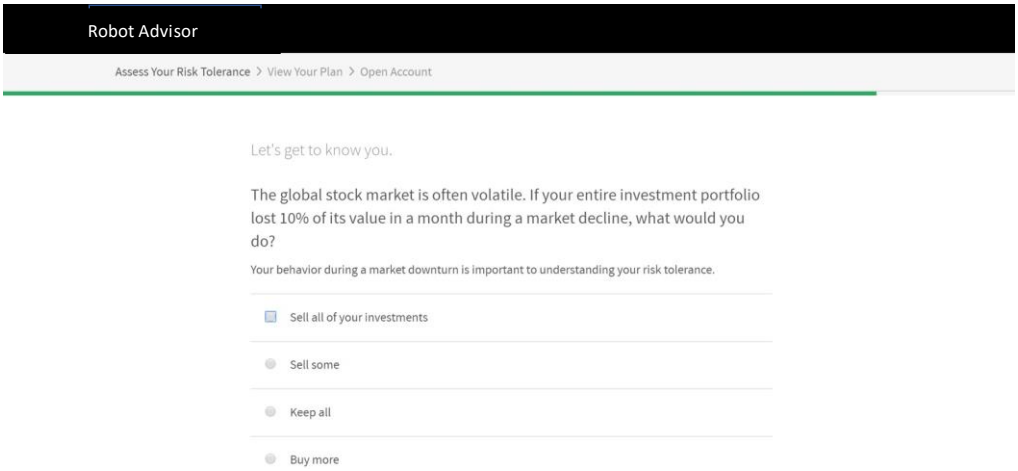

Robot Advisor
Assess Your Risk Tolerance > View Your Plan > Open Account
Let's get to know you.
What is your current age?
41

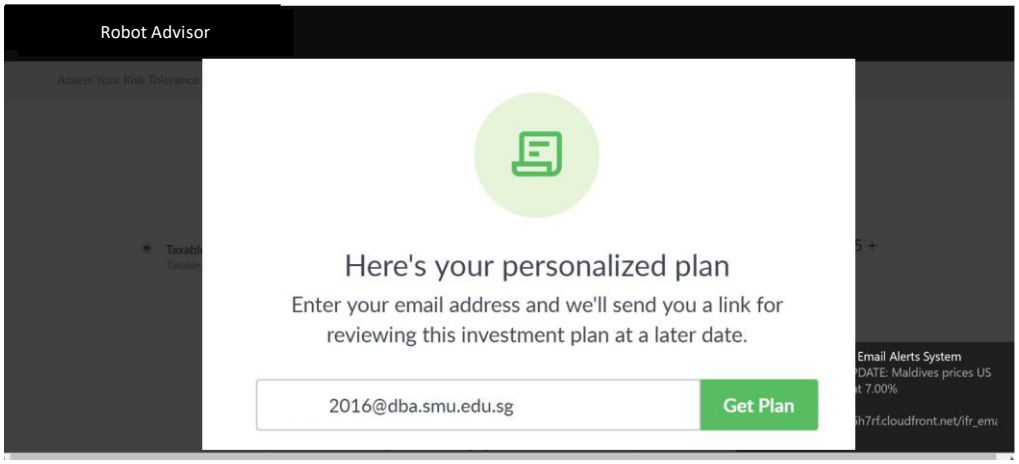

Robot Advisor
Assess Your Risk Tolerance > View Your Plan > Open Account
Let's get to know you.
What is your annual pre-tax income?
$100,000

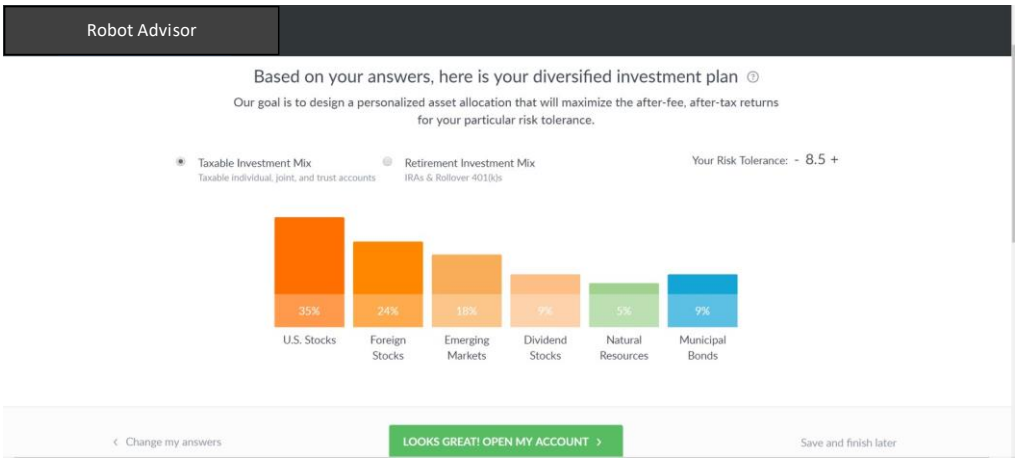

Robot Advisor
Assess Your Risk Tolerance > View Your Plan > Open Account
Let's get to know you.
Which of the following best describes your household?
Single income, no dependents
Single income, at least one dependent
Dual income, no dependents
Dual income, at least one dependent
Retired or financially independent


Robot Advisor
Assess Your Risk Tolerance > View Your Plan > Open Account
Let's get to know you.
What is the total value of your cash and liquid investments?
e.g. savings, CDs, mutual funds, IRAs, 401(k)s, public stocks
$300,000


Robot Advisor
Assess Your Risk Tolerance > View Your Plan > Open Account
Let's get to know you.
When deciding how to invest your money, which do you care about more?
Maximizing gains
Minimizing losses
Both equally


Robot Advisor
Assess Your Risk Tolerance > View Your Plan > Open Account
Let's get to know you.
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?
Your behavior during a market downturn is important to understanding your risk tolerance.
Sell all of your investments
Sell some
Keep all
Buy more





Please close this window and return to the survey

Appendix B: Actual survey

1 What is your age?

2 What is your gender?

3 Which of the following categories best describes your employment status?

4 Do you have any children under 18?

5 How much total combined money did all members of your HOUSEHOLD earn last year? This includes money from jobs; net income from business, or rent; pensions; dividends; interest; social security payments; and any other money income received by members of your HOUSEHOLD Figures in GBP

6 How much total combined financial assets of all members of your HOUSEHOLD? This includes money bank deposits, real estate, shares, bonds and other financial investments, but excludes the value of the princiapl residence of the family. Figures in GBP

7 What is the highest level of education you have completed?

8 In general, people really do care about the well-being of others.

9 The typical person is sincerely concerned about the problems of others.

10 Most of the time, people care enough to try to be helpful, rather than just looking out for themselves.

11 In general, most people keep their promises.

12 I think people generally try to back up their words with their actions.

13 Most people are honest in their dealings with others.

14 I believe that most professional people do a very good job at their work.

15 Most professionals are very knowledgeable in their chosen field.

16 A large majority of professional people are competent in their area of expertise.

17 I usually trust people until they give me a reason not to trust them.

18 I generally give people the benefit of the doubt when I first meet them.

19 My typical approach is to trust new acquaintances until they prove I should not trust them.

21 Technology gives me more control over my daily life.

22 New technologies make my life easier

23 Other people come to me for advice on new technologies.

24 I enjoy figuring out how to use new technologies.

25 Technology controls my life more than I control technology

26 I must be careful when using Artificial Intelligence (AI) technologies because criminals may use the technology to target me.

27 Artificial Intelligence Technology makes it too easy for companies and other people to invade my privacy.

28 I think high-tech companies convince us that we need things that we don't really need.

29 Which of the following statements comes closest to the amount of financial risk that you are willing to take when you make your financial investment?

30 Please indicate the [%] of wealth invested in directly held stocks, stock mutual funds, corporate bonds, derivatives.

31 Overall, how much experience do you have of investing in Financial Assets

32 I have been actively investing in stocks, bonds, or mutual funds for the past

33 Do you currently use a financial advisor to make portfolio investment decisions for you?

34 Do you currently use or are familiar with how a robo advisor works.

35 I believe that a Robo advisor would act in my best interest.

36 If I required help, a Robo advisor would do its best to help me.

37 A Robo advisor is interested in my well-being, not just its own.

38 A Robo advisor is truthful in its dealings with me.

39 I would characterize a Robo advisor as honest.

40 A Robo advisor would keep its commitments.

41 A Robo advisor is sincere and genuine.

42 A Robo advisor is competent and effective in providing investment advice.

43 A Robo advisor performs its role of giving investment advice very well.

44 Overall, a Robo advisor is a capable and proficient Internet financial advice provider.

45 In general, a Robo advisor is very knowledgeable about investments.

46 Suppose you had $100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow?

47 Imagine that the interest rate on your savings account was 2% per year and inflation was 3% per year. After 1 year, how much would you be able to buy with the money in this account?

48 If interest rates rise, what will typically happen to bond prices?

49 A 15-year mortgage typically requires higher monthly payments than a 30-year mortgage, but the total interest paid over the life of the loan will be less.

50 Buying a single company's stock usually provides a safer return than a stock mutual fund.

51 My current Bank/ financial advisor is sincere and genuine.

52 My current bank/ financial advisor performs its role of giving investment advice very well.

53 “How much do you trust your bank for your investment decisions?

54 My current bank is competent and effective in providing investment advice.

55 My current bank is fair and reasonable in the fees and charges that I have to pay

56 Did you see the demo of the Robot Advisor above?

57 I would be willing to provide information like my name, address, and phone number to a Robot Advisor.

58 I would be willing to provide my NRIC/ national identity number to a Robot Advisor.

59 I would be willing to share my current investment details with a Robot Advisor.

60 When an important market event arises, I would feel comfortable depending on the information provided by a Robot Advisor.

61 I can always rely on a Robot Advisor in a tough market environment.

62 I feel that I could count on a Robot Advisor to help with a crucial investment problem.

63 Faced with a difficult investment decision that required me to hire a financial advisor (for a fee), I would still use a Robot Advisor.

64 If I had a challenging investment problem, I would want to use a Robot Advisor again.

65 I would feel comfortable acting on the portfolio allocation given to me by a Robot Advisor

66 I would not hesitate to open an investment account with a Robot Advisor

67 I would make a Robot Advisor my primary source of investment advice

68 I would confidently act on the portfolio advice I was given by a Robot Advisor.

69 I would feel secure in using the funds suggested by a Robot Advisor.

70 I would allocate the following amount (GBP or equivalent) per month as investment with the robo advisor

71 I would allocate [ ] of my future invesmtent portfolio to a Robot Advisor

72 Would you like a copy of the survey results to be emailed to you. If yes, please enter your Prolific email address. (You will remain anonymous.)

73 Hypothetically speaking, are you willing to have a representative from Robo Advisor contact you to explain their products and services in greater detail?

74 Hypothetically speaking, would you be willing to receive an occasional newsletter (max 1 per month) from Robot Advisor.

75 Hypothetically speaking, would you be willing to recommend Robot Advisor to a friend who may benefit from knowing about it?

76 If yes, would you be willing to provide us with the friend's name or email address?

Appendix C: Typical questions asked by a Robo-Advisor

A typical set of questions as suggested by Mellon & Management, A. (2017)

1. Do you invest for retirement or to generate general savings?

2. What is your age?

3. What is your net income after taxes?

4. What is your savings rate?

5. What is the value of your current (liquid) investments?

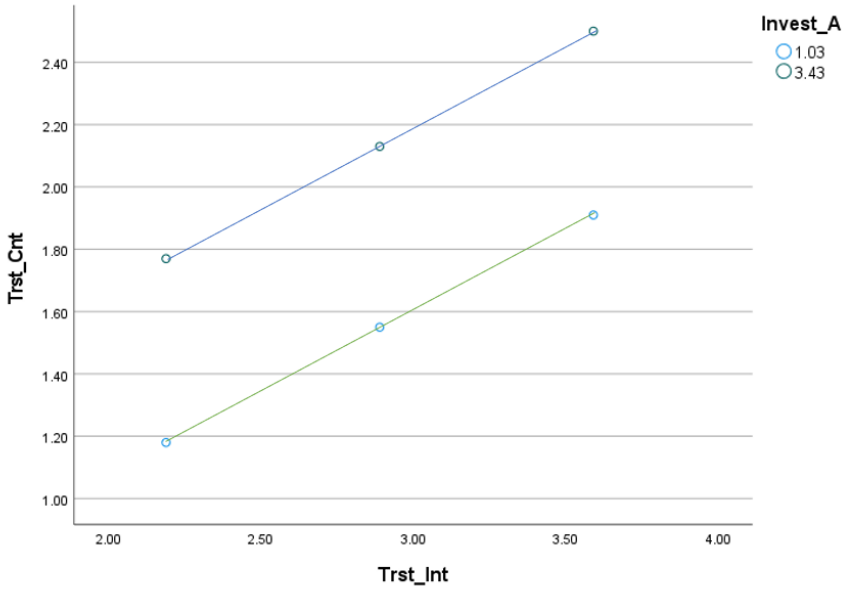
6. When deciding how to invest your money, do you worry more about maximizing gains, minimizing losses, or both equally?

7. If your investment portfolio lost x% in a given month, would you liquidate your portfolio, just sell some investments, do nothing, or increase investments?

Appendix D: Process Macro 3.5 Output for Moderation

```
**************** PROCESS Procedure for SPSS Version 3.5.3 ****************

          Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2018). www.guilford.com/p/hayes3

**************************************************************************
Model  : 1
    Y  : Trst_Cnt
    X  : Trst_Int
    W  : Invest_A

Covariates:
 Age      Gender   Total_We Highest_

Sample
Size:  188

**************************************************************************
OUTCOME VARIABLE:
 Trst_Cnt

Model Summary
          R       R-sq        MSE          F        df1        df2          p
        .51        .26       1.20       9.00       7.00     180.00        .00

Model
              coeff         se          t          p       LLCI       ULCI
constant        .00        .83        .00       1.00      -1.64       1.63
Trst_Int        .52        .26       2.00        .05        .01       1.04
Invest_A        .24        .36        .68        .50       -.47        .95
Int_1           .00        .11        .00       1.00       -.22        .22
Age            -.01        .08       -.11        .91       -.16        .14
Gender         -.13        .18       -.75        .46       -.49        .22
Total_We        .17        .09       1.94        .05        .00        .34
Highest_       -.09        .07      -1.20        .23       -.23        .06

Product terms key:
 Int_1    :        Trst_Int x        Invest_A

Test(s) of highest order unconditional interaction(s):
       R2-chng          F        df1        df2          p
X*W        .00        .00       1.00     180.00       1.00
----------
```

Moderator 1; Interaction of Size of Bet with Trust Intentions. DV= Trust Behaviours



Appendix E: Corelation Matrix Trust Worthiness and Trust Propensity

	Trust Worthiness of Robo				Trust Propensity towards Humans				
	Benevolence	Integrity	Competence	Trust Worthiness	Benevolence	Integrity	Competence	Trusting Stance	Trust Propensity
Robo Benevolence	--								
Robo Integrity	.68**	--							
Robo Competence	.54**	.62**	--						
Trust Worthiness	.83**	.89**	.86**	--					
Benevolence	-0.01	-0.01	0.01	-0.01	--				
Integrity	-0.06	-0.03	-0.02	-0.04	.64**	--			
Competence	-0.12	-0.03	-0.06	-0.08	.26**	.32**	--		
Trusting Stance	-0.09	-0.01	-0.03	-0.05	.22**	.34**	.16*	--	
Trust Propensity	-0.11	-0.04	-0.04	-0.08	.76**	.82**	.60**	.64**	--

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).