Robo-advisory an intrinsic convergence of ai in enhancing investment returns – An empirical analysis

K. P. Ramesh | R. Amudha | K. C. Prasob | Jose Francis

Abstract The vigor of Robo-advisory is anchored along with AI (Artificial Intelligence) to expedite, synthesize and synchronize the requisite information, an enabler in the progression of upscaling and facilitating financial intelligence and advice, to the xennials and the millennials, on their investment patterns. Innumerable times the investors usually behave irrationally in their investment decisions on selecting financial instruments, schemes or in trading, generally termed as behavioral biases. The prime target for Robo-platforms are the Millenials and the Xennials, due to affordability, 24/7 accessibility and utmost transparency with zero or nil investment bias, through a fusion model (of Robo-plus -Human) or a hybrid strategy, that can help to invigorate the investor’s investment goals. Henceforth this analytical study pertains to apply the advanced TAM (Technology Acceptance Model) on some of the significant variables such as the Perceived Usefulness, Perceived Trust, Perceived Security and the most inevitable demographic variables of the investors, administering the Structural Equation Model, that has confirmed, much remarkable user interface and the competences of AI has played a predominant role in structuring better ease-of-usage, trust and security among the investors on utilizing the Robo-Advisory Services.

Keywords: artificial intelligence (AI), robo-advisory, investment goals, financial decisions, millenials

1. Introduction

The dynamic element of robo-advisory services is artificial intelligence (AI), without any doubt. AI, demonstrated by machines, perceives, synthesizes and infers information similar to or better than human intelligence. This intelligence factor of AI enables higher investment returns through upscaling and integrating financial advice in robo-advisory services, playing a powerful role in providing financial insights with potential and positive outcomes. “Robo-advisors working on complex algorithms that have the capability to address complex investment needs of an investor” (Fisch et al., 2019). “There are two types of Robo-advisors: pure play Robo advisors and hybrid models that operate with or without an extra fee. As they are working on algorithms, Robo platforms can avoid conflicts of interest and investment biases that could occur with a human investment advisor, who might push for investment instruments that pays higher incentives for him” Fisch. Robos came to existence a decade ago, and the first two brands that introduced robo-advisory platforms were Wealth front and Betterment.

Today, Robos are a fast-growing investment advisory platform across the globe, but they still command a very small share of investment in the advisory market. In 2016, robo-advisory platforms had an AUM of $126 billion out of $69 trillion in the US. The surprising factor is that most recent studies have shown that 55% of investors still have limited or no knowledge about robo-advisory platforms. In 2017, the Securities and Exchange Commission included Robo Advisor in its “examination purview” as per the PwC report (2017). Robo advisors are regulated, i.e., Robots should register as investment advisors and as stock brokers if needed. Today, most of the robo-advisory platforms use improved algorithms that can accurately deliver investment solutions tailored according to the needs of people as required and can manage complex investment needs. It helps an investor to design his portfolio, invest as per his investment goals and retire better with the assistance of Robo-platforms. Advanced Robos use complex algorithms that use the data provided by clients to create and manage their portfolio based on the investment goals of the clients.

Robo advisors take the information from clients through an online questionnaire and use AI-based algorithms to recommend asset allocation that best fits the customer’s investment goals, risk appetite and investment horizon. “Post creating the portfolio, Robo advisors manages the portfolio by doing the periodic rebalancing, executing trades, performing tax-loss harvesting and other services that can help its clients” (Lilly et al 2022).
2. Conniving with Nudges

Robo advisors are suitable for investors who are comfortable using digital platforms with minimal or no human interference. “The gray area is, does a Robo-advisor improve outcomes?” Indeed, investment advice does pay off, says Hammond (2015). Studies show that investors who seek professional investment help by putting their money in target-date funds have seen that their median CAGR moves up by 3 percent.

The fundamental drawback of Robo-advisor is that there is no human touch and emotional angle, which is very important to some investors, and in Robo, you are just conversing to a computer, and “computers output is solely depended on the information that you input” (Sironi 2016). Even if the algorithm is super intelligent, it may not necessarily understand and draw out all information that is relevant to an investor’s investment goals and financial situation, most of the studies that have been done on the efficiency of the platforms. The performance of Robotics is still in the gray area when the market is highly volatile and the investor’s needs are highly complex.

3. Literature Review

The SWFI describes robo-advisory as a kind of financial advice for providing AI-based management of the portfolio with nearly zero human interaction and that has characteristically used algorithms and formulas (SWFI 2015). Accordingly, (Investopedia 2017) defined robo-advisory as digital platforms for providing algorithm-driven and automated financial planning services with no supervision of humans. The Wall Street journal, in its research, stated that with minimum balance and low management fees, robo-advisory is a boon to middle-class investors that enables them to access wealth management services.

The RA market of the Asian Pacific has been expected to depict promising growth among various regions and forms a continuous attempt to develop innovative and cost-effective automated economic advisory services. The RA market in this region is expected to be predominantly driven by India, Japan and China through the forecasting period. This is due to the enormous customer base associated with increased disposable income. As per (Tokic 2018), a robo-advisor enabled the handling of the complex investment needs of a prospective investor due to the complex algorithms on which robo-advisors work. (Fein 2015) clearly narrates in this study about the success rate of the investment decisions the Robo platforms can offer to an investor, as all new Robo platforms are working on complex algorithms. Belanche et al. (2019) state that with advanced algorithms, Robo-advisors can now play a critical role in investment success and revolutionize the investment market.

According to (Clarke Demo 2020), the success of Robo-advisors depends solely on two things: AI capabilities that can address complex investment needs and the user friendliness of platforms.

4. Structural Framework of the study

The structural framework of the study revolves around the provision of investment advice to the seeking investors, both millennials and retired individuals, for the purpose of enhancing their returns, which is both cost effective and reliable, facilitated through robo-advisors that are articulated with artificial intelligence.

4.1. Framework of Robo-Advisory on TAM

4.2. Investment Advice

According to the Research papers millennials are going to be the prime target for Robo-advisory platforms, due to the low fund management fees and transparency of platforms (Abraham et al., 2019) presented that the predominant reason for the Robo Advisory’s popularity among the millennials is because of the efficiency of the individual investors to take sole responsibility of their own investments and the millennials feel that the advices received are free from biases. Furthermore, as
millennials start their investment journey, the low level of investible income does not meet the minimum investment criteria set by wealth management firms; hence, millennials cannot access a wealth manager most of the time (Cedrell and Issa 2018).

4.3. AI and TAM in the Usage of Robo-advisors

According to (Francesco D’Acunto et al 2018), the robo-advisory is transparent as they work on AI. Meanwhile, the interaction between the clients and human advisors can be influenced by the interests of the advisor, whereas Robo-Advisor purely works on the inputs that an investor has given to the platforms and on the inbuilt algorithms. Hakla (2019) says that Robo-Advisor has the AI ability to make active investment decisions by replacing human involvement in active decision making, which makes this platform free from investment biases.

4.4. Process of Outcome

Rising awareness among customers for adopting automated financial advice for the purpose of investing and saving is the main and key concept for the demand for RA services in the upcoming years, as per the reports of Asian market witnesses. In India, the robo-advisory market is still at a very emerging but promising stage, and we need to create many positive perceptions about the platform and build trust for mass adoption (Ankita et al., 2020). According to (Fein 2016), RAs provide investment advice and discrete management services without the involvement of humans but with the help of algorithms followed by the allocation of asset models.

5. Research Design

A causal research design is applied to explore the effect of selected variables on investment returns. The respondents were customers seeking investment advice, mostly millennials and retired individuals. The data were collected from the Ernakulam district of Kerala state. The convenience sampling method is used to determine the client’s behavior toward its technological acceptance (TAM).

The TAM had nine variables, and the data collected were tested to prove the validity and reliability of the tool used. Cronbach’s alpha of all the variables was above 0.8, and structural equation modeling (SEM) using partial least squares was used to predict the effect of independent variables on behavioral intention.

The hypotheses framed for the study were as follows:

- **H1a**: Perceived usefulness has a significant positive effect on consumer attitudes toward intention-to-use robo-advisory
- **H1b**: attitude has a positive effect on the intention to use robo-advisory
- **H1c**: perceived ease-of-use has a positive effect on consumer attitudes toward intention-to-use robo-advisory
- **H1d**: perceived ease of use has a significant positive effect on consumer perceived usefulness of the intention to use of robo-advisory
- **H2**: The perceived usefulness of financial robo-advisors has a positive effect on the intention to use them.
- **H3**: Personal innovativeness in information technology has a direct relationship with the intention to use robo-advisory among investors.
- **H4**: Perceived trust has a positive relation with the intention to use robo-advisory devices among millennials.
- **H5**: There is no significant difference in age on the perceived uncertainty of investors’ intention to use RAs based on the extension of the TAM.
- **H6**: There is no significant difference in the effect of gender on the perceived uncertainty of investors’ intention to use RAs based on the extension of the TAM.

6. Analytical Observations

The primary data were collected from the investors on their utilization of robo-advisory services for investment advice instead of relying upon human suggestions and information about the selection of stocks and other capital market-related queries in the process of investors’ wealth creation. Relevant statistical tools applied to test the relationship and impact of the variables chosen under the study.

6.1. Relationship of perceived ease of use of RA toward gender

The Levine test for equality of variances was used to test the association between gender and the perceived ease of use of RA based on TAM.

- **Ho**: There is no significant difference in the effect of gender on the perceived ease of use of investors’ intention to use RAs based on the extension of the TAM.

From the analysis given in Table 1, it is clear that the gender of the respondents has a significant effect on the perceived ease of use (t value=2.053, p=0.041< 0.05). There is a significant difference in the genderwise perception of the robo-advisory scheme.
Table 1 Investor intention to use RAs based on the TAM.

<table>
<thead>
<tr>
<th>Lexue’s Test for Equality of Variances</th>
<th>t test for Equality of Means</th>
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<tr>
<td></td>
<td>t</td>
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<tr>
<td>Equal Variances assumed</td>
<td>sv</td>
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<tr>
<td>Equal Variances not assumed</td>
<td>2.054</td>
</tr>
</tbody>
</table>

6.2. Influence of age on perceived security

Evaluation of the influence of age on the perceived security of investors’ intention to use RAs based on the extension of the TAM

H₀: There is no significant difference in age on the perceived security of investors’ intention to use RAs based on the extension of the TAM.

Table 2 Effect of age on perceived security.

<table>
<thead>
<tr>
<th>Association between Age and Perceived security</th>
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<tbody>
<tr>
<td>Sum of squares</td>
</tr>
<tr>
<td>Between Groups</td>
</tr>
<tr>
<td>Within Groups</td>
</tr>
<tr>
<td>Total</td>
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</tbody>
</table>

The influence of the age category of the respondents on perceived security is evaluated using ANOVA, and the results show that the age of the respondents does not play any significant role in perceived security or its effect on the intention to use robo-advisory schemes (p value=0.933>0.05).

6.3. Structural Equation Model Analytical Views

6.3.1. Model Fit Indices for the Factors Influencing the Intention to use Robo-Advisory Services

Table 3 Model Fit Assessment of Factors influencing Robo-Advisory.

<table>
<thead>
<tr>
<th>Factors</th>
<th>Actual Value</th>
<th>Recommended Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>RMS</td>
<td>0.072</td>
<td>&lt;0.08</td>
</tr>
<tr>
<td>GFI</td>
<td>0.901</td>
<td>&gt;0.90</td>
</tr>
<tr>
<td>AGFA</td>
<td>0.822</td>
<td>&gt;0.80</td>
</tr>
<tr>
<td>NFI</td>
<td>0.924</td>
<td>&gt;0.90</td>
</tr>
<tr>
<td>TLI</td>
<td>0.934</td>
<td>&gt;0.90</td>
</tr>
<tr>
<td>CFI</td>
<td>0.912</td>
<td>&gt;0.90</td>
</tr>
<tr>
<td>RMR</td>
<td>0.035</td>
<td>&lt;1</td>
</tr>
<tr>
<td>IF</td>
<td>0.935</td>
<td>&gt;0.90</td>
</tr>
</tbody>
</table>
The fit indices shown in Table 3 for the proposed conceptual model indicate that the model is a good fit for the given data, with GFI=0.901, AGFI=0.822, NFI=0.924, TLI=0.934, CFI=.912, RMR=0.035, and IFI=.935, and the measures conclude that all the factors analyzed influence robo-advisory services.

7. Findings and Conclusion

The peculiar characteristic of Robo-Advisory is that it obtains information from its clients with regard to their financial situations, their investment horizon, the investor’s risk appetite and up the ante of their anticipated returns; hence, the data are processed with the aid of intricate built-in algorithms to achieve preeminent investment instruments harmonized based on their investment goals. Many studies on investor biases have observed that at times, investors behave irrationally more often while making decisions on investments, they show certain biases based on their past experiences, and these behavioral biases need to be avoided (Amudha and Muthukamu 2018). Such errors are proven to be very expensive in most situations; hence, we need dependable Robo-platforms that evolve from a technological standpoint and can handle complex investment needs even in volatile market conditions.

The findings of the study confirm that robo-advisors, along with TAM, exhibit a positive outcome. With advanced AI capabilities, robo-advisors can play a predominant role in the future and can truly help investors manage their investment with minimal advisory costs. AI-enabled robo-advisors benefit customers exclusively for those who have to start their investment journey, precisely for millennials. Enhanced user interfaces and AI capabilities have played a major role in building ease-of-use and conviction among investors in the adoption of Robo-advisors. Genderwise perceptions of Robo-advisory platforms are totally different from our study, which could be due to differences in the awareness level, and Robo-advisory platforms can be targeted to across investors, as age has the least implication in the perception and adoption of Robo-advisory platforms.

Millenials are going to be the leading targets for Robo-platforms due to their easy affordability, 24/7 accessibility and complete transparency with no investment bias, and as an investor ascends in their investment journey, a mix or hybrid structure (Robo + Human) is substantially helpful to reach their investment needs.

Ethical considerations

Not applicable.

Declaration of interest

The authors declare no conflicts of interest.

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