Journal of Accounting, Finance and Auditing Studies
https://www.acadlore.com/journals/JAFAS

Risk Aversion in the Future of Financial Advisory: The Legal Protections for Robo-Advisor Users in Mutual Fund Investments

Wardah Yuspin*, Muhammad Iksan

Faculty of Law, Universitas Muhammadiyah Surakarta, 57162 Surakarta, Indonesia

* Correspondence: Wardah Yuspin (wy204@ums.ac.id)

Received: 01-29-2024 **Revised:** 03-02-2024 **Accepted:** 03-13-2024

Citation: Yuspin, W. & Iksan, M. (2024). Risk aversion in the future of financial advisory: The legal protections for Robo-Advisor users in mutual fund investments. *J. Account. Fin. Audit. Stud.*, *10*(1), 28-36. https://doi.org/10.56578/jafas100104.

Abstract: This study investigates the deployment of Robo-Advisors (RAs), a form of Artificial Intelligence (AI), in offering investment advice aimed at maximizing investor returns. As the prevalence of platform investments incorporating RAs grows, a critical analysis is undertaken to assess the legal safeguards for users of RAs in making investment choices and in navigating the risk landscape of mutual funds. The focus is particularly on the legal mechanisms in place to protect investors from the inherent risks associated with mutual fund investments advised by RAs. Employing a qualitative research methodology alongside an empirical juridical approach, this analysis is underpinned by descriptive analytical techniques. The investigation draws upon regulatory frameworks pertaining to AI, complemented by observations and interviews conducted on the Bibit investment platform. The findings reveal that the RA functionality on the Bibit Investment platform is limited to processing risk mappings based on user inputs. It lacks the capability to predict future price fluctuations. Consequently, investors bear the profits and losses of their investments, contingent on the risks outlined at the outset. The RA merely provides recommendations based on responses from users, leaving final investment decisions to the discretion of the investors. This underscores the necessity for investors to be well-informed about the legal statutes governing their rights and obligations. The paper argues for a comprehensive understanding among investors about the extent of legal protection against the risks of mutual fund investments advised by RAs, highlighting the importance of investor education in navigating these legal frameworks.

Keywords: Artificial intelligence (AI); Robo-Advisor (RA); Investment; Risk; Legal protection

JEL Classification: K10; K2; K22

1. Introduction

This article discusses and analyzes legal protection for mutual fund investors who use RA to choose online platform investment investments. In the development of technology in the era of globalization, new investment trends online by the company providing its platform for investment to potential investors are circulating in the community. There is an online investment platform that makes it easy for people to invest their wealth just by visiting a website that offers investment (Pramita & Hendrayana, 2021). Technological changes and developments are global changes that significantly impact the country. In Indonesia, technological developments have significantly influenced people's lives. This development fundamentally changes society regarding behavioral patterns, social relationships, and ways of working (Kurniawijaya et al., 2021). Life in the business world follows constant development and increasingly rapid change. Currently, companies around the world have shifted from conventional to digital-based (Sumadi et al., 2022). Technological developments are accompanied by high levels of responsibility, affecting all technology users. Negative influences or effects from using this technology can be avoided with high caution and responsibility (Pratikno, 2017). Public awareness of investment increases when technology can facilitate the implementation of investment activities. With the help of a mobile phone or smartphone, anyone can invest their money through securities companies that offer applications to purchase investment products at the Indonesian Stock Exchange (BEI). This securities company offers various capital

market instruments (Mahfuzh & Yuliantari, 2022).

Current technological developments have made many companies provide places to invest by utilizing technological advances to help humans make investments, such as AI, which has been widely used by startup companies (startups) to help the company's business activities (Yuspin et al., 2022). Currently, activities in making investments online provide positive and negative value for investors, especially beginner investors. The internet's rapid growth, followed by AI's development in Indonesia, shows that technology and information have become massive. Indonesia, in particular, has adopted AI technology. For example, in the banking world, there is a feature of utilizing AI, namely chatbots that respond to programming languages to schedule customer questions in real time. In addition, in the investment world, a RA can adjust the portfolio of suitable investment types so that investors can determine based on the results provided by the RA (Priowirjanto, 2022). According to Marzuki Usman, investors are "people (individuals or institutions) who provide funds to companies by buying shares or bonds issued and sold by the company (Usman, 1990)." Investors are people who make investments. Negative impact on investing online, namely, in its implementation, the parties, namely investors and companies that provide a place to make investments, are based only on the trust of the parties. In this case, investors legally have a weak position in capital market activities. Because, in general, most companies that offer their securities through the capital market before offering their shares to the public are family companies whose shares and management are controlled by several people (Family Company), and after providing shares, generally still adhere to the same management pattern (Imaniyati & Wiyanti, 2000).

The analysis in this article completes a study regarding investment in mutual funds, which has previously been known as a reasonably high-risk investment. There have been many fraud cases under the guise of mutual fund investments (Pariela, 2018). With the high risk for mutual fund investors, increasing investment awareness for potential investors is necessary. One thing that differentiates it from existing articles regarding risks in mutual funds is that this article discusses the role of AI, in this case, RA, in mapping risks that may arise for investors. To clarify the role of RA in calculating investment risk, observations were made on the online platform of the mutual fund provider, namely Bibit (Martalena, 2010).

Like markets in general, the capital market is where sellers and buyers meet. The difference between capital and other markets is in the traded objects. Meanwhile, other markets trade goods for daily needs, but the capital market sells capital or assets as securities (Qamariyanti, 2009). The capital market plays a vital role in the financial industry because it offers a new way for the business world to obtain sources of payment for society, especially investors, to make investments. The capital market is known for the existence of a principle of openness, namely general guidelines that require issuers, public companies, and other parties that are subject to the law to inform the public in a timely manner of all material information regarding the business or its effects, which may influence the investor's decision regarding the securities in question and the price of the securities. AI is defined as intelligence demonstrated by artificial entities. Such systems are generally considered to be computers. Intelligence is created and inserted into computing machines so that they can function like the human brain (Nasution, 2012). Computers use microprocessors to process information according to a particular series of commands. Computers are widely used as tools in education, entertainment, and work. According to Kristanto, AI is a sub-discipline of computer science whose task is to design the automation of intelligent behavior in computer intelligence systems in an integrated manner (Azwary et al., 2016).

The aim of AI, according to Kusumawati (2018), is to support human activities and enable AI to imitate them in a human-like state of mind (Sari, 2019). Using AI, users can receive data, which is then processed and becomes a decision to complete a job (Haris & Tantimin, 2022). AI is a part of computer science that enables computer machines to do work as well as humans do. Humans can become clever at solving all the problems in this world because they have knowledge and experience gained from learning. In the beginning, computers were only used as calculating tools. However, as time passes, computers are no longer only used as calculating tools. Computers are expected to be empowered to do everything that humans can do (Jaya et al., 2018).

A significant part of AI is the knowledge base—the understanding of a subject gained through education and experience. AI is intelligence that is integrated into a system. Usually, AI can automatically read images, sounds, or someone's desires about something (Kusumawati, 2018). AI started in the summer of 1956. At that time, a group of computer experts and researchers from other disciplines from various academies, industries, and other fields in multiple circles met at Dartmouth College to discuss the possibility of computers imitating or simulating human intelligence. Since then, experts have worked hard to create, discuss, modify, and develop it until it reaches the point of perfect progress. The gradual development and commercialization of the results began in the late 1970s and early 1980s, from the laboratory to real work. Currently, many research results are implemented in natural products that are useful for users (T. et al., 2011).

AI, in all its essential aspects, can help companies improve their businesses, which increases the need for its use. However, the weaknesses of using AI must also be considered. For example, AI does not recognize emotions, ethics, or morals. So, when society uses AI technology, regulations are needed to limit things that can be legally accounted for. Commerce has become one of the choices of today's society, which is seen as more efficient, physically safe, and flexible.

Additionally, electronic commerce can reduce air and environmental pollution, create new jobs, benefit the academic world, and improve the quality of human resources. To survive and compete, entrepreneurs must strive to offer more services than other entrepreneurs. One thing that can be done is to use AI technology. The success of AI implementation is determined by six main factors: leadership, capability, analytical and systematic thinking, organizational culture, initiative, management, and entrepreneurship. Software in AI combines machine learning and the ability to learn from data without rule-based programming. AI can include machine learning, natural language processing, expert systems, vision, language, design, and robotics (Priowirjanto, 2022).

The history of AI development in Indonesia and the number of internet users are increasingly rapid. In the second quarter of 2020, it was recorded that 196.7 million people, or more than 70% of the population in Indonesia, were internet access users. This caused AI data to continue to develop. To handle large amounts of data, capacity or computing power was needed, and who was capable? With the development of cloud computing technology, AI is no longer expensive or difficult to achieve. Indonesia has also started to have many startups that use AI to support their businesses. This is because the supporting elements needed to incorporate AI into business activities are increasingly available and affordable and are now available to more than just developed countries or large companies (Cyber, 2022). The ability provided by AI to investors is that it can serve as a vital financial advisor for investors. In addition, AI in the market sector can help analyze financial data such as balance sheets or company reports.

In the financial industry, along with the development of digital technology, changes occur in business models and behavioral patterns where financial institutions compete to provide convenience for customers and easy access to financial information. The phenomenon of emergency startups, which offer unique mutual fund investment products to investors, is especially seen in the capital markets industry. Like the emergency startup, the Mutual Fund Selling Agent (APERD) is PT. Bibit Tumbuh Bersama (Rizal, 2021).

Law and investment are inseparable pieces of currency. The law is a tool that regulates all matters of social life, one of which is investment. A capital market is said to be healthy if it meets the requirements that have been met, namely the ability to accommodate as many transactions as possible, maybe in a short time (efficient), transactions that take place impartially or neutrally and based on an even distribution of information (fair), the market's ability to accommodate all the needs of sellers and buyers at all times (liquid), and the ability to provide instant or real-time information to all capital market players at any time (transparent) (Priowirjanto, 2022).

Legal protection for investors in the capital markets sector is provided by promulgating the Law of the Republic of Indonesia Number 8 of 1955 concerning Capital Markets (UU No. 8/1955). One of the objectives of the enactment of Law No. 8/1955 is that the development of the capital market requires a solid legal basis to provide legal certainty for parties still active in the capital market and protect the interests of the public in investing from detrimental practices. The Capital Market Law essentially regulates the authority and duties of the Capital Market Supervisory Agency as a supervisory institution, regulatory institution, and supervisory institution, which then transferred capital market supervision to the Financial Services Authority FSA since December 31, 2012.

Meanwhile, implementing FSA's authority as a supervisory authority can be preventive, namely in the form of rules, guidelines, guidance, and direction, and carried out repressively, namely in the form of investigative examinations and the imposition of sanctions. Law No. 8/1955 provides legal sanctions for violations of the principle of openness in the form of administrative, criminal, and civil sanctions. Administrative sanctions in the form of written warnings, obligations to pay or fines, restrictions on business activities, revocation of business permits, and registration, as well as criminal sanctions as described in articles 103-109 of Law No. 8/1955 concerning claims related to the capital market and filing compensation claims alone or together with other parties with the same claim against the party responsible for the violation. Apart from the protection provided by statutory regulations, investors must still act independently, meaning that they must bear the profits and losses resulting from their investments (Putralie et al., 2011).

In its development, PT. Bibit Tumbuh Bersama, as APERD, provides a service in the form of features that make it easier for potential investors and reduce investment risks for potential new investors in the future, especially for potential new investors. One of the features provided is to improve quality and reduce risks associated with making an investment by creating an AI in the form of RA. RA is an AI obtained from developments in the field of technology. RA has the function of automatically assisting investors in designing an optimal investment portfolio based on age, risk profile, and life goals for future investors.

AI is a technological development that is becoming a problem in several countries. Apart from that, the development of AI is a new challenge that must be faced with different implications, as stated by the President of the Republic of Indonesia, Joko Widodo, on November 1–4 at the opening of the Indonesia Science Expo (ISE). During the event, President Joko Widodo expressed his concern about the threats posed by the development of new technology. The low morality of technology users is a challenge that must be faced. AI requires a high standard of morality so that it can go in the same direction as technology. Therefore, research institutions are the answer to this challenge. Research institutions can become an ecosystem for national development based on science and technology, so cooperation is needed between the government, educational institutions, industry, and other partners (Suranto, 2018).

There are no legal regulations or legal norms in Indonesia that specifically regulate AI or its application, only Law Number 19 of 2016 concerning Amendments to Law Number 11 of 2008 concerning Electronic Information and Transactions (UU No. 19/2016 jo UU No. 11/2008), which equates AI with an "Electronic Agent." The characteristic of AI is the automation of information processing, which makes it equated to an "electronic agent." In Indonesian legal regulations, the word "automatic" in the definition of "electronic agent" is used as a bridge to build AI as an "electronic agent (Mahardika & Priancha, 2021). " The Indonesian legal provisions that define "electronic agent" can be found in the provisions of Law No. 19/2016 in conjunction with Law No. 11/2008. In Article 1, an electronic agent is a device from an electronic system that is created to carry out an action on specific information in an online manner and is automatically organized by people 28. The Electronic Information and Transactions Law explains that AI that is managed automatically by humans means that the organizer is responsible for the operation as an electronic agent. Thus, Indonesia automatically needs policies and regulations that can adapt to current technological developments, namely AI. Moreover, Law No. 19/2016, in conjunction with Law No. 11/2008, one of the fields or places that regulates various legal acts in the technology field, must be updated to regulate AI, which is already present in social life (Jaya & Goh, 2021).

The discussion in this article adds analysis regarding the role of RA in determining investor decisions on mutual fund investments as per research conducted by Krisna Listya Dewi & Ketut Warmika (2021) regarding the use of the RA feature in the Bibit application, which shows positive and significant results for one-trust Bibit application users. When e-trust is higher, it can increase the intention to use the Bibit application (Krisna Listya Dewi & Ketut Warmika, 2021). Another study conducted by Gunawan & Suartina (2021) explains perceived ease of use, product knowledge, and trust, which positively impact interest in using the Bibit application (Gunawan & Suartina, 2021).

2. Methodology

The approach method used in this research is an empirical juridical approach (Abdurrahman, 2009). Empirical juridical research is a type of legal research that analyzes and studies how law works in society (Muhaimin, 2020). The type of research used is descriptive analysis, which the researcher analyzes to provide an overview or explanation of the subject and object of the research as follows: results of the research. The data analysis method in research uses qualitative research methods, namely a method of research analysis that produces analytical descriptive data, namely data expressed by respondents in writing or orally, as well as natural behavior that is researched and studied as a whole. The data presented was obtained through primary and secondary data collection through field research (Wignjosoebroto, 2013) through interviews with informants, namely the Bibit application, and conducting library research in the form of books, journals, papers, dictionaries, encyclopedias, and statutory regulations (Dimyati & Wardiono, 2004).

3. Analysis and Discussion

Bibit is a platform mutual fund investment application that is precisely in the mutual fund section because of the license held by the platform Bibit investment application, which is owned based on a permit and supervised by OJK based on STTD/SK Number: KEP-14/PM.21/2017 as APERD. The purpose of the Bibit investment application is to make it easier for novice investors who have just started investing to make transactions via the Bibit platform application. According to Law No. 8/1955 in Article 1 Number 27, mutual funds are a forum used to collect funds from the investing public to be invested in securities portfolios by investment managers. Mutual funds are managed by investment managers with OJK permission, expertise in fund management, and intensive supervision. The agreement between the investment manager and mutual fund investors makes mutual fund investments possible. However, the portfolio manager will ultimately fulfill his duties as an investment manager to benefit investors. Investor funds are collected by issuing shares or mutual funds to individuals or institutions, which are then invested in a portfolio of capital or money market securities (Fahrevi, 2022).

Account registration for potential investors on the Bibit application is relatively simple, especially for novice investors. The purpose of the Bibit platform investment application is to provide convenience in simple and easy-to-understand operations, especially for beginners who want to start investing. Registration requirements on the platform Bibit Investment Application are similar to those of fintech. This generally means filling in personal information, account number, KTP, and photo selfie to fulfill the account registration requirements set for investors on the Bibit investment application.

PT. Bibit Tumbuh Bersama, or Bibit, as a means that provides a place to invest, gives a different platform for other investments by providing convenience. PT. Bibit has a mission to make it easy for novice investors to invest, and its mission is to increase financial literacy in all sectors of society through optimal use of existing technology.

PT. Bibit has the advantage of platform-to-platform other investments, for example, things that can be done online quickly, anytime, and in various places. Platform Bibit already has a cooperative relationship with BCA, Mandiri, BNI, Link Only, Bank Jago, and Mid Trans, and transactions can be done via top-up via GoPay for investors who want to start buying and selling mutual fund assets.

Assets available in the platform Bibit applications are only specific to mutual fund types, such as money market mutual funds, bonds, stocks, mixed, USD, and a selection of sharia-based mutual fund products. Several types of mutual funds are available for sale on platform Bibit investment applications, namely: Avrist Ada Kas Intan, Avrist Ada Kas Permata, Avrist Ada Sukuk Berkah Syariah, Bahana Revolving Fund, Bahana USD Global Shania Equites, Batavia Campur Gemilang, BNI-Am Likuid Prioritas Syariah, Capital Sharia Equality, Cipta Preeminent Shares Syariah, Danareksa Index Syariah, Danareksa Index Syariah, Eastspring Syariah Fixed Income Amanah, Eastspring Syariah Fixed Income Class A, Majoris Indonesian Mainstay Sukuk.

Purchasing mutual fund assets takes two working days, and Bibit itself has a fund transfer deadline of 13.00 WIB by Custodian Bank policy. If payment is made before 13.00 WIB, the purchase process will take less than one working day. The investment manager will verify transactions on the same day, and the purchase process will be completed on the next trading day. Meanwhile, if payment is made after 13.00 WIB, it will be verified by the investment manager on the next trading day, and the purchase process will be completed on the trading day.

Purchasing mutual fund assets itself has a minimum purchase with a money market mutual fund, which has the lowest purchase price for mutual fund assets compared to other types of mutual fund assets because it can be purchased at a reasonably cheap cost with nominal purchase transactions starting from IDR 10,000.00 (ten thousand rupiahs). Then, after all purchasing processes have been declared successful, users can find out about every process sent by Bibit to its users via email, starting from information about successful user registration, payment info, and access notifications, which provide facilities for investors to monitor portfolio developments and information about profits that have been received, for profits to be obtained within two working days for money market mutual funds and a maximum of seven working days for stock and bond mutual funds.

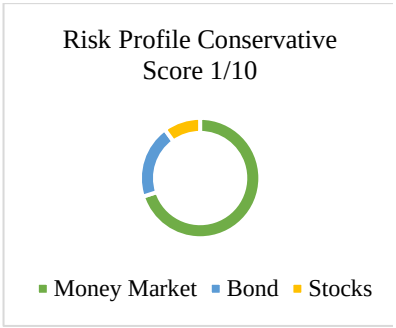
The sale of mutual fund assets on platform Bibit is classified as easy by simply applying for the sale of mutual fund assets owned by investors, provided by platform Bibit. Disbursement of mutual fund assets is adjusted to current regulations, with disbursement made within a maximum of 3 working days. Platform In general, there is no fee for Bibit because Bibit themselves receives a payment from the cooperation of the investment managers who collaborate with the platform. However, some investment managers require ownership of mutual fund assets with a minimum time limit of 3 months, so if it is not up to 3 months, they will be subject to a deduction due to not meeting the applicable conditions. Mutual fund assets owned by investors in platform Bibit as a Mutual Fund Selling Agent Representative (WAPERD) will be stored with the investment manager or custodian bank of each investor so that if PT. Bibit experiences problems in the future, mutual fund assets owned by investors remain safe and secure. Investing will be difficult for investors, especially if the activity is new or the investor is still categorized as a beginner. Therefore, before investing, especially on the Bibit platform, it is essential to determine the investment's target or purpose, invest according to the risk profile, and not often trade because mutual funds are investments to increase profits in the medium and long term.

The features provided on the platform There are various kinds of debit, such as goal setting, which functions to help calculate and monitor fund targets so that investors can achieve investment goals in a more planned manner; RA, which helps maximize investors' profits later in investing through verification and maintaining investor risk profiles; and auto debit, which functions for investors to make regular investments automatically so that later investors remain consistent and disciplined in achieving the investment targets that investors have previously determined. Asset Under Management (AUM) is a feature that provides information about how much money the investment manager manages.

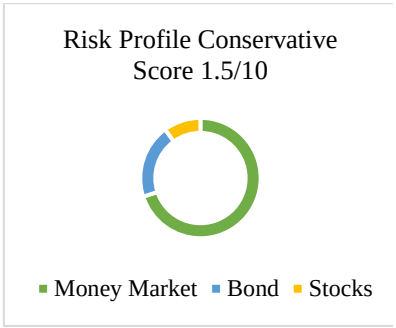
Platform Bibit investment has an excellent feature in the form of RA, which is provided and is essential for investors, especially beginner investors, in providing an assessment of the level of risk profile, which helps take a particular investment instrument and give an overview of the investment instrument by studying the graphs provided by Platform Bibit. The mechanism of how RA works is to recommend to investors by providing a reaction and formulating each question answered by the investors themselves. So, each investor will have a different result according to the answers that are input or submitted, so that later, RA will formulate based on the answers given by the investors and determine the risk profile that will be shared into three types of risk profiles, namely conservative, moderate, and aggressive.

Based on responses given by investors, RA recommends that the composition of investment portfolios purchased by investors focus more on mutual funds, money markets, and bonds to produce returns that are at least consistently above inflation with the lowest possible fluctuation values. A conservative risk profile has a value-risk score (0-4) (Bibit, 2020). In this conservative profile, it has a low level of risk with a low return, which is also low. With an overview of the risk profile, it is shown in Figure 1.

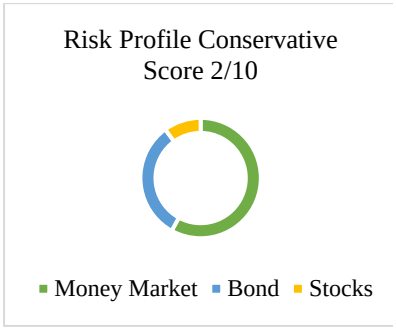
Based on investor responses, RA recommends making the composition of investment portfolios purchased by investors more focused on bond and money market mutual funds by increasing verified stock mutual funds for returns that exceed inflation with acceptable risk. In a moderate risk profile, it has a value risk score of 4–7 (Bibit, 2020). The risk value is a medium-risk level where the return on the gain is slightly higher than the conservative level. With an overview of the risk profile, as follows in Figure 2.



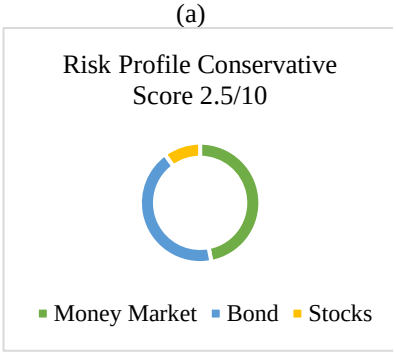
(a)



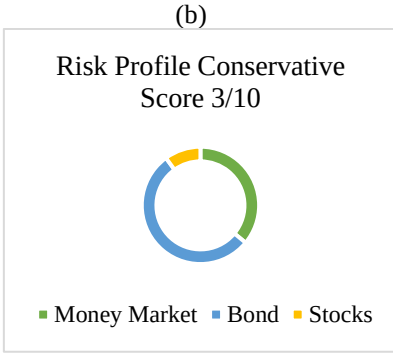
(b)



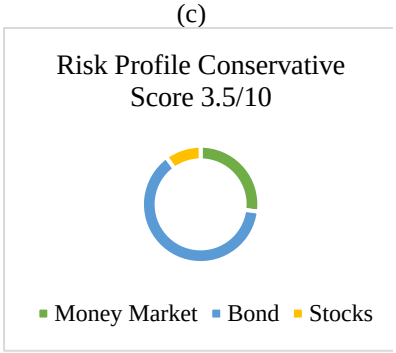
(c)



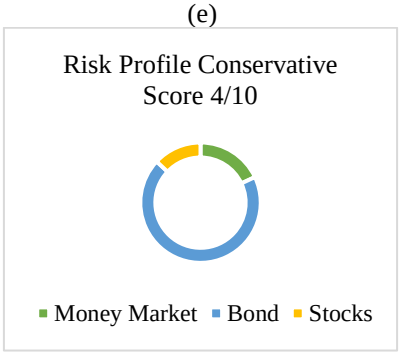
(d)



(e)

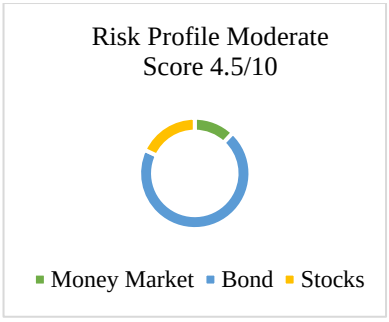


(f)

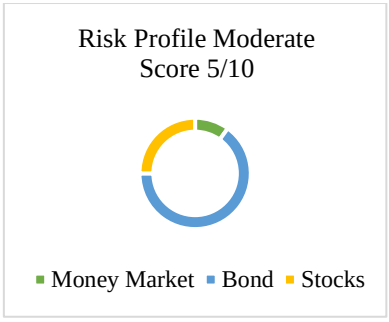


(g)

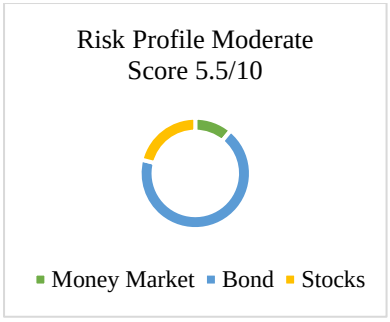
Figure 1. Risk profile conservative



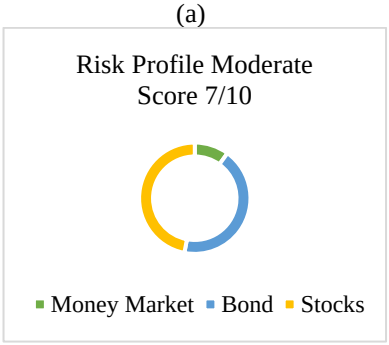
(a)



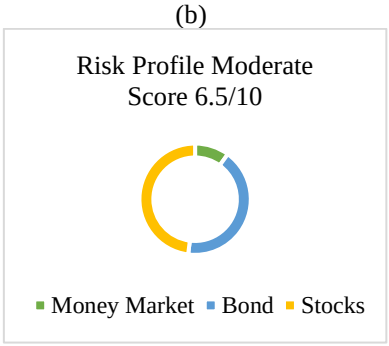
(b)



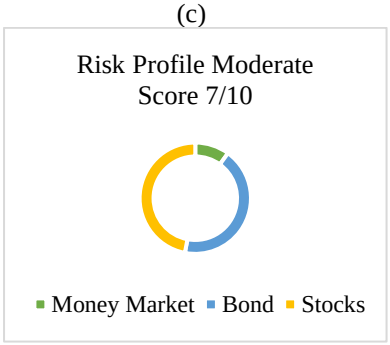
(c)



(d)



(e)



(f)

Figure 2. Risk profile moderate

Aggressive, based on investors' responses, RA recommends that the composition of the investment portfolio purchased by investors be more stock mutual funds, supported by a bit of diversification in bond mutual funds, to achieve maximum performance in the long term. An aggressive risk profile has a value-risk score of 7–10 (Bibit, 2020). This is the highest risk profile among the three, and the value return projected to be obtained is also higher. With an overview of the risk profile, as follows in Figure 3 (Bibit, 2020).

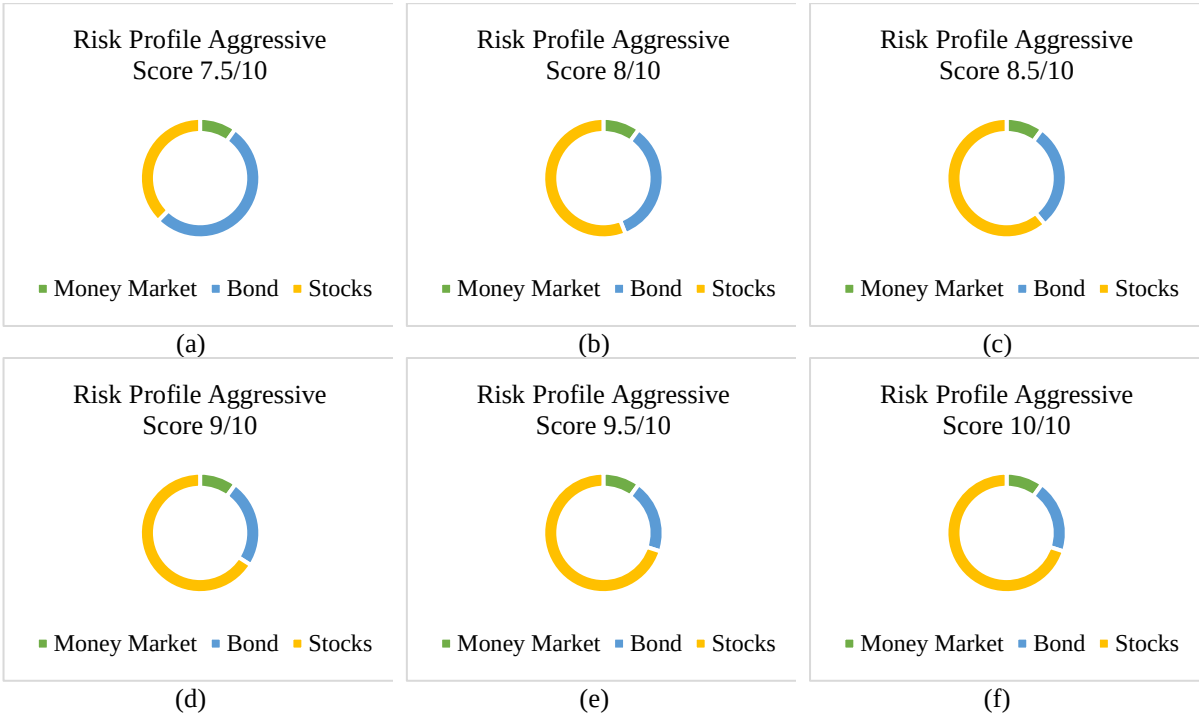


Figure 3. Risk profile aggressive

How RA works on platforms, The Bibit investment application is only based on input from the answers given by investors. It is not an AI that can provide or determine a purchase along with graphs of rising and falling prices in the future or sell and buy, as is the case with shares. Thus, RA, a feature provided by Bibit, cannot fully predict future investment value. This RA only provides recommendations based on reactions to answers given by investors. Thus, the risk of profit and loss experienced by each investor will be borne by the investor when selecting an investment instrument.

Market conditions determine the risk of profit and loss. RA cannot provide predictions because investors will determine what capital market instruments they will take. Meanwhile, the risk transfer that occurs on investments chosen by investors is the responsibility of each investor because the Bibit has terms and conditions that state, "The customer is obliged to bear all consequences and losses that may arise from the customer's negligence in updating the data on the Bibit." And "for information on returns, benefits, or advantages, Bibit uses data on past performance, not projections for the future; it is not certain that these projections will be achieved, and there is still a risk of loss." This clause explains that the position platform, Bibit, is just an online investment agent. Providing RA with advice regarding the type of investment and level of risk while deciding on the kind of investment remains the investor's investment choice and is the investor's responsibility.

4. Conclusions

One of the goals of AI is to help companies improve their businesses, especially in the field of investment. One of the AIs used in Bibit's investment platform is RA. RA aims to assist investors in determining their investment risk profile. It is divided into conservative, moderate, and aggressive risk profile groups. However, the AI in the Bibit investment platform does not serve to determine the future ups and downs of the chart. This is because RA serves only as a recommendation maker based on the answers given by investors. Therefore, investors have full legal awareness when choosing their investment instrument, including calculating and bearing any profits and losses. In making investments, investors already have sufficient legal protection to protect them from fraudulent practices when investing. In addition, there is an independent supervisory body, the OJK, tasked with supervising. In taking action, there are two efforts, namely preventive and repressive.

Author Contributions

Conceptualization Wardah Yuspin.; methodology, Muhammad Iksan.; validation, Wardah Yuspin and Muhammad Iksan.; formal analysis, Wardah Yuspin.; resources, Muhammad Iksan.; writing—original draft preparation, Wardah Yuspin and Muhammad Iksan.; writing—review and editing, Wardah Yuspin.

Data Availability

The data used to support the research findings are available from the corresponding author upon request.

Conflicts of Interest

The authors declare no conflict of interest.

References

Abdurrahman, M. (2009). *Sosiologi dan Metode Penelitian Hukum*. Malang: UMM Press.

Azwary, F., Indriani, F., & Nugrahadi, D. T. (2016). Question answering system berbasis artificial intelligence markup language. *Kumpul. J. Ilmu Komput.*, *3*(1), 48-60. http://doi.org/10.20527/klik.v3i1.34.

Bibit. (2020). *Robo Advisor*. https://faq.bibit.id/id/article/apa-itu-profil-risiko-1tiuy8q/

Cyber, C. D. (2022). *Perkembangan AI di Indonesia Pada Tahun 2022*. https://diengcyber.com/perkembangan-ai-di-indonesia-tahun-2022/

Dimyati, K. & Wardiono, K. (2004). *Metode Penelitian Hukum.* Surakarta: Fakultas Hukum, Universitas Muhammadiyah Surakarta.

Fahrevi, M. A. (2022). Aspek hukum pembelian reksa dana menggunakan robo advisor pada platform digital. [Doctoralthesis, Universitas Muhammadiyah Sumatera Utara]. http://repository.umsu.ac.id/handle/123456789/19833.

Gunawan, I. M. I. & Suartina, I. W. (2021). Pengaruh perceived ease of use, product knowledge, dan trust terhadap minat menggunakan aplikasi reksadana bibit (Studi kasus pengguna platform digital fintech bibit). *J. Manaj. Kewirus. Pariwis.*, *1*(4), 1150-1160.

Haris, M. T. A. R. & Tantimin. (2022). Analisis pertanggungjawaban hukum pidana terhadap pemanfaatan artificial intelligence di Indonesia. *J. Komun. Hukum (JKH)*, *8*(1), 307-316. https://doi.org/10.23887/jkh.v8i1.44408.

Imaniyati, N. S. & Wiyanti, D. (2000). Perlindungan hukum terhadap investor dan upaya bapepam mengatasi pelanggaran dan kejahatan pasar modal. *MIMBAR: J. Sos. Pembang*., *16*(4), 334-369.

Jaya, F. & Goh, W. (2021). Analisis yuridis terhadap kedudukan kcerdasan buatan atau artificial intelligence sebagai subjek hukum pada hukum positif Indonesia. *Suprem. Hukum*, *17*(2), 1-11. https://doi.org/10.33592/jsh.v17i2.1287.

Jaya, H., Sabran, Idris, M. M., Djawad, Y. A., Ilham, A., & Ahmar, A. S. (2018). *Kecerdasan Buatan*. Makassar. http://eprints.unm.ac.id/4532/1/Buku%20Referensi%20-%20Kecerdasan%20Buatan.pdf

Krisna Listya Dewi, P. A. & Ketut Warmika, I. G. (2021). Peran E-trust dalam memediasi pengaruh fitur robo advisor terhadap niat menggunakan aplikasi bibit. *J. Sos. Teknol.*, *1*(9), 29-36. https://doi.org/10.36418/jurnalsostech.v1i9.190.

Kurniawijaya, A., Yudityastri, A., & Zuama, A. P. C. (2021). Pendayagunaan artificial intelligence dalam perancangan kontrak serta dampaknya bagi sektor hukum di Indonesia. *Khatulistiwa Law Rev.*, *2*(1), 260-279. https://doi.org/10.24260/klr.v2i1.108.

Kusumawati, R. (2018). Kecerdasan buatan manusia (artificial intelligence); teknologi impian masa depan. *ULUL ALBAB J. Stud. Islam*, *9*(2), 257-274. https://doi.org/10.18860/ua.v9i2.6218.

Mahardika, Z. P. & Priancha, A. (2021). *Pengaturan hukum artifical intelligence Indonesia saat ini*. https://www.hukumonline.com/berita/a/pengaturan-hukum-artifical-intelligence-indonesia-saat-ini-lt608b740fb22b7

Mahfuzh, M. F. & Yuliantari, R. V. (2022). Analisis penerapan artificial neural network algoritma propagasi balik untuk meramalkan harga saham pada bursa efek Indonesia. *J. Appl. Electr. Eng.*, *6*(1), 1-3. https://doi.org/10.30871/jaee.v6i1.3814.

Martalena. (2010). Memilih reksa dana dengan tingkat pengembalian dan tingkat resiko yang sesuai. *J. Manaj. Maranatha*, *4*(2), 41-52. https://doi.org/10.28932/jmm.v4i2.242.

Muhaimin. (2020). *Metode Penelitian Hukum*. Mataram: Mataram University Press.

Nasution, H. (2012). Implementasi logika fuzzy pada sistem kecerdasan buatan. *J. ELKHA*, *4*(2), 4-8.

Pariela, M. V. G. (2018). Wanprestasi manajer investasi terhadap investor reksadana. *Sasi*, *23*(2), 129-135. https://doi.org/10.47268/sasi.v23i2.100.

Pramita, K. D. & Hendrayana, K. D. (2021). Perlindungan hukum terhadap investor sebagai konsumen dalam investasi online. *J. Pacta Sunt Serv.*, *2*(1), 1-8. https://doi.org/10.23887/jpss.v2i1.449.

Pratikno, A. S. (2017). Implementasi artificial intelligence dalam memetakan karakteristik, kompetensi, dan perkembangan psikologi siswa sekolah dasar melalui platform offline. In *Proceeding KMP Education Research Conference Keluarga Mahasiswa Pascasarjana (KMP)* (pp. 18-36).

Priowirjanto, E. S. (2022). Urgensi pengaturan mengenai artificial intelligence pada sektor bisnis daring dalam masa pandemi COVID-19 di Indonesia. *J. Bina Mulia Hukum*, *6*(2), 254-272. https://doi.org/10.23920/jbmh.v6i2.355.

Putralie, E. M., Syahputra, Y. A., & Zul, M. (2011). Perlindungan hukum investor di pasar modal. *J. Mercatoria*, *4*(1), 26-36. https://doi.org/10.31289/mercatoria.v4i1.604.

Qamariyanti, Y. (2009). Perlindungan hukum bagi investor dalam investasi. *J. Media Hukum*, *16*(1), 134-145.

Rizal, S. (2021). Fenomena penggunaan platform digital reksa dana online dalam peningkatan jumlah investor pasar modal Indonesia. *Humanis: Humanit. Manag. Sci. Proc.*, *1*(2), 851-861.

Sari, E. A. (2019). Peran pustakawan ai (artificial intelligent) sebagai strategi promosi perpustakaan perguruan tinggi di era revolusi 4.0. *BIBLIOTIKA: J. Kaji. Perpust. Inform.*, *3*(1), 64-73. https://doi.org/10.17977/um008v3i12019p064.

Sumadi, M. I. T. B. N., Putra, R., & Firmansyah, A. (2022). Peran perkembangan teknologi pada profesi akuntan dalam menghadapi industri 4.0 dan society 5.0. *J. Law Adm. Soc. Sci.*, *2*(1), 56-68. https://doi.org/10.54957/jolas.v2i1.162.

Suranto, G. (2018). *Presiden RI Joko Widodo Buka Indonesia Science Expo 2018*. https://infopublik.id/kategori/nasional-sosial-budaya/308214/presiden-ri-joko-widodo-buka-indonesia-science-expo-2018

T., S., Mulyanto, E., & Suhartono, V. (2011). *Kecerdasan Buatan*. Yogyakarta: Andi Offset.

Usman, M. (1990). *ABC Pasar Modal Indonesia*. Jakarta: Institut Bankir Indonesia.

Wignjosoebroto, S. (2013). *Hukum Konsep dan Metode*. Malang: Setara Press.

Yuspin, W., Wardiono, K., Budiono, A., & Gulyamov, S. (2022). The law alteration on artificial intelligence in reducing islamic bank's profit and loss sharing risk. *Legality: J. Ilm. Hukum*, *30*(2), 267-282. https://doi.org/10.22219/ljih.v30i2.23051.