

## Research Article

# An Effective Solution for Investing Funds Through the Robo Advisor Bibit Application

Mutiara Fajrin Azzahra Prasha, Tetty Rimenda\*

Politeknik Negeri Jakarta, Indonesia

**Abstract.**

Investment regulates finance such that its value can grow and generate future profits. In Indonesia, investment is increasing yearly. The increase is supported by millennials who have adapted to technology that makes it easier to make digital mutual investments. Although the increase in mutual investment in Indonesia is quite rapid, it does not preclude the possibility that there are still many people who have not invested. The reason people have not invested is that they are afraid to take risks, and their income is low. These reasons can be minimized with the use of technology. Innovation in investing has given rise to modern technological advances such as fintech or financial technology like Robo Advisor. The method used in this study was the Partial Least Squares Structural Equation Modelling analysis technique, which was operated using SmartPLSver. 3 software. Data were collected through questionnaires. The study used quantitative methods and a sample of 200 respondents who had or would have invested through the Bibit application with the use of the Robo Advisor feature. The results of this study found that Robo Advisor can affect millennials' investing through risk profiling, financial planning, and rebalancing.

**Keywords:** decision making, financial planning, investment, risk profiling, rebalancing, Robo Advisor.

Corresponding Author: Tetty Rimenda; email: tetty.rimenda@akuntansi.pnj.ac.id

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## 1. Introduction

The phenomenon that is happening right now is a change in how to invest. Across a countries, digital financial advisory services, in particularly robo-advisor are becoming more popular in invesment business. Customers use Robo advisor analysis before making an investment, especially to invest in stocks. Robo advisor is a financial technology application that relies on Artificial Intelligence (AI). AI plays a role in developing and managing portfolios for investors and bringing progress in finance [1]. In particular, robo-advisors differ from existing online investment platforms or online brokerage with respect to two different conceptual that is customer assessment, and customer portfolio management[2]. There are already many investment applications that use AI technology. One of them is Bibit. In the Bibit application, robo advisors have the ability to recognize

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and discover investors' risk profiles. These tools support their users in financial decision-making, through auto risk profiling, auto financial plan, dan auto rebalancing

Based on data published by the Central Efficiency Trust Indonesia (KSEI), it shows that the growth of mutual fund investors increased by 4.69% from 2022 to March 2023. This increase is dominated by millennials who are under 40 years old. Millennials are people born in 1981-1996 or aged 27-42 years [3]. Meanwhile, according to [4], the millennial generation is people born in the early 1980s to the 2000s or aged 23-43 years in 2023. So, in this study the millennial generation is people aged: 23-43 years. Even though there has been an increase in investors in Indonesia, in reality many people have not invested because they are unable to take risks [5]. Factors that cause customers to be afraid to invest, are because they don't want to try something new, or they are afraid of loss, or they have difficulty understanding complicated investment mechanisms, income constraints, and so on [6].

[21] research using SWOT analysis concludes that the Roboadvisor has many advantages that can be used to increase interest in investing, such as, low cost. For millennials, cost is one of the considerations in choosing an investment. Also the experience of investing without spending a lot of effort because it can be done with a mobile phone is one of the attractions of robo advisor. Next is goal based investing which allocates. Although so many advantages of robo advisor there are still don't believe in it including millennials. The purpose of this study is to find out whether robo advisor through risk profiling, financial plans and rebalancing be able to overcome the fear of millennials who are reluctant to invest. Also to examine the role of robo advisors for millennial investment decision making. The results show that robo-advisors have great potential to shape the future of the financial advisor industry, although there is still a lot of potential that has not been exploited.

## 2. Theory, Literature Review, And Hypothesis

### 2.1. Modern Portfolio Theory (MPT)

Modern Portfolio Theory (MPT) is an approach to aligning risk tolerance and financial expectations in order for investors to obtain an optimal portfolio by considering the composition of risk-related assets in a given period ([7]; [8]). The mutual investment in the Bibit application uses MPT as the best way to build a portfolio. One of the realizations is that if an investor sets up a portfolio for emergency funds, it must use a combination of money market, bonds, and stocks. To optimize the portfolio, it must use age so that

the portfolio can run optimally. As an investor grows older, the portfolio will be adjusted according to asset allocation. Investors can sell some of the more risky assets and use their profits to increase the portion into safer instruments such as bond funds and money market funds in portfolios.

## 2.2. Robo Advisor

Robo advisor is a technology that can facilitate and balance investors' portfolios at lower costs [9]. In investing, a robo advisor is essential to ensure that the portfolio. For example, when an investor suffers a portfolio loss, this can cause trauma and fear to invest in the short term. However, if investors have long-term investment goals, then it is important for them to overcome their behavior and fear of short-term investment. Thus, investors can optimize portfolios based on acquired reference points and plan strategies suitable for long-term investments by considering market prices and asset allocation when making buy or sell transactions [10]. In the Bibit application, the robot's work consists of Auto Risk Profiling, Auto Financial Plan, and Auto Rebalancing. With the implementation of these three procedures, investors, especially start-ups, can confidently invest and better optimize portfolios.

## 2.3. Risk Profiling

Risk profiling is a way to determine a person's level of risk in achieving an investment goal [9]. The process of determining the risk level can be carried out by presenting a questionnaire about investment to investors, and investors will provide answers according to their situation and conditions. Preparing a risk profile has an important role in making investment decisions and directly affecting asset allocation. Therefore, it is very important to make investment recommendations on the robot. There are three components associated to form a person's risk profile [11], namely:

1. *Risk Tolerance*
2. *Risk Capacity*
3. *Risk Need*

## 2.4. Financial Plan

Financial planning is a process of developing and implementing a comprehensive coordinated plan to achieve individual financial goals as a whole[12]. It is important for a person to plan a financial plan carefully in order to achieve their goals, both short - term and long – term [13].

Important aspects of financial planning include budgeting and rationing[13]. Budgeting, used to control expenditure, prioritize financial goals, and prevent waste. By budgeting, one can efficiently manage financial resources and improve the ability to set aside funds for savings, investments, or other financial purposes. Budgeting remains a relevant tool for individuals or organizations to meet needs and consider non-financial aspects as well as operational perspectives. Meanwhile, rationing is related to prioritization of expenditure or allocation of funds in areas with higher values and interests. This involves making the right decisions about what needs to come first and what needs to be reduced or eliminated. By rationing, one can optimize the use of their financial resources to achieve the primary financial goals.

## 2.5. Rebalancing

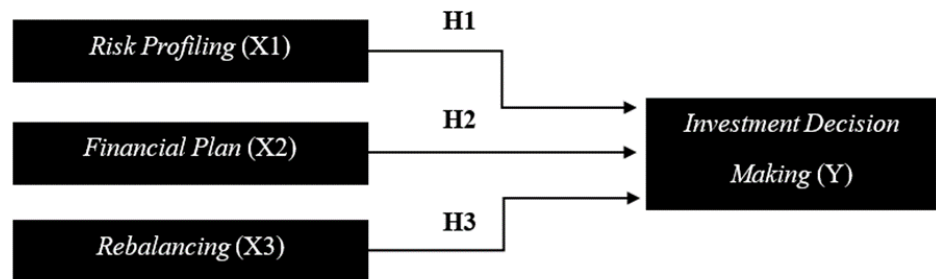
Rebalancing is an act to keep investors' portfolios within optimal limits by readjusting asset allocation based on established risks. By rebalancing, investors can re-optimize their portfolio composition according to investment goals and desired risk levels [14].

According to [15], the confidence of the portfolio with the composition of the original asset allocation is believed to result in optimal portfolio results and efficient diversification. In the Bibit application, if an investor has purchased a robo advisor recommendation fund, but the portfolio allocation differs from the optimal allocation target, then when the investor makes a subsequent purchase, Robo advisor will automatically help select funds for investment managers whose target is below the optimal value to be closer to the optimal portfolio. In general, the strategy of rebalancing or adjustment of investor portfolios is categorized into two different groups [15], namely:

1. Strategi *rebalancing frequency*
2. Strategi *rebalancing percentage*

## 2.6. Conceptual Framework and Hipotesis

A frame of thought is a useful diagram for describing relationships between variables, so that it can explain the direction for a study to be able to run according to a set scope. Here's a framework of thought Figure 1 created in this study:



**Figure 1:** Conceptual Framework.

Understanding the risk profile is the right approach for millennials to achieve their investment goals. By selecting the appropriate risk profile, investors can optimally manage risks and obtain returns that match the established risk level [7]; [16]. The risk profile offered through the Robo advisor on the Bibit application is ideal for millennials who have no experience of investing and may feel hesitant to take risks. Once the risk profile is identified, the investor can perform better financial planning to achieve its investment goals. The following hypothesis is then concluded:

H1: How Risk Profiling Robo Advisor Works Affects Millennial Investors Investing through the Bibit Fund Recsa Application

Achieving financial goals is beneficial for a millennial investor. To achieve this, a millennial investor needs to plan their finances carefully to minimize the risk of loss and achieve maximum returns[12]. If the financial plan is not prepared properly, then it is further away to reach the goal. This financial planning can be done by allocating portfolio assets to the Bibit application's robot supervisor feature. The asset allocation is in accordance with the investor's risk profile, so that investors can invest according to their needs. The following hypothesis is then concluded:

H2: How the Financial Plan Robo Advisor Works Affects Millennial Investors Investing through the Bibit Recourse Application

Rebalancing or portfolio adjustment Rebalancing or portfolio adjustment is a step taken by investors to reorganize their investment portfolios. In the Bibit application, portfolio adjustments are made automatically according to market conditions. This portfolio adjustment procedure is considered to produce an optimal portfolio because the Robo Advisor feature in the Bibit application has advised investors about the

necessary adjustments. With this automatic portfolio adjustment, millennials no longer need to be afraid of facing risks because portfolio adjustments are still carried out according to the permission given by investors, if deemed necessary to follow market conditions. The following hypothesis is then concluded:

H3: How Robo Advisor Rebalancing Works Affect Millennial Investors Investing through the Bibit Recourse Application

### 3. Research Methods

This study is based on a survey, and as such, aims to collect data from respondents who have the following criteria: 1) Respondents were the millennial generation aged 23-43 in 2023. 2) Respondents have accounts in the Bibit app. 3) Respondents once made a fund investment in the Bibit application using Robo Advisor. 4) Respondents reside in Jabodetabek. Because the number of investors of the Bibit application using the robot is unknown, sampling can be done using a calculation method involving multiplication between 5 and 10 times the number of indicator variables[17]. Therefore, the minimum number of respondents in this study was 95 respondents. The data collection method in this study used two ways: primary data collection was performed through a dataset method using a Google Form questionnaire on a scale of 1-5 Likert and secondary data collection through a library study.

In this study, using a quantitative approach with Partial Least Square - Structural Equation Model (PLS-SEM) data analysis techniques using Smart PLS version 3. Data analysis is performed in two stages: Measurement Model Analysis (Outer Model) to test the validity and reliability of latent variables, and Inner Model Analysis to analyze the effect of exogenous variables on endogenous variables. In this analysis, using R2 values to assess the predictive power of the model and path coefficients to evaluate the significance of the relationship between variables using the t-test and p-value of bootstrapping [18].

### 4. Results and Discussion

#### 4.1. Respondent

Questionnaire was filled out by 125 respondents through Google Form and the spread of questionnaires through social media such as instagram, twitter, and the Bibit community was telegraphed to make it easy for respondents to participate in the study.

The findings indicate that 70% of respondents were female. Most respondents (65%) fell within the 23–27 age range. A majority held an undergraduate degree (S1/D4). Depok in Jabodetabek was the primary domicile. Among employment categories, 55% were students. Income between Rp1,000,000 and Rp5,000,000 was reported by around 47% of respondents. Notably, 90% understood how the Bibit robot functions, aligning with investors’ 1–2 year experience (38%)—newcomers rely on roboadvisors to grasp risk profiles and investment strategies works.

## 4.2. Test Results SEM-PLS

### 4.2.1. Outer Model

In the test of the measurement model (outer model), a determination of the relationship specification between the latent variable and its manifestation variable (indicator). This phase consists of three stages: convergent validity, discriminant validity, and composite reliability

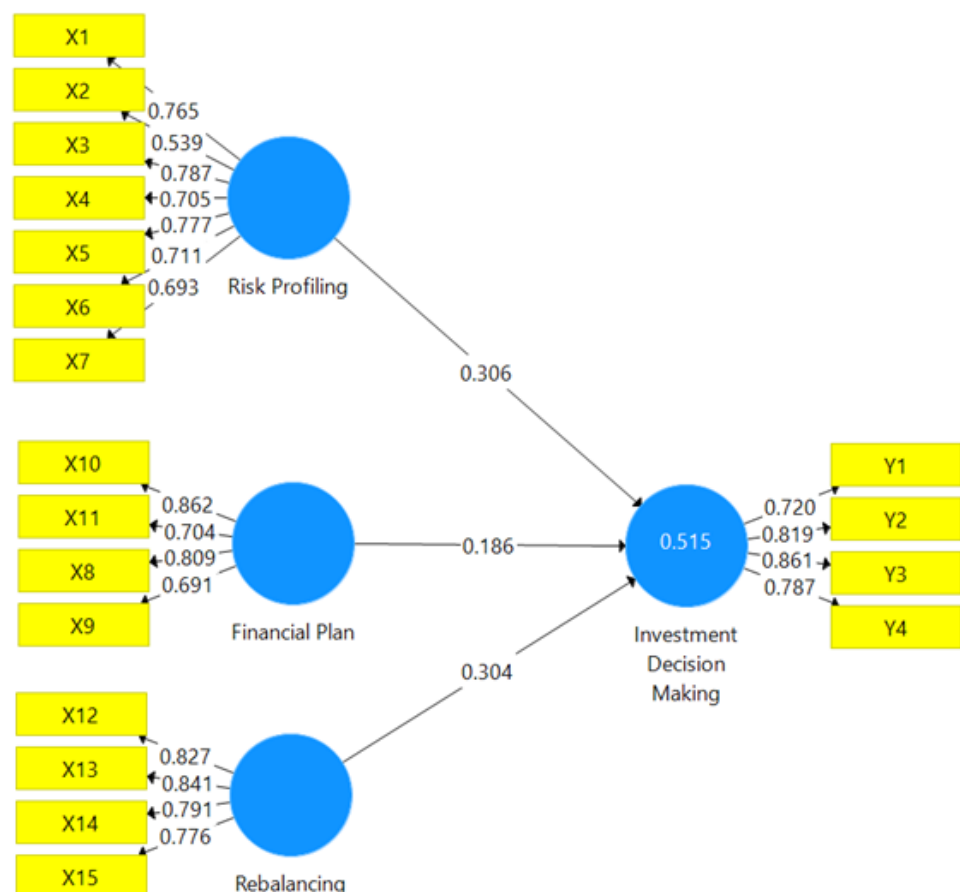
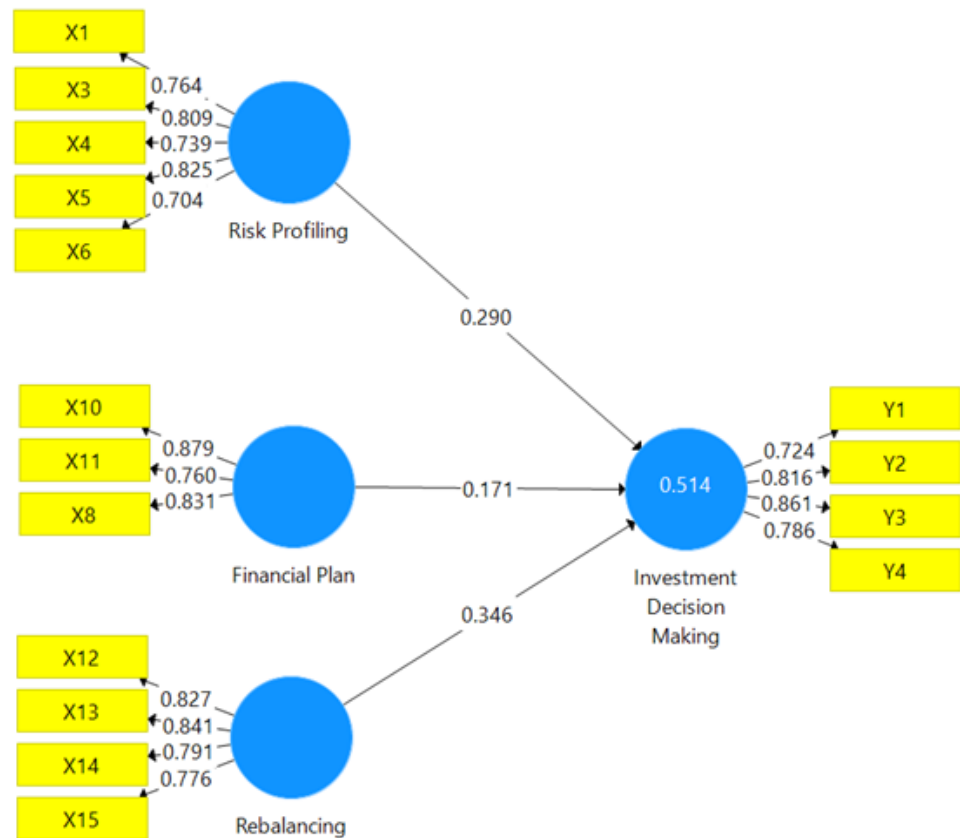


Figure 2: Phase 1 of Measurement Model Testing.

In step 1, there are indicators that have a loading factor of less than 0.70. Therefore, iterations are performed by eliminating the indicator until the final result is obtained with a loading factor greater than 0.70. After the iteration, the phase 2 measurement model is obtained:



**Figure 3:** Phase 2 of Measurement Model Testing.

#### 4.2.2. Convergent Validity

A convergent validity value is a measurement model that can show how manifest or observable variables represent latent variables to be measured. Individual reflective measures can be said to be collaborative if the company’s value is more than 0.7 with the construct to be measured [18]. From the results of the above measurement model analysis, it is known that there are several manifest variables whose corporate factor loading value is 0.7 so that to satisfy the rule of thumb, then the manifest variables whose corporate value is 0.4 must be dropped from the model. The following are the corporate value factor loading all variables:

It is seen that in stage 1 there are still loading factor values of each variable that are less than 0.70. This needs to be iterated by discarding one indicator that has a



TABLE 1: All Variable Loading Factor Values.

Variabel	Indikator	Outer Loading		Keterangan
		Tahap 1	Tahap 2	
<i>Risk Profiling</i>	X1	0,765	0,764	Valid
	X2	0,539	DROP	
	X3	0,787	0,809	Valid
	X4	0,705	0,739	Valid
	X5	0,777	0,825	Valid
	X6	0,711	0,704	Valid
	X7	0,693	DROP	
<i>Financial Plan</i>	X8	0,809	0,831	Valid
	X9	0,691	DROP	
	X10	0,862	0,879	Valid
	X11	0,704	0,760	Valid
<i>Rebalancing</i>	X12	0,827	0,827	Valid
	X13	0,841	0,841	Valid
	X14	0,791	0,791	Valid
	X15	0,776	0,776	Valid
<i>Investment Decision Making</i>	Y1	0,720	0,724	Valid
	Y2	0,819	0,816	Valid
	Y3	0,861	0,861	Valid
	Y4	0,787	0,786	Valid

loading factor of less than 0.70 until the final result with the loading factor value on each variable whose value is more than 0.70. The factor loading values in step 2 are all manifest variables 0 0.7, so nothing is output or dropped. It means that all items are validly capable of reflecting each variable, so that all manifest variables have met the rule of the model of measurement and subsequent testing can be continued.

#### 4.2.3. Discriminant Validity

Discriminant Validity is a test performed by looking at cross loading to test that each concept of each latent variable is different from the other latent variable. To measure the discriminant validity is to look at the height the crossloading value for each variable must be 0 0.7. Another way to assess the discriminant validity is to compare the root value of AVE with the correlation value between latent variables in the model. Discriminant

validity values for a good model if the root of AVE in the construct is greater than the correlation of the construct with other latent variables, a value greater than 0.5 [18]. Based on the tests performed, the output of the discriminant validity is accepted as follows:

TABLE 2: Discriminant Validity.

Variabel	Financial Plan	Investment Decision Making	Rebalancing	Risk Profiling
Financial Plan	0,825			
Investment Decision Making	0,612	0,798		
Rebalancing	0,656	0,646	0,809	
Risk Profiling	0,738	0,639	0,645	0,770

**i. Composite Reability**

Measuring the reliability of a construct with reflective indicators can be done in two ways: with Cronbach’s Alpha and Composite Reliability. The Rule of Thumb to assess construct reliability is that the Composite Reliability value must be greater than 0.70.

TABLE 3: Reability and Validity Constructs.

Variabel	Composite Reliability	Average Variance Extracted (AVE)
Financial Plan	0.864	0.680
Investment Decision Making	0.875	0.637
Rebalancing	0.883	0.655
Risk Profiling	0.879	0.592

According to Table 4 it can be seen that all endogenous and exogenous variables in reliability testing use composite reliability, exceeding 0.7. Thus, it can be concluded that the tested variables are valid and reliable. Therefore, the next step is to continue testing the structural model.

**4.3. Inner Model**

**4.3.1. R-Square (R<sup>2</sup>)**

The R-square value of 51.4% means that the diversity that can be explained by Risk Profiling, Financial Plan and Rebalancing factors in Investment Decision Making is 51.4% while the rest 48.6% is explained by other factors outside the model.

TABLE 4: Endogenous Variable R Square Value.

		R Square	R Adjusted Square
Investment Making	Decision	0.514	0.500

4.3.2. Coefficient Path

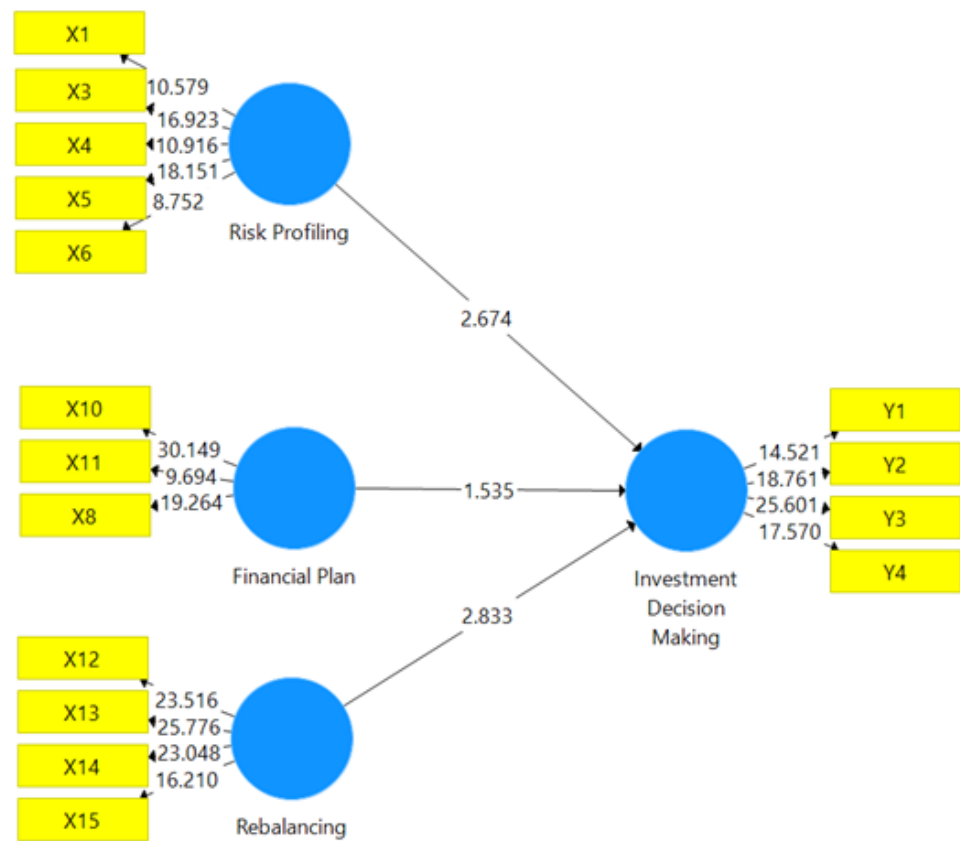


Figure 4: Bootstrapping Results.

TABLE 5: Coefficient Path Significance Measurement.

Hipotesis	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics ( O/STDEV )	P Values	Conclusion
Risk Profiling -> Investment Decision Making	0.290	0.302	0.108	2.674	0.008	S
Financial Plan -> Investment Decision Making	0.171	0.159	0.112	1.535	0.125	NS
Rebalancing -> Investment Decision Making	0.346	0.354	0.122	2.833	0.005	S

According to Table 6, the results of the hypothesis test show that two hypotheses, namely risk profiling and rebalancing are significant and one hypothesis, namely financial plan is insignificant. Rebalancing has a significant effect with prob values (0.005) smaller than alpha 5% and path coefficients of 0.346 which have the most influence on Investment Decision Making. The positive influence shows that the better Rebalancing will be able to increase Investment Decision Making. Risk Profiling has a significant effect with prob values (0.008) smaller than alpha 5% and path coefficients of 0.290 having a second effect on Investment Decision Making. Lastly, the positive influence shows that the better Risk profiling will be able to increase Investment Decision Making. The financial plan had no significant effect on Investment Decision Making because the prob value (0.125) was greater than alpha 5% and the path coefficient was 0.171.

## 5. Discussion

This study tested the influence of the robot's work on the Bibit application, namely risk profiling, financial planning, and rebalancing on investment decision making carried out by millennials. In this study, it can be found that risk profiling and rebalancing have a positive effect on Investment Decision Making. Meanwhile, financial plan variables have no significant effect. This research is in line with previous research which revealed that the use of robo advisor on funds invested by retirees increases the value of these funds, although it does not mention what factors increase these funds [19]. Therefore the use of robo advisors by retirees can increase investment value and by millennials can increase interest in investing

Risk profiling variables can affect and improve millennials' in the Bibit application because they can measure a person's risk level according to their choice. It is further suggested by [19] that it should be developed framework consumer risk profile. This risk profile provides questions that are relevant to the risks faced by customers and how to assess these risks

Portfolio rebalancing variables can lower investment risk and time changes and dynamic market movements can cause the composition of asset allocation from optimal portfolios to change. However, the financial plan variable has no effect on investment decision making because it is likely that investors in investing in the Bibit application have control in their decisions and the majority of respondents still need consideration on how the financial plan roboadvisor works in the Bibit application to help them invest. According to [20], Financial plans are closely related to experience. The more

experience they have in investing, the less financial plans they need because financial plans are already embedded with making investment decisions.

## 6. Finding and Conclusion

Based on research and analysis on how the robot works in the Bibit application, it can be concluded that the use of the robot has successfully influenced millennials' decision to invest. This is supported by the effectiveness of three ways the robot works, namely risk profiling, financial plan, and rebalancing. Of these three ways of working, two variables, namely risk profiling and rebalancing, have an influence in influencing investment decisions by millennials.

The influence of risk profiling on investment decisions suggests that this method is the right approach to help a person decide to invest according to the risk level. Meanwhile, variable rebalancing also has an important role in influencing the decision to invest millennials because it can maintain investors' portfolios to remain optimal and efficient.

However, it should be noted that millennials who already have experience in investing tend to be more independent in decision-making and may not rely too much on the advice of the supervisor, so the financial plan variable does not have a significant influence on investment decisions. This may be due to the long-standing investment experience that makes the use of the robot less necessary for them.

## 7. Implications, Limitations, and Suggestions

For Bibit Applications, based on the results of this study, the risk profiling and rebalancing on how the robot works effectively becomes a major influence for investors to invest. Although the financial plan is insignificant and less effective because if one has long experience of investment, financial planning using a roboadvisor is not necessary.

For subsequent research, it has the potential to examine more in-depth roboadvisor such as user trust, comparative studies between investment platforms that have roboadvisor, and in this study how financial plan works on the Bibit application roboadvisor has no effect on investment decisions, This can be researched in more detail so that the use of roboadvisor is improved. In addition, further research can also expand respondents throughout Indonesia, especially small cities with low investor rates so that the increase in investors in Indonesia is evenly distributed.

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