



## The Nexus of Financial Literacy and Investment Decision in the Light of Risk Tolerance Mediation

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**Abstract**

In this research examines the relationship of financial literacy with investment decision along with the mediating role of risk tolerance for the retail investors in Pakistan. The study has employed the decision theory and behavioral finance theory. The primary data required for this study were collected through a structured questionnaire from 325 retail investors from different cities of Punjab, Pakistan by collecting data using a non-probability sampling technique, such as convenience sampling technique. The data has been analyzed through SMART PLS-SEM and SPSS software. The main effect model results indicate that financial literacy has a positive and significant impact on investment decisions. The finding for the mediation effect model shows that the mediating variable of risk tolerance has significantly and positively mediated the relation of financial literacy with investment diction. This study suggests that the government and other decision makers take appropriate steps to increase the level of financial literacy of retail investors because it will result in better saving habits for the people and the funds generated from the public can be used for a variety of economic activities and the country's economic growth.

### 1. Introduction

Investment decisions are important along with many decisions that one must make in life for the future. The investment is a decision to invest the capital in a financial instrument for a specified time to make wealth in the future. Bodie, Kane, and Marcus (2018) stated that investment is the way of putting money into a portfolio of real and financial assets. The long-

term investment decisions have become one of the most imperative information that should be provided for both institutional and individual investors, it is also influenced by a variety of variables, including financial literacy, knowledge, education, risk tolerance, etc.

In Pakistan, most investors have insufficient financial data, affecting them with certain types of biases, and as an effect, the investment decision-making is irrational which bears large losses on investment and these impacts are observable on the national stock market. According to the Financial Literacy and Education Commission of the United States of America, FL is defined as "the possibility of making better decisions and performing activities related to the existing and future use and control of finances" (Basu, 2005; Vorobyov & Basu, 2005). The financial literacy is described as the ability to understand concepts and risks, and the ability to create good financial decisions and improve one's financial welfare and help the community (Susilowati & Santoso, 2018). It's difficult to make strong financial decisions without financial information these days, because of the improved nature of the financial markets in recent years. Financial literacy is critical for people with lower financial resources in the Islamic Republic of Pakistan, as incomplete information may lead to investment difficulties. The risk tolerance is well-defined as the inclination to take risks with a higher return (Grable & Joo, 2004). It refers to a person's willingness to accept risk as a result of financial decisions (Bahri, 2018). A person's risk tolerance refers to his willingness to take risks as the level of risk tolerance for each investor is different as it defines a person's reaction to and attitude toward investment risks. The risk tolerance can help anyone in recognizing the level of risk involved with an investment to achieve investment objectives and also, be able to withstand and accept the current risks to achieve investment goals.

This research will also help out the investors to better understand their behaviors by analyzing the reasons that influence them to deviate from wealth-maximizing strategies. Before making an investment decision, they will be able to more effectively focus and review all relevant information. As per the author's best knowledge, there is a research gap regarding the relationship of FL and ID in the light of RT mediation. Moreover, the literature also shows that this type of study has not been conducted in the context of Pakistan. Therefore, this research is intended to fill this research gap as it is the first study which is exploring the nexus between FL and ID through RT mediation. The investors must accept the available opportunities based on the financial decisions which should not be taken in a rush for a profitable investment decision as the irrational investment decision can result in investment

losses. It is required to recognize the important concepts of financial literacy to get the maximum benefit from the investment process. Saleem, Usman, Haq, and Ahmed (2018) depicted that investor make irrational decisions because of their inadequate mental ability, time, and other resources which results in poor financial performance. Therefore, sufficient financial literacy and rational behavior are critical elements for a rational investment decision. Therefore, the prevailing literature depicts that there is a need to further investigate the Nexus of FL and ID in the light of RT mediation. Therefore, this study intended to determine the influence of FL on ID with the mediating role of RT for the retail investors of Punjab, Pakistan.

This research may also be helpful for the investors in considerate the value of financial literacy in dealing with risky investments as well as generating more profit from the investment. In the end, this study illustrated how retail investors can use FL, and RT to take the ID which will result in a positive, rational, and profitable decision for them.

## **2. Literature Review**

Many researchers have studied the association between Financial Literacy (FL), Risk Tolerance (RT), and Investment Decision (ID) Arif (2015) discovered a positive and significant correlation between FL and ID for investors. Abdeldayem (2016) depicted that FL had an insignificant effect on ID in the Kingdom of Bahrain because the FL of Bahraini investors is below average. Zakaria, Nor, and Ismail (2017) determined that FL has a positive and significant association with RT for savings and investments T. Kalsum, Anwar, Majid, Khan, and Ali (2018) stated that FL influences small enterprises' ID in Southeast Sulawesi which means that if small enterprises in Southeast Sulawesi have better FL, they will make a better decision. T. Kalsum et al. (2018) portrayed that FL influences small enterprises' ID in Southeast Sulawesi which means that if small enterprises in Southeast Sulawesi have better literacy, they will make a better decision.

Oteng (2019) discovered that there is an effective and positive link between FL and ID, indicating that improved FL leads to better decisions. Adiyani and Mawardi (2020) exposed that RT has a positive and significant impact on millennial investors' stock decisions in Semarang City. Alaaraj and Bakri (2020) depicted that FL and ID have a positive and significant connection. Anastasia and Basana (2021) revealed that FL has a significant impact on ID, whereas RT has a significant impact on ID. Nugraha, Tulung, and Arie (2021) exposed that FL consumes a positive and significant influence on ID in Manado. Barno,

Cheboi, and Muganda (2021) that FL has a positive influence on ID, which improves means that better literacy improves the outcomes of decisions and therefore improves the financial performance of SMEs.

Some studies have provided positive results as FL performs a critical part in improving ID (Ameriks (2003); Lusardi and Mitchell (2007); Pak and Mahmood (2015); Awais, Laber, Rasheed, and Khursheed (2016); Chavali and Mohanraj (2016); Shusha (2017); Zakaria et al. (2017); Gupta, Zuniga, Ghosh, Abdou, and Mao (2018) Oteng (2019); Asfira, Rokhmawati, and Fathoni ; Alaaraj and Bakri (2020); (Waheed, Ahmed, Saleem, Mohy-Ul-Din, & Ahmed, 2020); Baihaqqy and Sari (2020); Anastasia and Basana (2021) and (Prasad, Kiran, & Sharma, 2021). Nevertheless, few researchers have also depicted negative, neutral, and mixed correlations (Moore et al. (2003); Huston (2010); Hayat and Anwar (2016); Sadiq and Khan (2018); Ainia and Lutfi (2019); Hamza and Arif (2019); and (D. Khan, 2020).

We can also see from the literature review that some studies depicted a positive relationship, whereas, some other studies depicted a negative relationship between FL and ID with RT. Thus, a major objective of this research is to fill this research gap as it is the first study which is exploring the nexus between FL and ID through RT mediation to encourage better investment decision making. Following are the hypotheses of this study:

**H1:** Financial Literacy has a positive and significant impact on Investment Decision.

**H2:** Financial Literacy has a positive and significant impact on Risk Tolerance.

**H3:** Risk Tolerance has a positive and significant impact on Investment Decision.

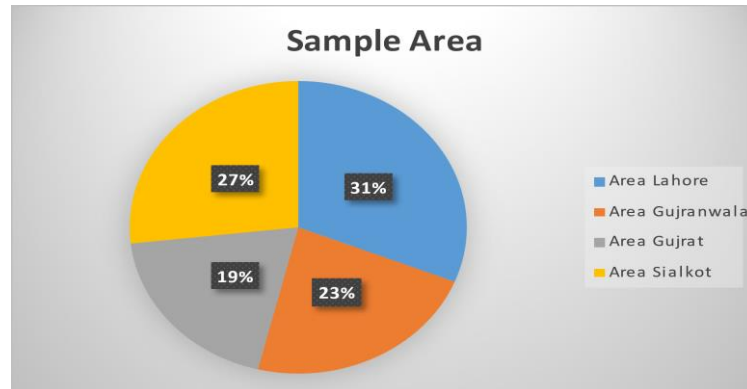
**H4:** Risk Tolerance has the mediating effect between Financial Literacy and Investment Decision.

### **3. Methodology and Data Analysis**

#### **3.1 Participants and Procedure:**

This study has used the primary data composed from the retail investors from the cities of Lahore, Gujranwala, Gujrat, and Sialkot in Punjab, Pakistan by using the structured questionnaires in August and September 2021. The sample for this study contained of retail investors in Punjab, Pakistan, who must have invested in stock on the Pakistan Stock Exchange (PSE). There are 325 valid questionnaires collected from the respondents out of 500 total distributed questionnaires which represents a response rate of 65%. The questionnaires have been sent to retail investors with past investment experience. The number of questionnaires collected from Lahore city is 101; 74 questionnaires have been collected

from Gujranwala; 63 completed questionnaires have been collected from Gujrat and 87 completed questionnaires have been collected from Sialkot. This information has been shown in figure 1 as follows:



*Figure 1: Sample Area*

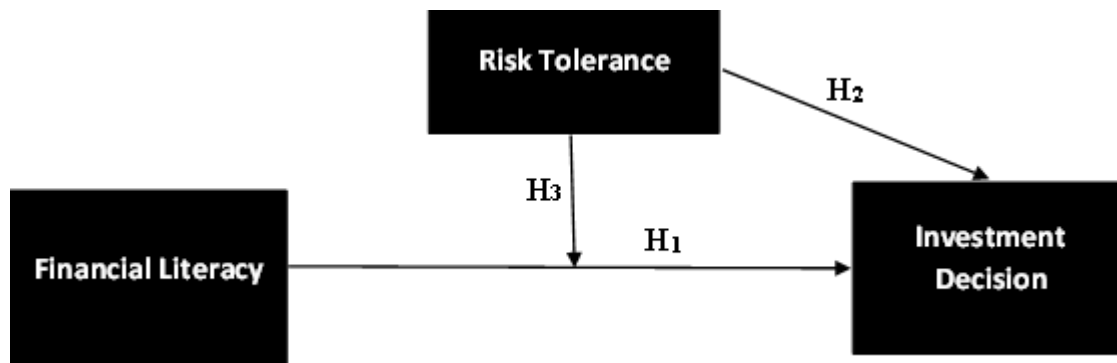
### **3.2 Population and Sample Size:**

The targeted population of this study is the retail investors of Punjab, Pakistan from the industries of Apparel and Sports Goods, Leather items, Surgical Instruments, Ceramics, Cutlery, Metal Processing, Sanitary items, Motors and Pumps, PVC and Plastic items, Fans, Furniture, and Carpets. This study has used a non-probability sampling technique such as the convenience sampling technique to collect the data from the retail investors of Punjab, Pakistan. The sample size of the study is 325 according to Morgan's table (Krejcie & Morgan, 1970).

### **3.4 Measurement and Scales:**

This research has utilized a self-administered questionnaire and there are three variables used in this study namely, Financial Literacy which has been used as an independent variable, Investment Decision is used as a dependent variable, while, the Risk Tolerance is employed as a mediating variable. A total of 500 questionnaires have been circulated to the respondents for ensuring a minimum sample size of 325; out of the 500 distributed Questionnaires, 105 questionnaires were not returned by the respondents; 47 questionnaires contained incomplete information and were not suitable to be included in the final sample; whereas 23 questionnaires contained inconsistent information i.e., there is only one trend of answers. The questionnaire is consisting of 5 sections and a 5-Point Likert scale is used to measure all items in sections 2, 3, and 4. Each of the items has the following Likert scales: 1 is strongly disagree, 2 is Disagree, 3 is Neutral, 4 is Agree, and 5 is strongly agree.

Based on the empirical literature, the theoretical model of this study is as follows:



**Figure 2: Theoretical Model**

The proposed model was based on two theories in this study namely the Decision theory presented by Warner (1968) which is the first theory, and the Behavioral finance theory (BFT) which is the second theory proposed by (Tversky & Kahneman, 1980). The theory of decision-making aims to explain how a range of factors influence the investment decision-making process, which might vary from person to person because of the complex characteristics of individuals (Musundi, 2014).

The behavioral finance theory declares that instead of being rational, people normally have emotions and cognitive biases are used to make financial decisions. This theory can be applied to this research since it describes the aspects that are important to investors when formulating investment decisions. Behavioral finance theory examines how psychological elements and behavioral biases influence decision-making.

This study has used the following regression model for determining the association of FL with ID with the mediating role of RT:

$$ID = \alpha + \beta_1 FL + \beta_2 RT + \varepsilon$$

*ID = Investment Decision*

*α = Constant*

*β = Beta Coefficient*

*FL = Financial Literacy*

*RT = Risk Tolerance*

*ε = Error Term*

## 4. Results

### 4.1 Descriptive Statistics:

The summary of results related to descriptive statistics comprising mean, maximum value, minimum value, standard deviation, and variances are showed in Table 1 as follows:

*Table 1: Descriptive Statistics*

	N	Minimum	Maximum	Mean	Std. Deviation	Variance
<b>Financial Literacy</b>	32	1.000	5.000	2.842	0.926	0.857
<b>Investment Decision</b>	325	1.000	5.000	3.125	0.857	0.735
<b>Risk Tolerance</b>	325	1.000	5.000	3.562	0.940	0.883

The table 1 shows that the mean values for FL, ID and RT are 2.842, 3.125 and 3.562 correspondingly. The results also show that the standard deviations values FL, ID and RT are 0.926, 0.857 and 0.940 respectively. Whereas, the findings also show that the variance values for FL, ID and RT are 0.857, 0.735 and 0.883 exclusively.

### 4.2 Correlation Matrix:

The correlation analysis has been performed on the dataset and the results have been reported in Table 2 as follows:

*Table 2: Correlation matrix*

	Financial Literacy	Investment Decision	Risk Tolerance
<b>Financial Literacy</b>	1		
<b>Investment Decision</b>	.526**	1	
<b>Risk Tolerance</b>	.274**	.535**	1

The findings also depicted that FL has a positive impact on ID by a value of  $r = 0.526^{**}$ , which means that FL has a significant link with ID. The outcomes also show that there is a positive connection between FL and RT with a value of  $r = 0.274^{**}$ , which means that FL has a significant association with RT. The results also show that there is a positive association among RT and ID with a value of the coefficient of  $r = 0.535^{**}$ , which means that RT has a significant relationship with ID.

**4.3 Demographic Characteristics of Participants:**

The results related to the demographic characteristics of the participants have been accessible in table 3. There are three different categories namely age and income which has been further divided in five sub-categories.

*Table 3: Demographic Characteristics of Participants*

<b>Profile</b>	<b>Category</b>	<b>age%</b>
<b>Age</b>	Below 30	34%
	31-40	15%
	41-50	25%
	51-60	18%
	Above 60	8%
<b>Income</b>	Below 50,000.	12%
	50,001 to 70, 000.	17%
	70,001 to 90,000.	18%
	90,001 to 110,000.	23%
	Above 110,000	30%

**4.4 Confirmatory Factor Analysis:**

The confirmatory factor analysis is discussed in this section and the results have been discussed in table 4. As recommended by Anderson & Gerbing (1988); a two-step method is used for data analysis.

*Table 4: Confirmatory Factor Analysis*

<b>Constructs</b>	<b>Items</b>	<b>Source</b>
Financial Literacy Cronbach's Alpha = 0.762 CR = 0.840 AVE = 0.516	I Know how the stock market works	0.738
	I have knowledge about the activities in PSX	0.815
	I was somehow at tending the conferences, seminars and workshop arranged by PSX at least 3 time in a year	0.704
	Most of the time I will visit the website of PSX (at least every 3 months).	0.733
	I believed that the investor personal knowledge about investment and stocks will help them to make secure financial investment.	0.580
Risk Tolerance Cronbach's Alpha = 0.704 CR = 0.833	If I believe an investment will carry profit, I am willing to borrow money to make this investment	0.831



AVE = 0.626	I believe I need to take more financial risks if I want to improve my financial position	0.821
	I want to be sure my investments are safe. (Reverse-coded)	0.717
Investment decision Cronbach's Alpha = 0.742 CR = 0.788 AVE = 0.557	A fluctuation in stock exchange markets do not concerns me	0.522
	Put up my half of investments money in the stock exchange of Pakistan	0.742
	Wisely allocate my income for making investment decisions	0.815
	I think the benefit of choosing risky investments was influence the decision making	0.730
Overall Model Fit: Chi-Square = 0.322; NFI = 0.614; SRMR = 0.141; d_ULS = 1.798; d_G = 0.322.		

The table 4 displays that all of the components' Alpha values are fluctuated from 0.704 to 0.762 which indicates that the alpha values of all constructs meet the 0.70 minimum criteria. The composite reliability (CR) values vary from 0.788 to 0.840, exceeding the standard value of 0.70, so the instrument was considered to be accurate for measuring latent constructs in this study. All items had a standardized factor loading of 0.704 to 0.831 which is significant at the 0.01 level of significance. However, two items with values of 0.522 and 0.580 are unacceptable, thus these items have not been included in the analysis. All AVE values were between 0.516 to 0.626, which was higher than the minimum criteria of 0.50, indicating that maximum variance is evaluated using constructs (Forlani & Mullins, 2000). The values of AVE were compared to squared correlations between paired constructs to evaluate discriminant validity, and discriminant validity was represented. Finally, the research instruments demonstrate that the value of the latent construct has a high level of validity and reliability.

**4.5 Path Coefficients:**

The path analysis was operated by using the PLS-SEM version 3.3.3. The whole PLS path model was examined, including the effects of FL and ID, as well as the mediating effects of RT. The findings are depicted in the following sections.

**4.5.1 Main Effect:**

The main effect analysis has been performed and the following results are exposed in figure 3 and table 6 as follows:

**Analysis of PLS (Partial Least Square):**

Figure 3: Analysis of (PLS) Main Effect

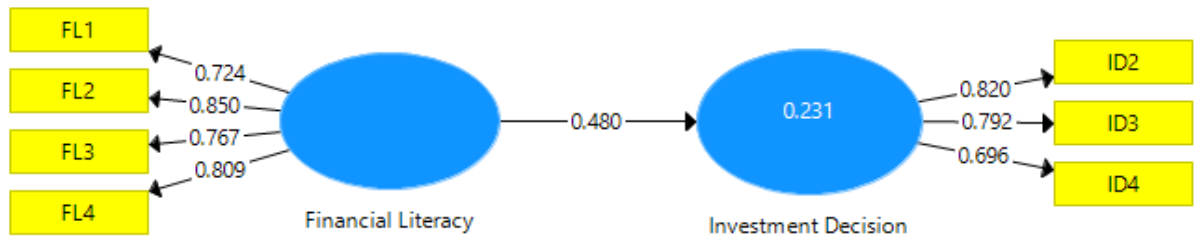


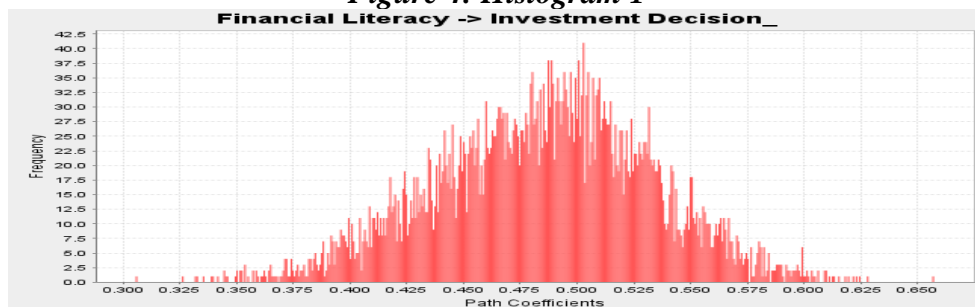
Table 5: Model estimation

Hypothesized Path	Main Effect			Status
	Path Coef	t value	p-value	
H1: FL--> ID	0.480	10.125	0.000	Accepted

Note: FL = Financial Literacy; ID = Investment Decision

As depicted in figure 3; the independent variable of FL has four indicators for measuring the value; the first indicator has a value of 0.724; the second indicator has a value of 0.850; the third indicator has a value of 0.767, whereas, the fourth indicator has a value of 0.809. The dependent variable of ID has three indicators for measuring the value; the first indicator has a value of 0.820; the second indicator has a value of 0.792, whereas, the third indicator has a value of 0.696. The hypothesis 1 investigates the impact of FL on ID and found that FL has a positive and significant impact ( $b = 0.480$ ;  $t = 10.125$ ) on ID which is presented with the help of bootstrapping. As the t-value of this relationship is more than 1.96, therefore, H1 is supported as depicted in table 5. The findings show the value of the path coefficient is 0.480 which means that a unit change in FL will improve the ID by 0.480 or 48%. The R value of ID is 0.231 which means that FL has explained 23% variations of ID as depicted in figure 3.

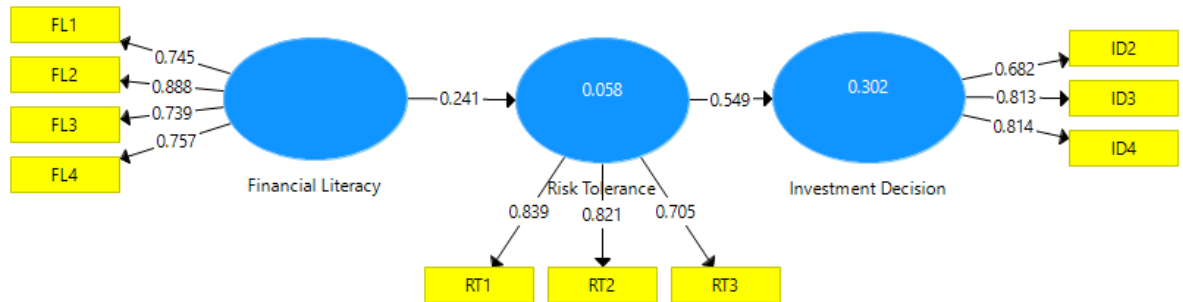
Figure 4: Histogram 1



**4.5.2 Mediation Effect:**

The analysis for the mediation effect has been performed and the results have been presented in figure 5 and table 6 as follows:

*Figure 5: Analysis of (PLS) Mediation Effect*



*Table 6: Model estimation*

Hypothesized Path	Mediation Effect			Status
	Path Coef	t value	p-value	
H2: FL--> RT	0.241	4.600	0.000	Accepted
H3: RT-->ID	0.549	12.547	0.000	Accepted
H4: FL-->RT--ID	0.132	3.745	0.000	Accepted

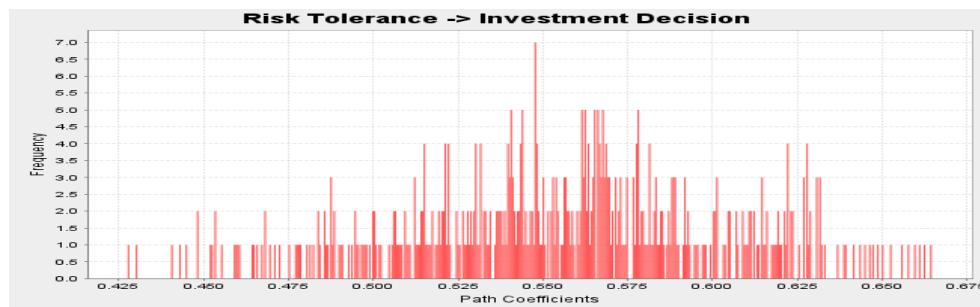
Note: FL = Financial Literacy; ID = Investment Decision; RT = Risk Tolerance

Adjusted R<sup>2</sup> 0.420 or 42%

As depicted in figure 5; the independent variable of FL has four indicators for measuring the value; the first indicator has a value of 0.745; the second indicator has a value of 0.888; the third indicator has a value of 0.739, whereas, the fourth indicator has a value of 0.757. The mediating variable of RT has three indicators for measuring the value; the first indicator has a value of 0.839; the second indicator has a value of 0.821, whereas, the third indicator has a value of 0.705. The dependent variable of ID has three indicators for measuring the value; the first indicator has a value of 0.682; the second indicator has a value of 0.813, whereas, the third indicator has a value of 0.814. The hypothesis 2 investigates the impact of FL on RT and found that FL has a positive and significant impact (b = 0.241; t = 4.600) on RT which is presented with the help of bootstrapping. As the t-value of this relationship is more than 1.96 therefore, H2 is supported. The results show the value of the path coefficient is 0.241 which means that a unit change in FL will result in an increase of 0.241 or 24% in RT. The R value of RT is 0.058 which means that FL has explained 6% variations of RT as depicted in figure 5.

*Figure 6: Histogram 2*



*Figure 7: Histogram 3*

The hypothesis 3 investigates the impact of RT on ID and found that RT has a positive and significant impact ( $b = 0.549$ ;  $t = 12.547$ ) on ID which is executed with the help of bootstrapping. As the t-value of this relationship is greater than 1.96, therefore, H3 is supported. The results show that the value of the path coefficient is 0.549 which means that a unit variation in RT will increase to 0.549 or 55% in ID. The R value of ID is 0.302 which means that RT has explained 30% variations of ID as depicted in figure 5. The hypothesis 4 investigates the impact of RT on ID with the mediating effect of RT and found that RT has significantly mediated the link between FL and ID ( $b = 0.132$ ;  $t = 3.745$ ). As the t-value of this relationship is greater than 1.96, therefore, H4 is supported as depicted in table 6.

The adjusted R2 value is 0.420, or 42 percent, indicating that the explanatory variables in this study have jointly described 42 % of the variance in investors' investment decisions, with the remaining 58 % influenced by additional variables not involved in this study model. As seen in tables 5 and 6, the results revealed that all four hypotheses are validated and accepted.

## 5. Discussion

This study intended to influence the effect of FL on ID with the mediating role of RT for the retail investors of Punjab, Pakistan. So, a major objective of this research is to fill this research gap as it is the first study which is investigating the nexus between FL and ID through RT mediation to encourage better investment decision making. The results expose that all the hypotheses of this study have been accepted. The results for the main effect model show that FL has a positive and significant effect on ID. The finding for the mediation effect model shows that the mediating variable of RT has significantly and positively mediated the relation of FL with ID.

Based on the preceding discussion, this study concludes that RT has a mediating effect on the relationship between FL and ID. So, this study has shown how retail investors

can use FL and RT to take the ID which will result in a positive, rational, and profitable decision for them.

### **5.1 Theoretical Contribution**

Our research contributes to literature in some ways. First, we extend prior research by investigating the relations of FL on ID. Therefore, the existing literature depicts that there is a need to further investigate the Nexus of FL and ID in the light of RT mediation. Moreover, the literature also shows that this type of study has not been conducted in the context of Pakistan. Second, this study will contribute to the literature is intended to fill this research gap as it is the first study which is investigating the nexus between FL and ID through RT mediation for the retail investors of Punjab, Pakistan. Third, this research may also be helpful for the investors in understanding the value of financial literacy in dealing with risky investments as well as generating more profit by the investment. The outcomes of this research have implications for the fund managers that how they can make an investment decision by having the minimum risk and still obtaining the maximum return from their investment portfolio. In the end, this study illustrated that how retail investors can use FL and RT to take the ID which will result in a positive, rational and profitable decision for them.

### **5.2 Managerial Implication**

The study is beneficial to investors who are fundamentally involved in the decision-making process for investments as it enables them to make more rational decisions to achieve better investment returns. This study recommends that the government and other decision makers take appropriate steps to increase the level of financial literacy of retail investors because it will result in better saving habits for the people and the funds generated from the public can be used for a variety of economic activities and the country's economic growth. This study will help investors better recognize their financial system and improve it additional for their wealth maximization. Moreover, this study highlights the significance of financial literacy which also helps investors get rid of the psychological combining issues which influence their investment choices and decisions. This research provides valuable information for managers and investors who are involved in investment decision-making on an individual or intuitional level. The study also helps the fund managers how they can make an investment decision by having the minimum risk and still obtaining the maximum return from their investment portfolio.

### 5.3 Limitations and Future Directions

The future researchers can focus on the following future directions: Firstly, this study only collected the data from the retail investors of Punjab, Pakistan, so future research can collect data from all over Pakistan for better results. Secondly, due to time constraints, the number of completed questionnaires is at the minimum level, so future researchers can obtain the data from more respondents and from different cultures and regions for more valid results as suggested by previous researchers (Rasheed, Weng, Umrani, & Moin, 2021; Yousaf, Rasheed, Kaur, Islam, & Dhir, 2022).

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