

-RESEARCH ARTICLE-

**THE ROLE OF INVESTORS' BEHAVIOR AND PSYCHOLOGICAL UNBIASEDNESS ON THE DIGITIZATION OF THE CAPITAL MARKET IN INDONESIA: MEDIATING ROLE OF TECHNOLOGY ADVANCEMENT**

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### —Abstract—

Recently, the digitalization of the financial markets is the requirement of the modern world that requires the attention of regulators and researchers. Hence, the current article investigates the impact of investors' behavior towards technology adoption and psychological unbiasedness about technology advancement on the digitalization of the capital market in Indonesia. The study also examines the mediating role of technology advancement among investors' behavior toward technology adoption, psychological unbiasedness about technology advancement and digitalization of the capital market in Indonesia. The article used questionnaires to collect the data from the selected respondents. The study also applied the PLS-SEM to test the association between the variables using smart-PLS. The results indicated that the investors' behavior towards technology adoption and psychological unbiasedness about technology advancement have positive relationships with the digitalization of the capital market in Indonesia. The findings also exposed that the technology advancement mediates among investors' behavior and psychological unbiasedness and digitalization of the capital market in Indonesia. The study guides the policymakers in establishing policies related to the digitalization of the capital market by promoting the investors' behavior and psychological unbiasedness towards technology adoption.

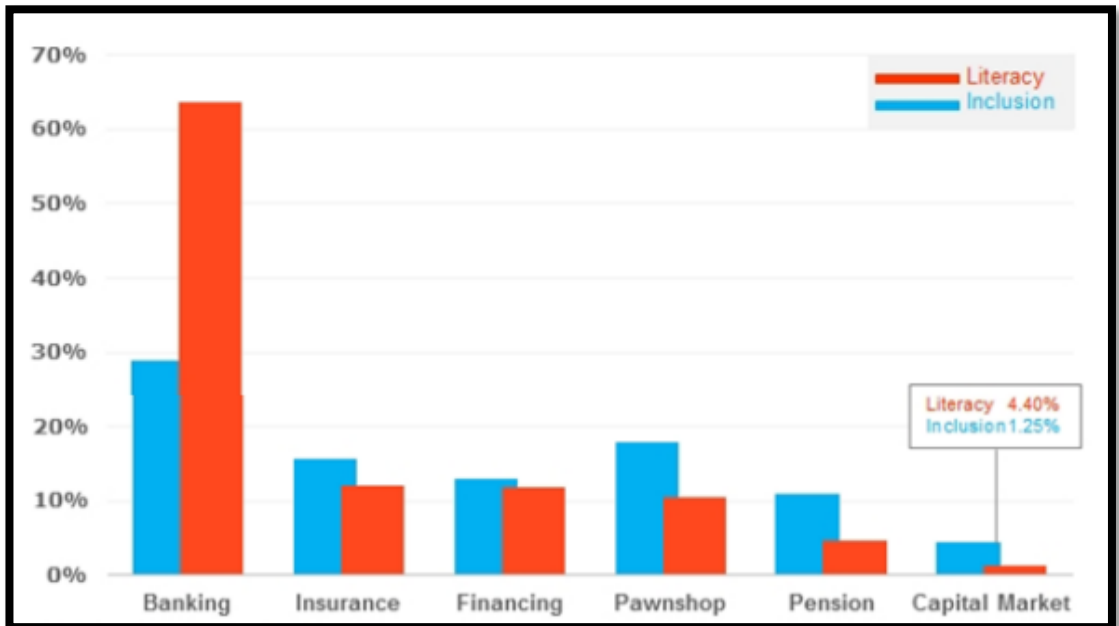
**Keywords:** Digitalization of capital market, psychological unbiasedness, technology advancement, investors' behavior

## 1. INTRODUCTION

The capital market of any country is one of the key supporters and contributors to the country's economy. The capital market is also the indicator of foreign direct investment, whether to invest in the country or not. As the capital market is an organized physical location where securities are exchanged (O. Kim, 2020; Żebrowska-Suchodolska et al., 2018). It is essential to realize that the stock market is a structured system that connects direct and indirect sellers and purchasers of securities. Over the past few years, one of the factors which affected the financial markets all around the globe is Covid pandemic. As the Covid-19 pandemic put a lot of pressure on Indonesia's stock market throughout 2020, the number of investors in the market has seen a significant increasing trend. With

the frequency of the increased transactions, the total number of investors in the capital market climbed to 3.88 million, there is a 56% increase from the previous year. The number of investors continued to rise to 4 million investors till January 2021. According to KSEI statistics from October 2020, a fintech trading agent attracted over 49.75 percent of capital market participants (Hamzah, 2018; Hani et al., 2020). These statistics demonstrate how a change in consumer behavior affects the industry's move to digital platforms. Thus, there is an association between consumer behavior (which build from the individual psyche) and the digitalization of any industry in the country (Sima et al., 2020; Valverde et al., 2020).

Despite that, there are numerous challenges faced by the investors regarding digitalization of the capital market like investor resistance in terms of avoidance of market digitalization, investor psyche, and country's economic as well as political circumstances. The present study will address the investor's role in capital market digitalization. The retention of the investors is the ultimate aim of the capital market. Market while having decision analyze every aspect of the decision to avoid any sort of resistance. Indonesia is a developing country, therefore, likewise, the developed countries it's not fully digitalized. With the view to meet international clients the capital market gets itself digitalized. This digitalization is expressing the effect on that people. The factors like investor behavior along with psychological biasedness are the key element in the entire process (Ady, 2018, 2019; Ady et al., 2013). Therefore, the present study will address the investor's role in the digitalization of the capital market. Indonesian capital market conditions are given in figure 1.



**Figure 1: Indonesian capital market conditions**

The present study will address some gaps does exist in the literature like 1) as a result of globalization the technological revolution has enforced every aspect of society to adopt it. Similar is the case with the financial market. Now the investors also prefers to operate their investment from anywhere, although the capital market adopted the digitalization but still there are number of investors who still not accept this digitalization, being one of the important and highlighted factors although its researched although but still there are number of factors yet to explore, 2) [Uddin et al. \(2021\)](#), worked on the necessity of the capital market digitalization in Bangladesh while Pandemic situation, whereas the present study will check it with investors behavior and psychology in Indonesian perspective with the fresh data set, 3) [Spindler \(2019\)](#), investigated the capital market digitalization from corporate law point of view, whereas the present study will investigate it with investors behavior, psychological unbiasedness and also with the addition of moderation effect in Indonesian perspective with the fresh data set, 4) [Basrowi et al. \(2020\)](#), worked on the Islamic Sharia Capital market along with digital technology, whereas the present study will check it in traditional capital market with the addition of moderating variable i.e. technological advancement from Indonesian perspective, 5) the model consist of investors behavior, psychological unbiasedness, technological advancement and digitalization of the capital market is not tested before in Indonesian in the recent time, 6) [Kalbhor et al. \(2020\)](#), worked on the capital market and investor decision making in India, whereas the present study will check the capital market from digitalization perspective along with addition of moderating variable technological advancement in Indonesia. The significance of the study is 1) will highlight the importance of capital market digitalization for the market expansion as well as for the investors particularly in Indonesia, 2) will be helpful for the capital market related professional to revamp their policies with the view to convincing the investors to accept the digitalization in the capital market, and 3) will help the researchers to explore more aspects of capital market digitalization in particularly in Indonesia.

Structurally the paper is divided into different chapters. In the first chapter, the overall introduction of the study including the study gap and significance will be presented. The second phase will present the evidence about investor's behavior, psychological unbiasedness, technological advancement, and digitalization of the capital market in connection with past studies will be discussed. The third chapter of the study will provide the methodology, i.e., the collection of data about investor behavior, psychological unbiasedness, technological advancement, and digitalization of the capital market. After that will, the validity of the data will be analyzed. The results received after data analysis will be presented in the fourth chapter. Finally, the study conclusion, implications, and recommendations will be presented.

## 2. LITERATURE REVIEW

Over the past few decades, the financial markets also witnessed different changes as a result of advancement. There are different factors that affect the capital market decision making like digitalization or any other sort of technological changes. The market forces while having any decision ensure maximum analysis of investors who are the ultimate effect of these changes. The digitalization of the market has different effects on different investors. Investors who avoid much technology involvement usually avoid any such changes. But the market forces ensure the proper support of such individuals as the individual behavior affects the capital market (Kalbhor et al., 2020; Parveen et al., 2020). As the investors of the capital market play a vital role in the overall performance of the capital market. The market is the combination of investors like well-literate or less literate (Ady, 2019). The behavior of the investors who changes themselves with the technological and other changes is different from those who ignored the adoption of the change. Factors like financial literacy affect individual behavior which further affects the capital market and any sort of decision like digitalization. In this context, Shaik et al. (2022) worked on the association between financial literacy and the behavior of the investor, particularly in India. The data set of 100 respondents was collected and tested with the help of SPSS. The results of the study revealed that there are a number of factors that affect the investor psyche and one of them is financial literacy. Financial literacy helped the investor for a better understanding of the capital market which further affects individual behavior in any sort of decision-making pertaining to the capital market (Ady, 2019). Investors that exhibit herding behavior replicate the behaviors of others (Ady et al., 2020; Hartani et al., 2021). The Covid pandemic has affected herding behavior in two different ways investors first take into account the information available to maintain and/or invest in the capital markets based on their beliefs and then they consider other agents who are more informed and adapt their behavior. This is done in response to the economy's decline and the medical and social uncertainties. In this context, Espinosa-Méndez et al. (2021), worked on the relationship between herding behavior and the capital market as a result of the Covid pandemic. The study was conducted in Europe. The data set of 20 years like from 2000 to 2020 was collected and tested. The results of the study revealed that the Covid pandemic has resulted in increase in the herding behavior in the capital market of France, Germany, Italy, UK and Spain. Thus, the investor's behavior effects the capital market. Thus, the hypotheses derived from the above debate is as under:

**H1:** Investors' behavior significantly influences the digitalization of the capital market.

The investors are the ultimate stakeholders of any financial market. Similar is the case with the capital market. Investor involvement decides the future of any market. Over time the capital markets change themselves with the view to facilitate their investors with the aim to support their investors. The investor psyche plays a vital role in its decision making which further affects the market decisions like digitalization (Haque et

al., 2022; Madaan et al., 2019). With the passage of time, every financial market adopts digitalization in order to meet rapidly changing technological needs. The investor's psyche pays to affect the capital market in terms of its decision-making. In this context, Kalbhor et al. (2020), worked on individual behavior and decision-making in the capital market. The study was conducted in the Indian capital market. The data set of 241 respondents were collected and tested with the help of SEM. The results of the study revealed a substantial association between the personalities of Individualist and guardian and all three biases like a celebrity and straight arrow and both anchoring and herding biases, and adventurer and just herding bias. Furthermore, it is discovered that all of the personalities, with the exception of the straight arrow, have a substantial association with demographics. While having decisions regarding the capital market the individual should remain unbiased as biases can cause impulsive decision-making. Individual psychosocial unbiasedness plays a vital role in the case of capital market decision-making (Sol, 2022; Uddin et al., 2021). Similarly, Shahid et al. (2018), worked on the investor's psychology and capital market. The study was conducted in Pakistan. The data set of 30 interviews were conducted. The results of the study revealed that investor behavioral biases affect the investor's decision-making. The investor's decisions with unbiasedness can lead to a good decision on the other hand any sort of biases can lead to adverse decision making. The psychology is one of the strong tools for the individual behavior. The behaviors biasness based on the psychology. An investor with positive psychology will lead to an unbiased decision making. In this context, Shah et al. (2018) worked on the biases in investor decision-making and their effect on the capital market performance. The study was conducted in Pakistan. The data set of 143 investors were collected and tested with the help of the PS technique. The results of the study revealed an empirical understanding of how investment choices, heuristic biases, and perceived market efficiency are related. Thus, the hypotheses derived from the above debate is as under:

**H2:** Psychological unbiasedness significantly influences the digitalization of the capital market.

The investor's behavior regarding investment and the financial market changes over time. There are multiple reasons for it like individual behavior, psyche, market conditions, and market internal and external force's reaction. If the investment is in good flow for the investor the one avoids any sort of changes in the market that might affect the investment (as per investor developed opinion) (Davoudi et al., 2022; Perwitasari et al., 2020). The world is getting more digitalized which also expresses its effect on the capital market. The markets are getting digitalized with the view to meet world demand. There is a mixed response from investors reporting on such digitalization. The investors who like the changes usually accept them wholeheartedly but on the other hand, the investors who prefer the traditional ways avoid them. Thus, technological changes get affected by investor behavior which further affects the digitalization of the capital

market; thus, technological advancement can act as an active mediator. In this context, [Feng et al. \(2021\)](#) worked on the mediating role of technological innovation in the relationship between environmental information and economic development. The study was conducted in China. The data set of 10 years like from 2008 to 2018 was collected and tested. The results of the study revealed that technological advancement in terms of innovation significantly acts as a mediator in the relationship. Moreover, [Kulathunga et al. \(2020\)](#), also investigated the mediating role of technological advancement in terms of enterprise resource planning (ERP). The study was conducted on SMEs. The data set of 319 SME employees was collected and tested. The results of the study revealed that technological innovation in terms of innovation significantly acts as a mediator. Similarly, [Susilawati et al. \(2021\)](#), also explored the technological advancement mediating role in terms of technological innovation. The study was conducted in Indonesia. The results of the study revealed that technological innovation significantly act as a mediator. Thus, the hypotheses derived from the above debate is as under:

**H3:** Technological advancement significantly acts as a mediator in the relationship between investors' behavior and the digitalization of the capital market.

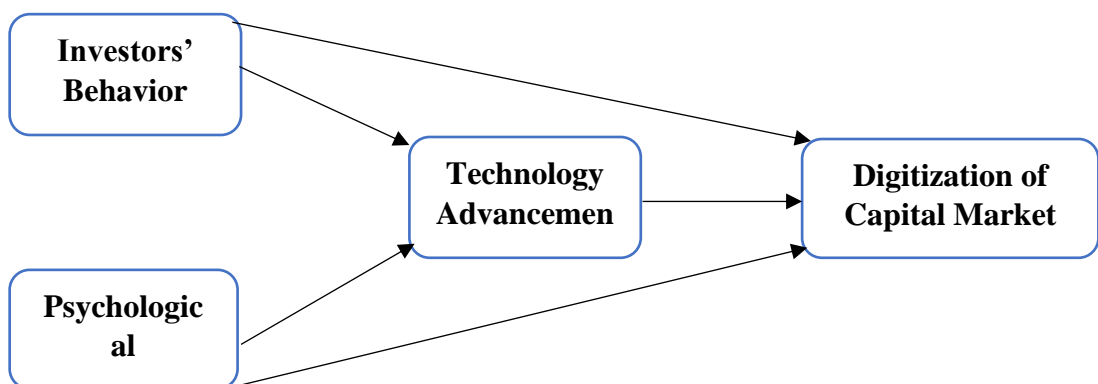
There are numerous factors that affect individual decisions and one of the prime factors is individual psychology. The individual psyche leads to biasness or unbiasedness in one's decision-making. The individual psyche further gets affected by many factors like an individual opinion regarding any practice. Once an individual is satisfied with any practice then any deviation from that practice may lead that individual to express biases and change will affect his comfort zone in terms of running practice. Similar is the case with the investor. If an investor is comfortable with any capital market practice, then any change in that practice will affect the investor psyche. Thus, the changes which impact the individual psyche lead to biasness decision-making ([P.H et al., 2020](#); [Upadhayay, 2019](#)). Many investors in the market avoid excessive digitalization. Thus, they express biased decision-making. The investor's unbiased decision-making will support digitalization in the capital market. Better awareness of technological changes will lead to a change the investor psychology regarding digitalization. In this context, [Bagheri et al. \(2019\)](#) investigated the mediating role of technological innovation in the relationship between international orientation in SMEs. The results of the study revealed that technological innovation significantly acts as a mediator in the relationship. Moreover, [Khin et al. \(2020\)](#), also explored the mediating role of digital innovation in the relationship between digital technology and organization performance. The results of the study revealed that digital innovation positively mediates the relationship between digital technology and organization performance particularly in Malaysia. Thus, the hypotheses derived from the above debate is as under:

**H4:** Technological advancement significantly acts as a mediator in the relationship between psychological unbiasedness and the digitalization of the capital market.

### 3. RESEARCH METHODS

The article investigates the impact of investors' behavior and psychological unbiasedness about technology advancement on the digitalization of the capital market and also examines the mediating role of technology advancement among investors' behavior, psychological unbiasedness about technology advancement and digitalization of capital market in Indonesia. The article used questionnaires to collect the data from the selected respondents. The items were used to measure the variables of the study. These items are taken from past studies, for example, investors' behavior was measured with six items taken from [H. Wang et al. \(2019\)](#), psychological unbiasedness was measured with eight items taken from [Stanovich et al. \(2019\)](#), technology advancement measured with five items extracted from [Janse van Rensburg et al. \(2018\)](#) and digitalization of capital market measured with ten items taken from [Youssef et al. \(2021\)](#).

The investors of the capital market are the respondents of the study. They were selected based on simple random sampling. The surveys were distributed to the selected investors through the mail. The researchers distributed the 570 surveys to the respondents, but only 290 were received after one month. These surveys have an approximately 50.88 per cent response rate. Moreover, the study also applied the PLS-SEM to test the association between the variables using smart-PLS. This tool is suitable when the data is collected from questionnaires. It provides reliable results in the case of small and large data sets. PLS-SEM is also a suitable technique that provides reliable results even when researchers use complex frameworks. The study used two predictors, investors' behavior (IB) and psychological unbiasedness (PUB) about technology advancement. In addition, the article also used one mediating variable, such as technology advancement (TAD) and also took one dependent variable named digitalization of capital market (DCM). These constructs are presented in the framework in [Figure 2](#).



**Figure 2:** Theoretical Model



#### 4. RESEARCH FINDINGS

The study shows the convergent validity that shows the correlation between the items. The study used composite reliability (CR) and Alpha to check the reliability. The results indicated that the values are higher than 0.70 and exposed valid reliability. In addition, the study used the factor loadings and average variance extracted (AVE) to check the validity. The results indicated that the values were higher than 0.50 and exposed valid convergent validity. These values are given in [Table 1](#).

**Table 1. Convergent Validity**

Constructs	Items	Loadings	Alpha	CR	AVE
Digitalization of Capital Market	DCM1	0.807	0.907	0.924	0.579
	DCM10	0.641			
	DCM2	0.795			
	DCM3	0.821			
	DCM4	0.805			
	DCM5	0.788			
	DCM7	0.773			
	DCM8	0.802			
	DCM9	0.577			
Investors' Behavior	IB1	0.836	0.893	0.919	0.655
	IB2	0.849			
	IB3	0.705			
	IB4	0.768			
	IB5	0.838			
	IB6	0.849			
Psychological Unbiasedness	PUB1	0.901	0.975	0.979	0.869
	PUB2	0.928			
	PUB3	0.956			
	PUB4	0.944			
	PUB6	0.911			
	PUB7	0.953			
	PUB8	0.929			
	PUB9	0.929			
Technology Advancement	TAD1	0.844	0.917	0.938	0.751
	TAD2	0.881			
	TAD3	0.874			
	TAD4	0.834			
	TAD5	0.900			

The study shows the discriminant validity that shows the correlation between the variables. Cross-loadings and Fornell Larcker were used to check the discriminant validity. The results indicated that the values that show the association between the variable itself are bigger than the values that show the association with other variables. These results exposed low association among variables and valid discriminant validity. These values are given in [Table 2](#) and [Table 3](#).

**Table 2: Fornell Larcker**

	<b>DCM</b>	<b>IB</b>	<b>PUB</b>	<b>TAD</b>
DCM	0.761			
IB	0.508	0.809		
PUB	0.471	0.494	0.932	
TAD	0.381	0.425	0.415	0.867

**Table 3: Cross-Loadings**

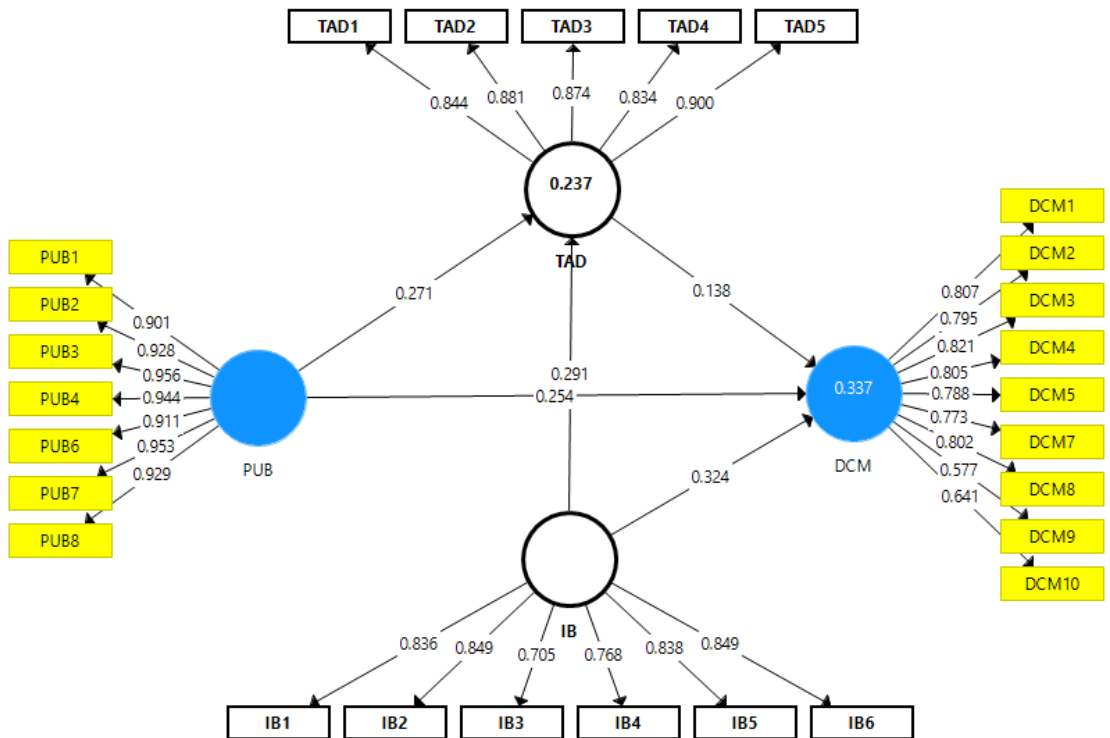
	<b>DCM</b>	<b>IB</b>	<b>PUB</b>	<b>TAD</b>
DCM1	<b>0.807</b>	0.358	0.305	0.292
DCM10	<b>0.641</b>	0.260	0.341	0.211
DCM2	<b>0.795</b>	0.373	0.325	0.332
DCM3	<b>0.821</b>	0.403	0.332	0.326
DCM4	<b>0.805</b>	0.350	0.306	0.286
DCM5	<b>0.788</b>	0.455	0.393	0.301
DCM7	<b>0.773</b>	0.460	0.429	0.335
DCM8	<b>0.802</b>	0.447	0.406	0.305
DCM9	<b>0.577</b>	0.304	0.358	0.184
IB1	0.405	<b>0.836</b>	0.384	0.334
IB2	0.451	<b>0.849</b>	0.451	0.346
IB3	0.361	<b>0.705</b>	0.317	0.339
IB4	0.394	<b>0.768</b>	0.400	0.360
IB5	0.401	<b>0.838</b>	0.378	0.335
IB6	0.448	<b>0.849</b>	0.456	0.351
PUB1	0.420	0.455	<b>0.901</b>	0.388
PUB2	0.459	0.444	<b>0.928</b>	0.356
PUB3	0.441	0.471	<b>0.956</b>	0.406
PUB4	0.417	0.476	<b>0.944</b>	0.415
PUB6	0.430	0.462	<b>0.911</b>	0.384
PUB7	0.445	0.468	<b>0.953</b>	0.402
PUB8	0.462	0.446	<b>0.929</b>	0.358

TAD1	0.339	0.309	0.346	<b>0.844</b>
TAD2	0.352	0.390	0.357	<b>0.881</b>
TAD3	0.335	0.374	0.346	<b>0.874</b>
TAD4	0.303	0.391	0.382	<b>0.834</b>
TAD5	0.323	0.376	0.369	<b>0.900</b>

The study shows the discriminant validity using Heterotrait Monotrait (HTMT) ratio. The results indicated that the values are lower than 0.85. These results exposed low association among variables and valid discriminant validity. These values are given in Table 4.

**Table 4: Heterotrait Monotrait Ratio**

	DCM	IB	PUB	TAD
DCM				
IB	0.555			
PUB	0.499	0.527		
TAD	0.414	0.470	0.439	

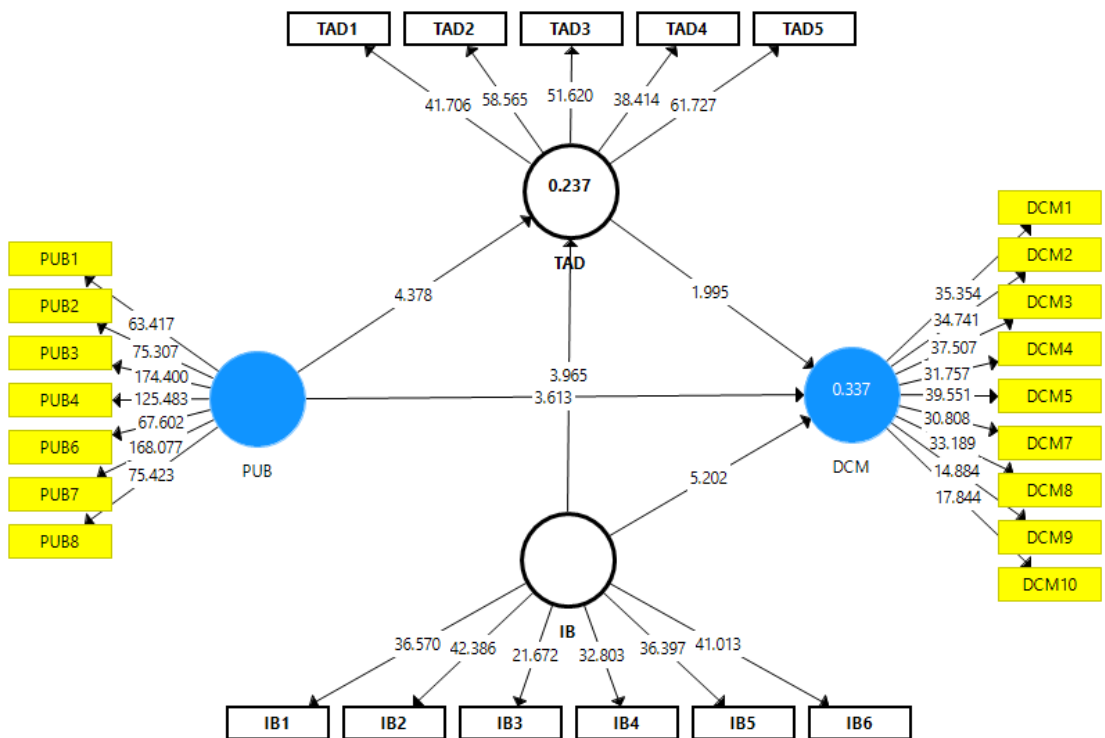


**Figure 3: Measurement Model Assessment**

The results indicated that the investors’ behavior towards technology adoption and psychological unbiasedness about technology advancement have positive relationships with the digitalization of the capital market in Indonesia and accept H1 and H2. The findings also exposed that technological advancement mediates among investors’ behavior and psychological unbiasedness, and the digitalization of the capital market in Indonesia and accept H3 and H4. These values are given in Table 5.

**Table 5. Path Analysis**

Relationships	Beta	S.D.	T Statistics	P Values
IB -> DCM	0.324	0.062	5.202	0.000
IB -> TAD	0.291	0.073	3.965	0.000
PUB -> DCM	0.254	0.070	3.613	0.000
PUB -> TAD	0.271	0.062	4.378	0.000
TAD -> DCM	0.138	0.069	1.995	0.024



**Figure 4: Structural Model Assessment**

## 5. DISCUSSIONS

The results revealed that investors' behavior has a positive association with the digitalization of the capital market. These results are in line with the past study of

Hossnofsky et al. (2019). The study posits that the performance of the capital market depends on investors' behavior when the investors have good behaviors to know about the innovations, interact with the new technologies, and acquire the skills required for running that technology. In this way, the use of technologies within the capital market increases. These results also agree with the study of Chen et al. (2022), which highlights that when investors bring positivity to their behaviors while going to adopt new technology, it becomes possible to digitalize the capital market. The results revealed that investors' psychological unbiasedness has a positive association with the digitalization of the capital market. These results are in line with the past study of H. K. Kim et al. (2021), which explains that one of the great hurdles in technology adoption is the users' biasedness. Investors who are not the subject of psychological biasedness have a wide acceptance of novel technologies. It is the source of the digitalization of the capital market. These results also agree with the study of Škare et al. (2021), which shows that when investors have the least psychological biasedness, they can think freely about the ease and usefulness of technologies. This thinking encourages the digitalization of the capital market.

The results revealed that technological advancement is a significant mediator between investors' behavior and the digitalization of the capital market. These results are in line with the past study of Estrin et al. (2022), which claims that the positivity in investors' behavior about the usefulness and adoption of technologies encourages them to move towards technological advancement and this technological advancement leads to the digitalization of the capital market. These results also agree with the study of J. Wang et al. (2019), which states that technological advancement in a country is triggered by users' positive behaviors. Investors with positive behavior enhance technological advancement, which further assures the digitalization of the capital market. The results revealed that technological advancement is a significant mediator between investors' psychological unbiasedness and the digitalization of the capital market. These results are in line with the past study of Ricci et al. (2020). This literary workout states that the investors' psychological unbiasedness improves perception about technology use, and this allows technological advancement and, thereby, encourages the digitalization of the capital market. These results also agree with the study of Zaborovskaia et al. (2020), which highlights that investors' psychological unbiasedness motivates them to the adoption of technologies and encourages them to move towards technological advancement and this technological advancement leads to the digitalization of the capital market.

## 6. THEORETICAL IMPLICATIONS

The current study has guidelines for academics because it has a significant contribution to the literature. The study analyzes the influences of investors' behavior and psychological unbiasedness on the digitalization of the capital market. The previous literature has a discussion about the impacts of investors' behavior and psychological

unbiasedness on the digitalization of the capital market. But a single study has discussed the role of either the investors' behavior or the investors' psychological unbiasedness in the digitalization of the capital market. With the simultaneous analysis of these factors' relationship, the current study adds to the literature. One major contribution is to explore the mediating impacts of technological advancement between investors' behavior and psychological unbiasedness and the digitalization of the capital market. This study extends the literature in the sense that it analyzes investors' behavior and psychological unbiasedness role in the digitalization of the capital market for Indonesia.

## **EMPIRICAL IMPLICATIONS**

This study has considerable significance to emerging economies like Indonesia. It addresses the critical issue of the economy in the contemporary era, which is the digitalization of the capital market. This study throws light on the ways to promote digitalization in the capital market that is a source of finance and its circulation. The study guides the economists and actors of the capital market in that they must struggle to develop positivity in investors' behavior towards different types of technology designed for communication, information and data management, and financial administration. This would be helpful in the digitalization of the capital market. It also suggests that psychological unbiasedness must be developed in investors to enhance the digitalization of the capital market. The study guides the policymakers in establishing policies related to the digitalization of the capital market by promoting the investors' behavior and psychological unbiasedness towards technology adoption. Furthermore, the study conveys that the policymakers and regulators should motivate the investors for positive behavior and psychological unbiasedness to promote technological advancement and digitalization of the capital market.

## **7. CONCLUSION**

The objective of the study was to explore the influences of investors' behavior and psychological unbiasedness on the digitalization of the capital market. It was also to check what the role of technological advancement is in the association between investors' behavior, psychological unbiasedness, and digitalization of the capital market. The authors collected information on investors' behavior, investors' psychological unbiasedness, technological advancement, and digitalization of the capital market in Indonesia. They inferred that investors' behavior and psychological unbiasedness positively influence the digitalization of the capital market. The results showed that when the investors adopt a positive behavior toward the selection and use of modern technologies in order to perform their functions and achieve goals, the use of digital technologies increases within the capital market. The results also indicated that the investors have psychological unbiasedness, not only sticking to typical techniques of communication, information management, and financial management. But they are ready to accept novel technologies, and the actual adoption of technologies enhances the

digitalization of the capital market. The results highlighted that technological advancement mediates the relationship between investors' behavior and psychological unbiasedness and the digitalization of the capital market. When the investors have positive behavior and psychological unbiasedness, there is demand and encouragement for technological advancements. The increasing technological advancements encourage the digitalization of the capital market.

## 8. LIMITATIONS

There are some limitations still associated with the current study. These limitations are likely to be removed in future literature, and the same study can be improved. This study examines only two factors, investors' behavior and psychological unbiasedness, which influence the digitalization of the capital market. As a result, the study is limited, and it is recommended that scholars they must explore more factors that have an influence on the digitalization of the capital market. Moreover, the results about the relationship of investors' behavior and psychological unbiasedness to the digitalization of the capital market are not general because the data were collected from the Indonesian capital market alone. In the future, authors must collect information about different economies for more valid and general results.

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