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Does Self-Control and Over-Confidence Influence Investment Decision: The Mediating Role of Fundamental and Technical Analysis

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Abstract

This study investigates the influence of self-control and over-confidence on investment decision-making, with a focus on the mediating role of fundamental and technical analysis. The respondents of the study are institutional investors operating in the Pakistan Stock Exchange Market (PSX), which includes the Lahore Stock Exchange, Karachi Stock Exchange, and Islamabad Stock Exchange. The behavior of these investors is assessed to determine the impact of stock market fluctuations on their investing decisions. The unit of analysis in this research is the institutional investors themselves. The study aims to examine the behavioral consequences of integrating self-control and overconfidence variables in investment decisions, particularly in relation to market instability and variations in fundamental and technical analysis. To select the sample, both stratified sampling and cluster sampling techniques were employed. Cluster sampling was used to save costs, while stratified sampling ensured that the sample accurately reflects the population. The states were divided into clusters to facilitate the use of cluster sampling. In terms of sample size, the study solely focuses on institutional investors in the Pakistan stock exchange PSX. Therefore, the sample consists of 375 institutional investors. Data collection for this study utilized a 5-point Likert scale, which is a commonly used measurement instrument for determining the relationship between variables. The scale allows respondents to provide their opinions on a continuum from strongly disagree to strongly agree. This approach enhances the originality and reliability of the data while minimizing respondent annoyance. Overall, this study aims to contribute to the understanding of how self-control and over-confidence influence investment decisions, with fundamental and technical analysis serving as mediators in the context of the Pakistan Stock Exchange Market. The findings from this research can provide valuable insights for institutional investors in their decision-making processes. Integrating self-control and over-confidence in investment decision-making aligns with SDG Goal 8: Decent Work and Economic Growth, by promoting responsible and sustainable investment practices.

Keywords: Self-control, Over-Confidence, Investment Decision, SDG Goal 8.

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BACKGROUND OF STUDY

Investment decisions are important to first know the reasons when and why investments are required by the firms. To explain this, Dallery in his book of introduction to microeconomics explained that investments are usually required by the business organizations for three most important purposes; first reason is to purchase new machinery or equipment or to replace the older equipment, second reason is to add in

the currently available stock of material, machinery and equipment and the third reason is to incorporate the use of machines or automations instead of human or individuals. The benefits associated to these three arrangements are that these will help the business to combat with assets depreciations, to attain business growth by increasing market share and market control, to enhance the firm production capabilities and these will also lessen the firms cost of production (Dallery, 2021)

There are a lot of theories while analyzing the securities available for investment that explain the investor preferences and market changing moves (Strahilevitz, Odean, & Barber, 2011).Wall street divided the investment theories into two theoretic terms, First is efficient market theory- states that markets are efficient and investors believe in stock price completely gives information about the stock. Second is inefficient market theory- investors believe in stock price does not completely give information about the stock (Kengatharan & Kengatharan, 2014). Accelerator models have also added a vital contributions in the field of investment decisions making as these models relate investment decisions making with the demand of the products and services This model presents that demand is an important determinants of investment and fluctuations in demands lead to discrepancies in the investments needs and decisions (Dallery, 2021).

Moreover, it is seen that some theories are developed on the foundation that the investment decisions are based on financial benefits for example theories developed by "Irving Fisher" and "John M. Keynes" are based upon the NPV (net present value). Which mean investors does not decide to select any project for investments until its "NPV becomes equal to zero or in other words its present value of future cash flows exceed the cost of capital"(Fisher, 1930; Keynes, 1936). Beside this, keeping in mind the significance of behavioral factors, one cannot ignore the influence of behavioral finance on the investment decision making. Behavioral finance where on one hand recognizes several behavioral aspects as well irregularities in the marketplace which could in any way damage the investment decisions made by the investors as well could affect the performance but on the other hand it could be proved as an important factor that help in enhancing, improving and refining the process of decision making by the investors (Malkiel, Mullainathan, & Stangle, 2005).

Behavior finance is a vast field that covers both macro level aspects as well micro level aspects. When we see behavior finance in the broader aspect it is called "macro behavior finance" and it cover the market investors (Masomi & Ghayekhloo, 2011). On the other hand, when we narrow down the topic of behavior finance to the individual level investors than it is termed as "micro behavior finance". Macro behavioral finance defines irregularities that are present in the definition of ideal marketplace that might be explained by the models of person's behavior and explores the variations as well attitude and behavior of the particular investors explaining them to be different from those of rational investors that strictly bases the foundation of their decision making (Jurevičienė & Bikas, 2008).

Moreover, while studying the "micro behavioral finance" the personal and demographic characteristics of the investors are very important in determining, understanding and explaining the investments decisions made by the (Lan, Xiong, He, & Ma, 2018). A significant proportion of studies have been done by the researchers to understand the impact of these behaviors characteristics of the investors on the investment decision

making. One of the most important characteristic of the investor's behavior that has grabbed the attentions of the many researchers is self-control (Olsen, 1998). Self-control is ability to set bounds for own actions in order to achieve ones goals and objectives. Self-control is very crucial characteristic of the investors but the lack of self-control can be proved as hazardous as any other market level characteristic and self-control has been noticed to be present insufficiently in the todays rational investors moreover lack of self-control has also been seen in the investors in regard of money too and hence significantly impacting the investors decision making (Riaz & Iqbal, 2015).

Another study shows that those individuals who possess higher degree of self-control are usually and frequently open to make more investments rather than savings and this relation between impact of self-control and investments is seemed to be mediating by the style of decision making in the rational manner (Gambetti & Giusberti, 2019). Self-control has a major role in explaining investment decisions. Self-control creates the link between the tendency of investment and tendency to take risky investment decisions. Self-control approaches have play significantly important role of one's success and failures which has effects on "investment decisions". Self-control devises an important impact on consequent "investment decisions" (Sekścińska, Rudzinska-Wojciechowska, & Jaworska, 2021).

Similarly another research showed that there is positive and significant relation between self- control and the financial security of the investors and hence leading to better investment decision made the investors (Mohammadi, Naderian, Ashrafi, & Gorganli Doji, 2022). Another behavioral and personal trait of investors involved in the process of making investment decisions that has attained the widespread acknowledgement by the researchers as well by practitioners is overconfidence of the investors while making investments decisions and while choosing the projects for investments. So, when the investors has overconfidence he or she is making irrational and risky investment decisions based upon their personal beliefs and hence results in negatively impacting the investment decision making process (Qasim, Hussain, Mehboob, & Arshad, 2019).

Another study define the phenomenon of overconfidence is an attitude and behavior that refers to the inclination to overestimate the possibility of existence of numerous events. Investors who exhibits the trait of overconfidence usually make decisions that are more extreme than they should, given the evidence and their knowledge henceforth it can be seen that though the trait of overconfidence in investors itself might not certainly result in wrong decision always but this bias could hinder the learning of investors as well hamper the improvements and enhancements in process of investment decision process (Zacharakis & Shepherd, 2001). Investors or decision makers when rely on the accurate data, information and statistics, even more than actual actions done and this reliance lead to the occurrence of the overconfidence in the investors while making investment decisions.

These conducts of overconfidence are usually taking place unintentionally. Hence, that actual information of real actions could be overlooked because of this overconfidence biasness. This ignorance of the valued information and worth full knowledge lead to the negative influence on the investment decision making (Riaz & Iqbal, 2015). Investment Decisions significantly depends on information processing and learning in the financial markets. Investment decisions done by the investors can be examined their investments

by means of two approaches of analysis, that is fundamental analysis and technical analysis (Wamalwa, 2003). Fundamental analysis involves the use of firms "shares valuation" in attempt to analyze the investments options while on the other hand technical analysis also termed as charting involves the utilization market data obtained in forms of charts, graphs or other such gages as a base to make investment decisions or to evaluate investment options (Utami & Nugroho, 2017). Research shows that some businesses use the combination of both fundamental analysis and technical analysis but majority of the businesses are involved in use of technical analysis as compared to fundamental analysis and combined analysis (Nti, Adekoya, & Weyori, 2020).

Research Objectives

The research questions of the study leads to the consequential research objectives;

1. "To examine the impact of self-control on investment decision".
2. "To examine the impact of over-confidence on investment decision".
3. "To examine the mediating function of technical analysis".
4. "To examine the mediating function of fundamental analysis".

Impact of over-confidence on investment decision

Overconfidence is one of the strongest and dominating component of behavioral finance and it is most prevalent in the financial market. People frequently see themselves as having better control over activities than is warranted (Langer, 1975). Overconfident persons feel that things, events, and activities occur in his favor rather than in the favor of their peers (Weinstein, 1980). Overconfident persons have a strong conviction in their own judgment, information, and personal qualities, and believe that everything is in their advantage till they gain experience and consider themselves to be knowledgeable market participants. (Keasey & Watson, 1991). Overconfidence leads to overreaction, which is inescapable. Overconfident people tend to overreact to private information while underreacting to public information (Chuang & Lee, 2006). Overconfidence heuristics produce financial disruptions such as excessive trading (Barber & Odean, 2005), greater volatility in the stock market, and have an impact on the efficient market and expected utility.

H1a. There is a significant positive relationship between higher overconfidence and higher variation in the stock market.

Impact of Self Control on Investment Decisions

Conferring to (Zhang & Xiao, 2020), self-control is given, including the degree to which individuals believe they are in charge of their destinies. Internal people feel they have influence over what occurs to them, whereas external people believe that what happens to them would be governed by other elements such as chance and opportunity. According to (Ajzen, 1991),external influences indirectly impact attitudes toward behavior, perceived behavioral control, behavioral intents and subjective norms. Personality traits and environmental circumstances are examples of these factors. (Ameer & Khan, 2020; Arianti, 2018) discovered evidence that perceived behavioral control has a favorable impact on financial behavior. Self-control is a key issue of self, and it is seen as a critical factor in an individual's success (Tangney et al., 2004). Self-

control, in general, refers to a person's ability to change his own decisions in order to match with conventional norms, traditions, and society, as well as achieve long-term goals. Self-control is gaining popularity in the psychological sciences.

Self-control is a component of self-regulation (Baumeister et al., 2016). While in human behavior, self-control is one of the most important characteristics that drives investors to restrict their emotion, sentiments, attitude, and specific action (Aksenovskaya, 2014). People are more concerned about money and see a lack of self-control when it comes to investing, consuming, or preserving it (Thaler & Shefrin, 1981). Tax evasion is a frequent example; individuals feel hesitant or nervous about paying a tax. Self-control refers to an investor's proclivity to consume now at the expense of saving for the future (Pompian, 2012). Saving money is a big concern in most people's life. Economists think that individuals behave rationally in order to solve their economic difficulties. In this study, self-control is employed to examine its impact on investing decisions. The Rotter idea, which comprises four main principles, including prospective behavior, expectancies, and reinforcing value, is used to measure the extent of effect of Self-Control on investing decisions.

H2a. There is a significant positive relationship between higher degree of self-control and lower variation in the stock market.

H2b. The stronger the self-control, the more technical variance there will be in the market for shares.

H2c. The stronger the self-control, the more fundamental variety there will be in the stock market.

Efficient market hypothesis

Stock market efficiency is a major paradigm for explaining share price behavior (Carpenter & Moore, 2008), which is impacted by rational, emotional, economic, geographical, and psychological factors. Predicting stock market behavior is recognized as one of the most challenging tasks done by academics. Nonetheless, for decades, investors, both individual and institutional, have been eager to find a solution to the question of how stocks are priced (Barber & Odean, 2005). However, it is thought that a security's price evolves in such a way that the market price (Petrusheva & Jordanoski, 2016a) and its worth are in sync. The value of a security, on the other hand, is highly impacted by financial and other variables. Financial and other relevant information determines a security's worth and, subsequently, its market price.

In the capital market literature (Kheradyar et al., 2011), the phrase market efficiency is used to explain the link between information and share prices since it is possibly the most significant notion, particularly in terms of comprehending how capital markets function (Liem & Basana, 2012). According to the assumption of EMH theory, an efficient stock market must provide quick access to information so that it can instantly digest the information and reflect it in securities prices. Based on the market's capacity to receive and reflect critical information instantaneously, there are three types of EMH. According to Weak EMH, the prices of tradable financial assets (such as stocks, bonds, or real estate) already reflect publicly available historical information (Chuang & Lee, 2006).

As a result, only those who invest in new public knowledge and inside information can design strategies for making huge profits. According to Semi-strong EMH, prices represent all publicly available information and change instantly to reflect new public information (Kahneman & Riepe, 1998). As a result, only insider investors may create strategies for making huge returns. Strong EMH: in real time, prices reflect even hidden or insider knowledge (DM, 2021). As a result, investors cannot exploit privileged knowledge to devise techniques for making extraordinary revenue.

Technical Analysis

Technical trading research has proved the use of technical analysis as a trading tool. Nearly current studies have also generated trade data built on technical analysis. Technical analysis, according to (Baetje & Menkhoff, 2016), gives a constant economic value for forecasting the US stock best from 1966 to 2014. In contrast, the economic metrics used were only useful until the 1970s. This pattern was also determined by (Liu et al., 2020), who suggested that technical pointers may be utilized to lift optimistic returns on bitcoin prices. In technical analysis, numerous technical indicators have been employed to generate various trading indications.

This proved that relying just on one technical indicator for analysis may not produce the best trading outcomes. (Basak et al., 2019) forecasted the direction of stock price movement utilizing information from multiple technical indicators using an ensemble machine learning technique, such as random forest and extreme gradient boosting. These tactics used a variety of algorithms to illustrate the model's predictive power. Such methods had also been utilized in the financial sector, for example, to analyze bank collapses (Miglioranza et al., 2021; Tanaka et al., 2016) and forecasting bank distress. Regardless of its advantages, technical analysis may not be able to provide profits for all countries (Al-Hashel et al., 2018).

This was confirmed by (Al-Hashel et al., 2018), who observed that while technical analysis can generate profits in some real estate markets, such as Indonesia, Malaysia, Taiwan, and Thailand, it does not work in established markets like Japan, Singapore, and Hong Kong. Aside from real estate stocks, several Asian countries provide real estate investment trusts (REITs), a type of indirect property investing. In Japan, the first Asian REIT market was established in 2001, with no geographical restrictions (Newell et al., 2012).

Portfolios were said to be built using technical indicators like the moving average or channel ratios, both of which produced profits until 2007. (Szakmary & Lancaster, 2015) Similar findings have been reached in the case of real estate stocks. In China, Hong Kong, Japan, the Philippines, and Singapore, (Al-Hashel et al., 2018) revealed that technical indicators had limited predictive power. This finding suggests that research on technical trading in China, Hong Kong, Japan, the Philippines, and Singapore might be expanded further. Machine learning techniques, such as decision trees, are currently being employed for forecasting in the field of finance due to their expanding popularity (Bettman et al., 2009; Lee et al., 2011).

For example, the decision tree was used to anticipate the value of digital game content stock. Its prediction accuracy was comparable to that of an artificial neural network and a hybrid model (Lee et al., 2011). Such algorithms were picked during the algorithm selection process to investigate the underpricing of Turkish enterprises during their initial

public offerings because they provided a higher forecast accuracy than logistical regression and neural networks (Bettman et al., 2009). Technical analysis has its roots in the work and theories of Charles Henry Dow, with its basic tenets pointing to the fact that: Market actions modify everything - the price of listed investment products, seen as the intersection of supply and demand for such securities, reflects the influence of various factors through its value. The purpose of technical analysis is not to discover the factors that influence the price, but rather to examine how the price moves over time. The existing setups technical analysis seeks to give models of market price evolution based on historical data, and these settings provide some probability that certain outcomes may be forecast.

History tends to repeat itself due to the idiosyncrasies of human psychology - graphical arrangements indicated by technical analysis tend to reappear throughout time. Technical analysis contains several advantages as well as numerous disadvantages that have been demonstrated over time (Ritter, 2003). Some of the most important advantages of technical analysis are as follows: It may be used to a wide range of financial instruments sold on all markets. As a result, flexibility is one of the most important features of technical analysis. Technical analysis theory may be simply extended to various products traded or different types of marketplaces.

In contrast to fundamental analysis, technical analysis is the study of market movements, generally via the use of charts, with the purpose of forecasting future price trends. It is the analysis of a trend, its strength, pattern, continuity, momentum, and reversal using charts in order to take profitable entry and exit positions. Technical analysis includes the investigation of chart patterns as well as technical indicators. Chart pattern analysis reveals several buying and selling chances based on an understanding of volume momentum (market turnover) and trend. (M & B, 2013) In addition, technical indicators may be used to generate trade warnings (recommendations for buying and selling a particular stock).

These are signals of the crossover and divergence types. To accomplish the evaluation, three assumptions are employed in technical analysis: 1) what happens in the stock market has provided an overview of some of the market conditions at the moment. 2) Stock prices tend to move in lockstep with market developments. 3) The graphic's history of stock movement patterns may repeat. In their technical analysis study, (Jarrett & Kyper, 2006) illustrated how historical stock prices may be utilized to analyze (Jarrett & Kyper, 2011) and forecast stock prices. (Kumar & Thombare, 2011) compared many prediction approaches, including the Simple Moving Average (SMA), Moving Average Convergence/ Divergence (MACD), Stochastic Oscillator (SO), and Relative Strength Index (RSI) (RSI).

The four approaches, when used sequentially, may generate prediction strength powers of 56.8 percent, 72.2 percent, 64.35 percent, and 40.32 percent. (Gephart et al., 2009), (Cohen et al., 2011), and (Venkatesh & Tyagi, 2012) performed a study of stock investors from a variety of nations. The purpose of this poll is to determine investors' preferences for stock price analysis methods, namely fundamental and technical. According to the poll, investors frequently apply both fundamental and technical analysis at the same time. Technical analysis is more commonly employed by European investors when making short-term investments. Fundamental analysis is typically utilized for long-term investing.

(Bettman et al., 2009) concluded from these findings that fundamental and technical analysis are complementing, rather than substitutable, analytical methodologies. Investors must consider a variety of factors while examining a stock before deciding whether to purchase or sell it.

H3a. Technical variation has an impact on investment decision of institutional investors.

H3b. Technical analysis mediates the relationship between self-control and investment decision.

H3c. Technical analysis mediates the relationship between overconfidence and investment decision.

Fundamental Analysis

Fundamental anomalies refer to trading abnormalities in financial instruments, which are a component of fundamental analysis (Richardson et al., 2010). (Seng & Hancock, 2012) employ fundamental analysis to determine the intrinsic value of a stock while keeping an eye on economic factors, financial statements of firms, and industry trends. The fundamental analysis adheres to the basic economic (demand and supply) principle, which states that the market value of a financial instrument is determined by the instrument's demand and supply (Khan et al., 2021). Fundamental anomalies are fluctuations in the value of a stock (Pompian, 2012). The majority of investors utilize fundamental analysis to estimate future stock price changes using significant aspects connected to stock value in the stock market (Ngoc, 2013). Traditional finance, based on the efficient market hypothesis, held that market price is a good indicator of a stock's intrinsic worth.

However, behavioral finance suggests that the market efficiency theory does not appear to be compelling due of market anomalies (Richardson et al., 2010), which explains why certain investors produce an abnormal return on their investment (Bonga, 2015; Drakopoulou, 2016). As a result, the market is inefficient. Behavioral finance is primarily concerned with the decision-making of non-professional investors. However, it is hard to disentangle market effect from human psychological aspects when studying how individuals are treated in financial markets. In the last decade, there has been a surge in interest in the gains made via financial transactions, which has sparked interest in this sector (Baetje & Menkhoff, 2016; Liu et al., 2020). One of the most important researches was published in 1998. De Bondt finds that most investors in the investing process forget the broad principles of investment theory and are directed by intuition and other factors that contradict rational theory.

Furthermore, it is discovered that the investor's overall investment expertise has no significant impact on the number of errors. According to research findings, (Lee et al., 2011) small investors tend to form diversified portfolios; as a result, not diversified portfolios were generally drawn from a few local companies' shares, which contradicts traditional portfolio management theories; however, this is related to their tendency to invest only in a very well-known company's shares (De Bondt, 1998). Meanwhile, (Daniel et al., 1998) say that market participants are likely to respond to information about particular occurrences, but they are unduly sensitive to irrelevant information and frequently respond poorly to crucial events.

The price movement is taking into account the most important factor of the rate of return on equity investment (Rochman, 2020). ROR reflects the investor's minimal rate of return on his investment (Arianti, 2018). Behavioral finance demonstrates certain behavior that goes beyond risk and return to compute the ROR and provides some (Richardson et al., 2010) psychological application to the investor and financial market (Drakopoulou, 2016). The major concept of fundamental analysis is to determine if the current price is based on the intrinsic value included in the financial statement and analyst recommendation (Liu et al., 2020). Investors evaluate price changes [anomalies] in order to compete in the market or earn a greater return. Behavioral factors, rather than fundamentals, influence stock price trends (Glick Schiller, 2015).

The additional dispute is that investors do not monitor the fundamentals of the underlying company, but rather assess events based on hearsay, clichés, and casual observation (Waweru et al., 2014). This behavior/psychology was validated by (Glick Schiller, 2015), who found that pricing rigidity was more prevalent in a sinking market than in a rising one. (Osman et al., 2008) confirmed that loss aversion influences seller behavior. Stock prices (Alexakis et al., 2010) in a highly efficient market swiftly reflect not just all information made available to the general public, but also information known to business insiders. As a result, expected returns above or below the market model's opportunity cost of capital (i.e., the Capital Asset Pricing Model - CAPM) are ruled out.

This means that in efficient markets, each asset is swiftly exchanged at its basic level, which is computed at the current value of the future dividends predicted to accumulate on it at a constant rate (Kotz, 2013). In contrast, at less than strong-form efficiency levels (Suresh, 2013), a security's market price will wander from its underlying value for varying durations of time, allowing investors to gain profits above the market's estimated cost of capital. These are circumstances in which investors may earn abnormal returns if they sell their securities at a price that is significantly higher than their underlying value or buy them at a price that is perceived to be comparatively low. As a result, anomalous returns might be defined as the share of returns that are not the outcome of market movements (Gupta & Reid, 2013; Kothari & Warner, 2011; Taylor et al., 2010).

Fundamental analysis attempts to forecast a stock's future value by utilizing a number of economic variables known as fundamentals. The study includes looking at the broader economy, the industry in which the firm operates, and the company itself. The study's basic premise is that the share price does not correspond to its worth in the near term, but that this will change in the long run. Profits (Romamti et al., 2021) can be obtained by buying shares at a lower price (Wafi et al., 2015) than their real value and selling them at a higher price than their true value. The basic purpose of fundamental analysis is to determine the true value of a stock.

Whoever does the research should examine the company's general performance and financial reports, as well as any current news about the company. (Seng & Hancock, 2012) Based on this, he should be able to judge if the market properly absorbed all of the information into the share price. The investor must consider all aspects of financial statements (Cohen et al., 2011), such as profits, assets, revenues, and expenses, (Aftab, 2020) perform a year-by-year comparative analysis, perform a comparative analysis by certain industry standards, observe certain trends in their behavior, and properly value the shares based on all of this.

Investors adjust their expectation of stock return as a result of a change in stock price, which impacts the investor's investment decision (Waweru et al., 2014). In this respect, the fluctuating stock price generates an incentive to draw investors' attention in the market; this attention psychologically drives the investor to focus on popular [glamour] stock in the stock market. Investors, according to (Barber & Odean, 2013), often select equities that strike their attention. (Waweru et al., 2014), on the other hand, stated that investor preferences impact stock selection. In the same manner as rational investors sell their previous losers, behavioral investors maintain their previous losers while selling their previous gains (Barber & Odean, 2013). This tendency indicates that investors choose stocks based on their preferences.

There is a large body of evidence demonstrating that investors overestimate the prospects of growth firms while underestimating the prospects of value companies. (Swensen et al., 2009) Argued that the most significant problem in an investor's life is deciding whether to invest in a value or growth stock. According to certain criteria, value investing is defined as an investment in which the stock price is at its underlying value. (Swensen et al., 2009) and (Balvers et al., 2000) suggested that value investing provided a higher and better return on investment, due in part to the underlying propensity in other regular market conditions.

H4a. Fundamental variation has impact on investment decision of institutional investors.

H4b. Fundamental analysis mediates the relationship between self-control and investment decision.

H4c. Fundamental analysis mediates the relationship between overconfidence and investment decision.

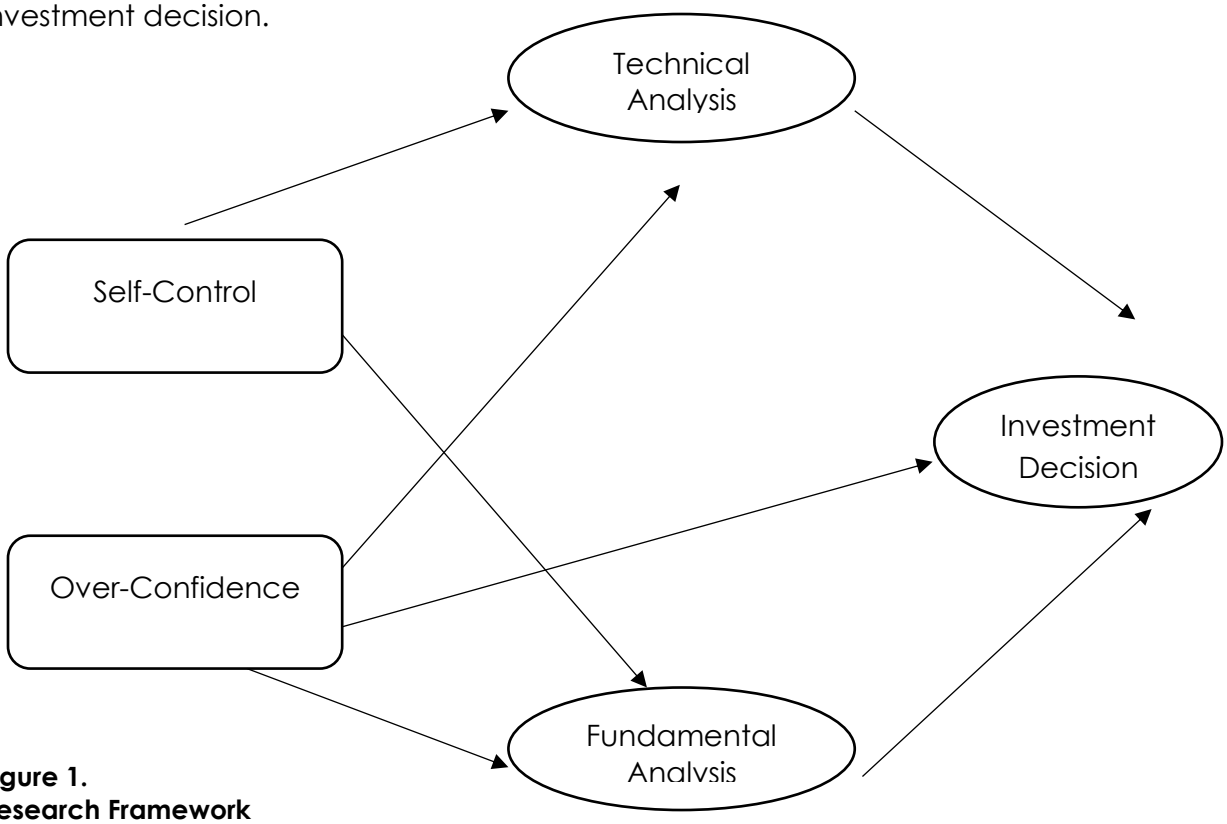

Figure 1.
Research Framework

RESEARCH METHODOLOGY

Statistical tool

Smart PLS will be used to evaluate the collected data in this investigation. For the descriptive analysis, meanwhile, SPSS will be employed. The evaluation will be split into two sections using Smart PLS. The measurement model would be assessed in the first section. The structural model is tested in the second section. In the initial part, Factor loading, Cronbach's alpha, composite reliability, convergent validity, discriminant validity, and average variance will all be studied as part of the measurement model (AVE). Internal consistency will be used to evaluate convergent validity. The moderation impact will be tested in the second stage, using Smart PLS scaling. Furthermore, Smart PLS scaling will be utilized to investigate the mediation impact, which will include both direct and indirect effects. Effect size (f2) and predictive relevance (Q2) will also be looked at.

Research Design

Using a cross-sectional research design, the current study will employ a quantitative research method. The survey method is used as it is considered the best in this study to examine the research design. The majority of survey methods were used in the positivist approach. The benefits of conducting a survey include determining the real value of variables and strengthen the relationships between them. In addition, the validation of the proposed elements in the study model is explained by gathering and analyzing methodologies (Newsted, Huff & Munro, 1998).

Population

The study's respondents are all institutional investors on the Pakistan Stock Exchange Market (PSX), which includes the Lahore Stock Exchange, Karachi Stock Exchange, and Islamabad Stock Exchange. These investors are employed to assess their behavior in order to determine the impact of stock market fluctuations on investing decisions.

Unit of Analysis

Institutional investors serve as the study's unit of analysis. This research focuses on the behavioral consequences of integrating self-control and overconfidence variables in investment decisions that mediate market instability including fundamental and technical variations.

Sampling techniques

The current study used stratified sampling and cluster sampling. Cluster sampling's major goal is to save money, while stratified sampling correctly reflects the population. All states will be separated into several clusters in order to use cluster sampling.

Sample Size

Because the current research is focused on Pakistan stock exchange PSX, the sample size is entirely comprised of institutional investors. Sample size for the current study is 375 institutional investors.

Instrumentation

A measurement scale is one of the most useful tools for determining the relationship between variables. As a result, one of the most appropriate methods for determining the relationship is to use a scale instrument. The data will be collected from respondents using a 5-point Likert scale in this study. By minimizing the respondent's annoyance level, the 5-point Likert scale increases originality and reliability. 1 from strongly disagree to strongly agree are the five categories of replies in a 5-point Likert scale Adetiloye and Babaji de (2012).

DATA ANALYSIS AND RESULTS

Model validity and structural routes are explored in this chapter, as well as an analysis of data of survey results. As a result, the aim of this section is to go over the entire analysis of data gathered from the questionnaire surveys. Data refining and hypotheses testing are all topics covered in this chapter. Data analysis was used in the current study to look for data mistakes. Missing values and outliers in the data are indications of errors. Table 4.1 displays the data statistics after data screening, indicating that no missing values or outliers exist. As a result, the existing data has reached a satisfactory level of quality for future investigation.

Table 1.
Data Statistics

	No	Missing	Mean	Median	Min	Max	Standard Deviation	Excess kertosis	Skewness
SC1	1	0	3.261	3	1	7	1.534	-0.505	0.094
SC2	2	0	3.265	3	1	7	1.775	-0.591	0.411
SC3	3	0	3.526	3	1	7	1.904	-0.829	0.312
SC4	4	0	3.54	3	1	7	1.921	-0.834	0.369
SC5	5	0	3.55	3	1	7	1.745	-0.505	0.296
OC1	6	0	3.517	4	1	7	1.814	-0.726	0.215
OC2	7	0	3.536	4	1	7	1.838	-0.897	0.128
OC3	8	0	3.706	4	1	7	1.872	-0.797	0.193
OC4	9	0	3.739	4	1	7	1.858	-0.769	0.279
FA1	10	0	3.678	3	1	7	1.94	-0.791	0.36
FA2	11	0	3.583	3	1	7	1.889	-0.731	0.378
FA3	12	0	3.592	3	1	7	1.869	-0.639	0.361
FA4	13	0	3.64	3	1	7	1.845	-0.708	0.303
TA1	14	0	3.502	3	1	7	1.778	-0.473	0.437
TA2	15	0	3.559	4	1	7	1.895	-0.906	0.183
TA3	16	0	3.493	3	1	7	1.817	-0.65	0.298
TA4	17	0	3.673	4	1	7	1.785	-0.664	0.24
ID3	18	0	3.085	3	1	7	1.509	-0.195	0.579
ID4	19	0	3.223	3	1	7	1.525	0.328	0.847
ID5	20	0	3.256	3	1	7	1.47	0.663	0.874

375 questionnaires were delivered to the institutional investors of Pakistan stock exchange market for data collection. 275 responses were collected. It is given in Table 4.2 that from 275 respondents, male respondents are 66.27% and female respondents are 32.27%. According to table 4.2, 62.4% respondents are single and 37.45% are married respondents. According to the age demographic profiles given in tables 4.2, 20.72% respondents are age group of 16-19 years, 40% respondents are age group of 20-35 years above 56 years respondents are 8.36%. According to the demographic profile of education level, post-graduation respondents are 46.18%, 5.18% for graduation level

respondents, under-graduation respondents are 42.54% and only 1.81% are secondary education respondents. According to table 4.2, work experience of 1-5 years respondents are 12%, 6-10 years work experience. Respondents have 41.81%, 11-15 years work experience respondents are of 26.54% and 17% belongs to above 15years work experienced respondents.

Table 2.
Survey respondents' demographic profiles

Demographics	Categories	Frequency (*N* = 275)	Percentage
Gender	Male	185	66.27
	Female	90	32.27
Marital status	Single	172	62.54
	Married	103	37.45
Age	16-19	57	20.72
	20-35	110	40.00
	36-55	64	23.27
	Above 56	23	8.36
		06	2.18
Qualification	Post-Graduation	127	46.18
	Graduation	16	5.81
	Under-Graduation	117	42.54
Working Experience	Secondary Education	05	1.81
	1-5 years	33	12.00
	6-10 years	115	41.81
	11-15 years	73	26.54
	Above 15 years	44	17.00
Monthly income (Pakistani Rupee = PKR)	20-40	10	3.63
	41-60	166	60.36
	61-80	77	28.00
	81-100	08	02.90
	Above 100	03	1.09

Partial Least Square Structural Equation Modeling was used in the current study to analyze the data (PLS-SEM). The PLS-SEM (Partial Least Square Structural Equation Model) has two key steps: measurement model assessment and structural model assessment. First and foremost, this study used Confirmatory Factor Analysis to investigate reliability and validity. This study looks at the Factor Loadings in Table 4.3 and the PLS measurement model in Figure 4.1 when it comes to measurement model evaluation. Factor loading is set to 0.5 as a minimum. As a result, in order to keep all of the goods, they must all be 0.5. Other factors with a Factor Loading of less than 0.5, on the other hand, should be removed. All of the scale items exhibit Factor Loading greater than 0.5, as shown in Table 4.3. As a result, everything is retained.

This research examined the reliability and validity through the factors loading. The minimum standard of Composite Reliability (CR) is 0.7, which is used in this study to analyze the reliability. The CR of self-control, overconfidence, technical analysis, fundamental analysis, and investment decision are all above 0.7 in table 4.4. In addition, the cronbach's alpha was used to verify the dependability of the data, and which is shown in Table 4.4, all of the variables have a 0.7 Cronbach alpha. This study aims to look at Average Variance Extracted (AVE), which should be more than 0.7. Average Variance Extracted (AVE) for Self-Control (SC) is 0.811, AVE for Over-Confidence (OC) is 0.834, AVE

for Fundamental Analysis (FA) is 0.828, AVE for Technical Analysis (TA) is 0.843, and AVE for Investment Decision (ID) is 0.843, as shown in table 4.4. The convergent validity is confirmed when the lowest AVE value is greater than 0.5 and the Composite Reliability (CR) is greater than 0.5

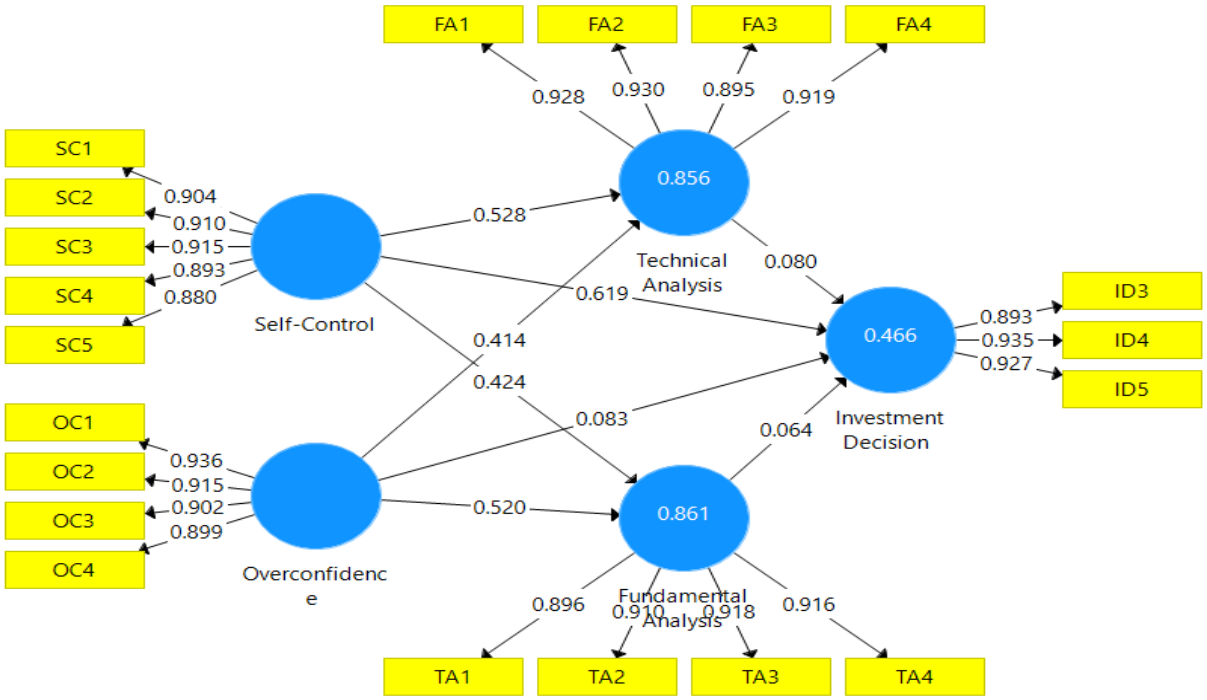

Figure 2.
PLS Measurement Model

Table 3.
Factor Loading

	Fundamental Analysis	Investment Decision	Overconfidence	Self-Control	Technical Analysis
FA1					0.928
FA2					0.93
FA3					0.895
FA4					0.919
ID3		0.893			
ID4		0.935			
ID5		0.927			
OC1			0.936		
OC2			0.915		
OC3			0.902		
OC4			0.899		
SC1				0.904	
SC2				0.91	
SC3				0.915	
SC4				0.893	
SC5				0.88	
TA1	0.896				
TA2	0.91				
TA3	0.918				
TA4	0.916				

Table 4.
Cronbach Alpha, Composite Reliability (CR), Average Variance Extracted (AVE)

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted
Fundamental Analysis	0.931	0.931	0.951	0.828
Investment Decision	0.907	0.909	0.942	0.843
Overconfidence	0.933	0.934	0.952	0.834
Self-Control_	0.942	0.942	0.955	0.811
Technical Analysis	0.938	0.939	0.956	0.843

The discriminant validity was also investigated in this study. With the Hitro-Trait and Mono-Trait ratios, discriminant validity is examined. HTMT and Cross-Loading are two abbreviations for it. Table 4.5 reveals that the HTMT value is less than 0.9, which meets the current study's minimum criteria, and table 4.6 shows that the Cross-Loading meets the same standard. As a result, there is also discriminant validity.

Table 2.
HTMT

	Fundamental Analysis	Investment Decision	Overconfidence	Self-Control_	Technical Analysis
Fundamental Analysis					
Investment Decision	0.684				
Overconfidence	0.779	0.699			
Self-Control_	0.769	0.736	0.799		
Technical Analysis	0.666	0.669	0.665	0.797	

Average variance extracted has been used to assess the discriminant validity. Values above 0.7 are considered very good whereas the level of 0.5 is acceptable. AVE square root of all the mentioned variables in table 4.6 are above 0.7 which means that values are above the acceptable level.

Table 3.
AVE Square Root

	Fundamental Analysis	Investment Decision	Overconfidence	Self-Control_	Technical Analysis
Fundamental Analysis	0.821				
Investment Decision	0.564	0.854			
Overconfidence	0.789	0.608	0.798		
Self-Control_	0.654	0.456	0.709	0.805	
Technical Analysis	0.601	0.589	0.587	0.702	0.851

This study used PLS-SEM to investigate the associations between variables in the following step of Partial Least Square-Structural Equation Modeling (PLS-SEM). The T-Value and the Beta Value were examined during this process. To accept or reject the hypothesis is determined by the T-Value of 1.96. The hypothesis was supported if the T-value was more than 1.96, and the hypothesis was rejected if the T-value was less than 1.96. Additionally, the direction of the link is examined using the Beta value. This study examined a total of twelve hypotheses in this process, which are listed below:

H1a. There is a significant positive relationship between higher overconfidence and higher variation in the stock market.

H1b. The higher the level of Overconfidence the greater the generation of technical variation in the stock market.

H1c. The higher the level of Overconfidence the greater the generation of fundamental variation in the stock market.

H2a. There is a significant positive relationship between higher degree of self-control and lower variation in the stock market.

H2b. The stronger the self-control, the more technical variance there will be in the market for shares.

H2c. The stronger the self-control, the more fundamental variety there will be in the stock market.

H3a. Technical variation has an impact on investment decision of institutional investors.

H3b. Technical analysis mediates the relationship between self-control and investment decision.

H3c. Technical analysis mediates the relationship between overconfidence and investment decision.

H4a. Fundamental variation has impact on investment decision of institutional investors.

H4b. Fundamental analysis mediates the relationship between self-control and investment decision.

H4c. Fundamental analysis mediates the relationship between overconfidence and investment decision.

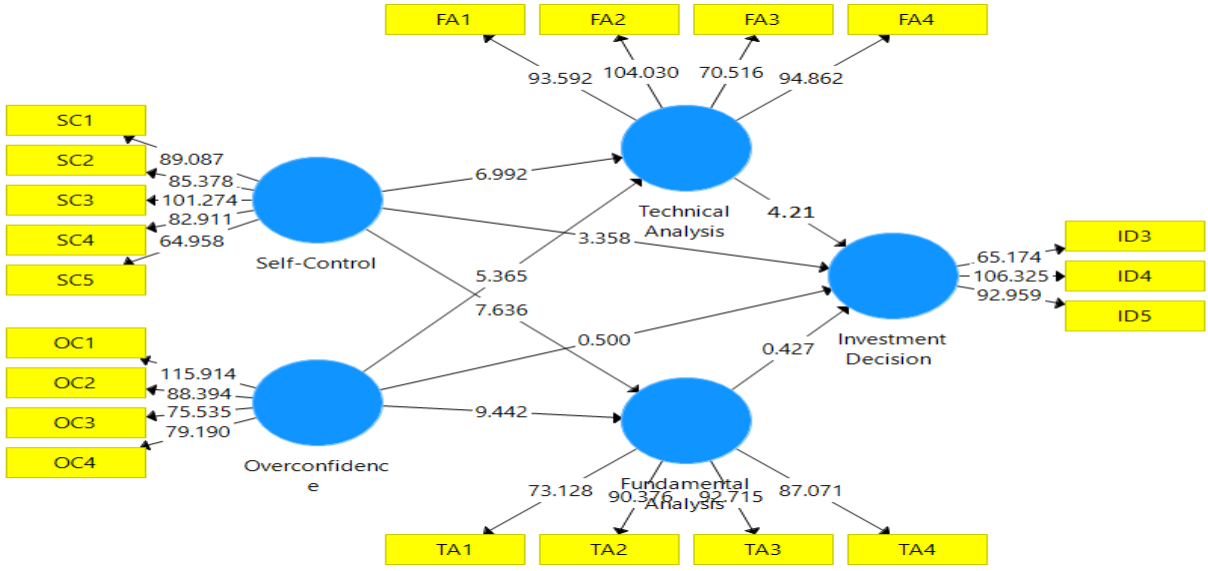

Figure 3.
PLS Structural Model

Table 4.
Direct Effect Results

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Fundamental Analysis -> Investment Decision	0.064	0.064	0.15	0.427	0.669
Overconfidence -> Fundamental Analysis	0.52	0.52	0.055	9.442	0
Overconfidence -> Investment Decision	0.083	0.091	0.166	0.5	0.617
Overconfidence -> Technical Analysis	0.414	0.414	0.077	5.365	0
Self-Control_ -> Fundamental Analysis	0.424	0.426	0.056	7.636	0
Self-Control_ -> Investment Decision	0.619	0.611	0.184	3.358	0.001
Self-Control_ -> Technical Analysis	0.528	0.529	0.075	6.992	0
Technical Analysis -> Investment Decision	0.08	0.077	0.019	4.21	0

PLS-SEM is given in Figure 4.2 and results are shown in Table 4.7. Following results are given in Table 4.7: Hypothesis H1a is not supported since the influence of over-confidence on investment decision is not positively significant, with a T value of 0.5, which is less than the normal value of 1.96. Hypothesis H1b is supported as over-confidence has significant positive relationship with technical analysis having T-value of 5.365 that is greater than normal value of 1.96. Hypothesis H1c is supported as over-confidence has significant positive relationship with fundamental analysis having T-value of 9.442 that is also greater than normal value of 1.96. Hypothesis H2a is supported since the influence of self-control on investment decision is positively significant, with T-value of 3.358 which is greater than normal value of 1.96. Hypothesis H2b is supported as self-control has significant positive relationship with technical analysis having T-value of 6.992 that is also greater than normal value of 1.96.

Hypothesis H2c is not supported since the influence of fundamental analysis on investment decision is not significant, with a T value of 0.427, which is less than the normal value of 1.96. Hypothesis H3a is supported as technical analysis has significant positive relationship with investment decision having T-value of 4.21 that is also greater than normal value of 1.96. Hypothesis H3b is supported having T-value of 3.49 which is greater than normal value of 1.96 and beta value is positive which shows that technical analysis has strengthen the relationship between self-control and investment decision. Hypothesis H3c is not supported which shows that technical analysis does-not strengthen the relationship between over-confidence and investment decision having T-value of 0.579 which is less than normal value of 1.96 and having beta value of 0.033.

Hypothesis H4a is not supported fundamental analysis has not significant positive relationship with investment decision having a T value of 0.472, which is less than the normal value of 1.96. Hypothesis H4b is not supported which shows that fundamental analysis does-not strengthen the relationship between self-control and investment decision having T-value of 0.579 which is less than standard value of 1.96 and having a beta value of 0.042. Hypothesis H4c is not supported which shows that fundamental analysis does-not strengthen the relationship between over-confidence and investment decision having T-value of 0.426 which is less than normal value of 1.96 and beta value of 0.027.

Table 5.
Indirect Effect Results

	Original Sample (O)	Sample Mean (M)	Standard (STDEV)	Deviation	T Statistics (|O/STDEV|)	P Values
Overconfidence -> Fundamental Analysis -> Investment Decision	0.033	0.033	0.078		0.426	0.67
Overconfidence -> Technical Analysis -> Investment Decision	0.033	0.032	0.057		0.579	0.563
Self-Control_ -> Technical Analysis -> Investment Decision	0.042	0.04	0.012		3.49	0.001
Self-Control_ -> Fundamental	0.027	0.028	0.065		0.42	0.675

This study evaluates the model's quality with the use of Predictive Relevance (Q2). Predictive Relevance must be greater than zero according to a prior study. Figure 4.3 and table 4.8 show this information. Fundamental Analysis has a predictive relevance of 0.706, an investment decision of 0.381, and a technical Analysis of 0.716. Because all of these numbers are greater than zero, the current study's model meets the basic quality requirements.

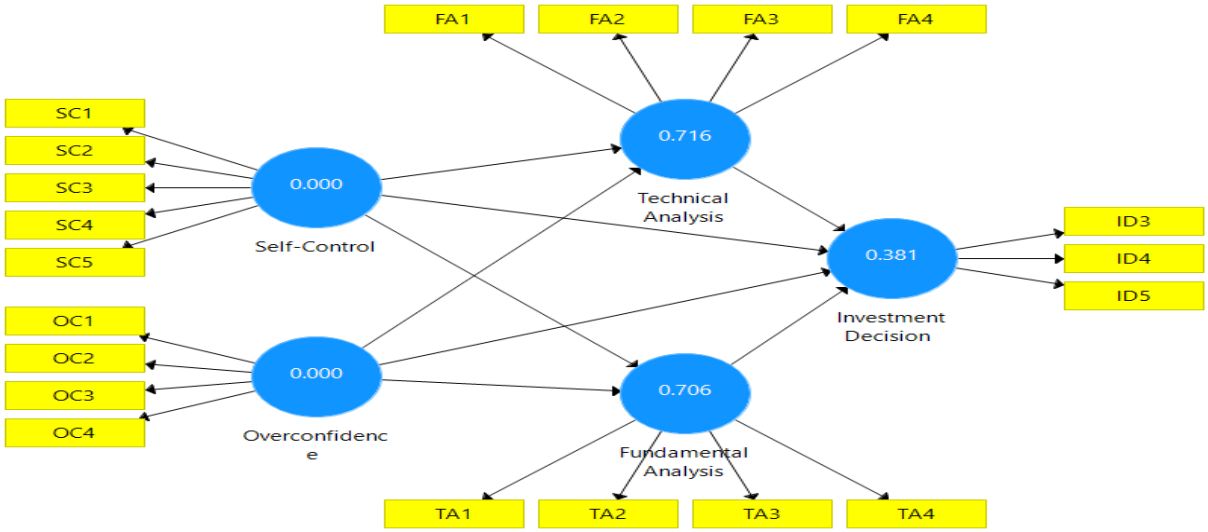

Figure 4.
Predictive relevance

Table 6.
Predictive Relevance (Q^2)

	SSO	SSE	Q^2 (=1-SSE/SSO)
Fundamental Analysis	844	247.76	0.706
Investment Decision	633	391.526	0.381
Overconfidence	844	844	
Self-Control_	1055	1055	
Technical Analysis	844	239.538	0.716

DISCUSSION AND CONCLUSION

The main objective of current research was to test the influence of self-control and over-confidence on investment decision by using mediating variables of fundamental analysis and technical analysis. To achieve the objective of current research twelve hypotheses were proposed out of which seven hypotheses are accepted and five hypotheses are rejected as shown in chapter 4. According to the results of current study:

Hypothesis H1a is not supported which shows that the relationship between over-confidence and investment decision is not positively significant; this result is in-consistent with previous studies (Delcey, 2019). Hypothesis H1b is supported which shows that over-confidence has significant positive relationship with technical analysis and this result is consistent with previous studies (Sekścińska; Rudzinska, 2021). Hypothesis H1c is supported which shows that over-confidence has significant positive relationship with fundamental analysis and this result is consistent with previous studies (Turner, 2018).

Hypothesis H2a is supported which shows that the relationship between self-control and investment decision is positively significant and this result is also consistent with previous studies (Fama, 2022). Hypothesis H2b is supported which shows that self-control has significant positive relationship with technical analysis and this result is consistent with the previous studies (Malkieli, 2017). Hypothesis H2c is not supported which shows that the effect of fundamental analysis on investment decision is not positively significant and this result is inconsistent with previous studies (Al-Ayoubi, 2019).

Hypothesis H3a is supported which shows that technical analysis has positively significant relationship with investment decision and this result is consistent with the previous studies (Hon-Snir, 2016). Hypothesis H3b is also supported which shows that technical analysis strengthen the relationship between self-control and investment decision and this result is consistent with the previous studies (Michalski, 2021). Hypothesis H3c is not supported which shows that technical analysis does-not strengthen the relationship between over-confidence and Investment decision and this result is consistent with the previous studies (Rushby, 2017).

Hypothesis H4a is not supported which shows that the effect of fundamental analysis on investment decision is not positively significant and this is consistent with previous studies (Rushby, 2020).Hypothesis H4b is not supported which shows that fundamental analysis does-not strengthen the relationship between self-control and investment decision and this result is consistent with the previous studies (Turner, 2017). Hypothesis H4c is not supported which shows that fundamental analysis does-not strengthen the relationship between over-confidence and investment decision and this result is consistent with the previous studies (Nugroho, 2019).

THEORETICAL AND PRACTICAL IMPLICATIONS

The discussion suggests that different behavioral components have different effects on investment decision, and that different components bring out different results. Researchers search out insights that are useful to institutional investors by examining at each component of behavioral finance. To the best of my knowledge, this is the first study in the field of behavior finance that has used multi-mediation mechanisms to examine the impact of behavioral components of self-control and overconfidence on investment decisions involving institutional investors in the Pakistan stock exchange market. It is one of the earliest studies of Pakistani investors' behavior, and it contributes to the behavioral finance literature by filling a gap. Furthermore, while only institutional investors are participating in the data gathering process, there is a possibility in the finance field to continue research by incorporating finance students and especially individual investors in order to assess the impact of components of behavioral finance on investment decisions.

CONCLUSION

This current study concluded that the main objective of research is achieved. Self-control has positive significant impact on investment decision of institutional investors of Pakistan stock exchange market with mediating effect of technical analysis as-well fundamental analysis has strengthen the relationship between self-control and investment decision. Technical and fundamental analysis both strengthen over-confidence in decision making of institutional investors. Although over-confidence behavior does not have direct impact on investment decisions as well fundamental and technical analysis has strengthen over-confidence behavior of institutional investors of Pakistan stock exchange market. Technical analysis is attractive factor for making investment decision whereas fundamental analysis has weaken the decision making of institutional investors. Moreover, fundamental analysis has weaken the relationship between the behavioral factors (such as self-control and over-confidence) and investment decision. Furthermore, technical analysis has weaken the relationship between behavioral factor of over-confidence and the investment decision of institutional investors of Pakistan stock exchange market.

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Consent to Participate: Yes
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APPENDIX I

QUESTIONNAIRE

Note: It is promise to you that the information is only used for academic purpose and it's keeps confidential.

Section 1: Demographics: Please tick □appropriate response or fill the gap

1. Gender: □Male □Female
2. Age: □16-19 years □20-35 years □36-55 years □Above 56
3. Marital Status: □Married □Single
4. Highest level of education attained:
   □Post-Graduation □Graduation
   □Under Graduation □Secondary Education
5. Years of Working Experience in the stock market:
   □1-5 years □6-10 years □11-15 years □Above 15 years
6. Your monthly income (in Thousands):
   □20-40 □41-60 □61-80 □81-100 □Above to 100
7. Nature of employment:
   □Businessman □Employee
8. You are investor:

□Active (Active role in investing own money) □Passive (Not to take risk on own money)

Note: There is no right and wrong answer, so please evaluate the most appropriate scale as to be.

Section 2: Please indicate your response to the following statements by ticking the appropriate corresponding choice.

Statements	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
Sometimes you are not as dependable or reliable as you should be.					
To what extent you never seem able to get organized.					
You often feel that you speak or act too quickly, without thinking about the consequences.					
You often late for appointments.					
You often try to avoid the situation that requires thinking in depth about something.					
You do not like to have to do much thinking.					
You trade excessively in the stock market because you are sure of what step to take at all times to increase the worth of your investment.					
You are a smart participant in the stock market.					

You are always confident you will make sure gain when trading in the market.					
You believe that your skills and knowledge of stock market can help you to outperform the market.					
To what extent do you have high expectation of stock return beyond market expectations?					

Section 3: Please give your opinions about the levels of agreement for the following statements:

Statements	**Strongly Disagree**	**Disagree**	**Somewhat Agree**	**Agree**	**Strongly Agree**
You consider carefully the Price Change of stocks that you intend to invest in.					
You Focus on popular stock for your investment.					
You have the Over/under reaction to the price change of stocks.					
You study about the market Fundamental of underlying stocks before making investment decisions.					
Market information is important for your stock investment.					
You put the Past trend of stocks under your consideration for your investment.					
To what extent do you use chart pattern to analyze the price action for your investment.					
To what extent you used past price and volume of stock under review for your investment.					

Section 4: Please evaluate the degree of your agreement with the following statements.

Statements	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
The return rate of your recent stock investment meets your expectation.					
Your rate of return is equal to or higher than the average return rate of the market.					
You feel satisfied with your investment decisions in the last year (including selling, buying, choosing stocks, and deciding the stock volumes).					

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