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Investment Decision Quality (IDQ) as a Forensic Indicator: Multidimensional Scale Development and Validation

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Abstract

Behavioral distortions, information asymmetry, financial illiteracy, and weak forensic oversight are the most common drivers of investment decision failures in emerging markets resulting in inefficient allocation of portfolios and a decrease in welfare to investors. Although past studies have studied behavioral biases and market inefficiency in detail, the available literature is still piecemeal, and most authors have concentrated on single predictors or outcomes of investment behavior. Consequently, the research area does not have a unified, theory based, and psychometrically sound instrument that can measure the overall quality of investment decisions as a multidimensional construct.

To fill this conceptual and methodological gap, the current study formulates and empirically evidences Investment Decision Quality (IDQ) as a new multidimensional construct based on decision quality theory, behavioral finance, prospect theory, and forensic behavioral views. IDQ is defined as a higher-order construct that is formative and consists of three reflective dimensions namely Process Rationality, Portfolio Appropriateness, and Outcome Satisfaction. Development of a scale consisting of 19 items was done with the help of a systematic literature review and expert judgment and then underwent demanding empirical testing. A total of 540 active individual investors of the Pakistan Stock Exchange (PSX) provided data. IBM SPSS Statistics was used to perform exploratory factor analysis (EFA) on the dataset and then confirmatory factor analysis (CFA) by means of partial least squares structural equation modeling (PLS-SEM) with hierarchical component modeling. The given approach allowed a strict test of the measurement structure and gave evidence of structural robustness and theoretical coherence.

Comprehensively, the results substantiate the strength of the reflective-formative hierarchical model and the fact that IDQ is a structured, empirically based instrument that can be used to test the level at which investors process information, form portfolios, and decide on the success of investment. The article has both theoretical and methodological implications: it was the first to conceptualize investment decision quality as a forensically directed multidimensional formative construct, and it validated a reflective-formative hierarchical scale in an emerging-market setting. In practice, the IDQ scale presents

regulators, financial advisors and investor-protection agencies with a diagnostic and screening instrument on the basis of behavioral vulnerability, suitability misalignment and exposure to deceptive investment practices.

Keywords: *Investment Decision Quality (IDQ), Portfolio Appropriateness (PA), Process Rationality (PR), Outcome Satisfaction (OS), Forensic Variable, Investment Decision Making.*

1. Introduction

Investment decisions are based on various factors such as the way individuals gather information, analyze cues, evaluate alternative options, and predict outcomes. Mostly, the behavioral finance research reflects that investors may not always behave as rational models predict; rather, their investment decision often based on past experiences and intuition that may often lead to systematic flaws (Kahneman & Tversky, 1979; Tversky & Kahneman, 1974).

These biases affect the way investors search for information, assess risk, and make expectation about returns. This leads to the decision that detracts from a rational financial behavior (Barberis & Thaler, 2003; Shah & Oppenheimer, 2008). The research studies of different markets also claim that these types of biases reduce the effectiveness of decisions and may outweigh the analytical reasoning capability of individuals (Ahmad & Shah, 2020; Hunjra et al., 2012; Khan et al., 2021)

Since the outcomes of investment decisions are affected by many external factors, the success or failure of an investment cannot be determined solely on the basis of performance. Sometimes, any favorable outcome can be the result of luck rather than skill, and at times, a well-reasoned decision may also lead to negative outcomes in a volatile market (Bell, 1982; Shefrin & Statman, 2000). Due to these reasons, it becomes difficult to determine the quality of investment decisions. The current research studies focus on isolated domains such as risk tolerance (Gerrans et al., 2015), investors' satisfaction (Rutkowska (Rutkowska, 2015), or particular behavioral biases (Almansour et al., 2023; Hayat & Anwar, 2016). However, the existing studies lack in providing an integrated measurement framework to capture the complete decision process, portfolio's appropriateness, and the investor's personal evaluation of outcomes. Thus, behavioral finance lacks a comprehensive, validated investment decision construct.

In emerging markets, this gap is considered to be very important because the factors such as limited financial literacy, strong social influences, and information diversity lead to market volatility and make investors vulnerable to unreasonable investment decisions (Hassan Al-Tamimi & Anood Bin Kalli, 2009; Hunjra & Rehman, 2016). Recent studies further highlight that emerging markets exhibit stronger behavioural distortions due to information asymmetry and social trading dynamics (Chishti et al., 2025; Almansour et al., 2023; Dassani & Manda, 2022). In these kinds of scenarios, weak investment decision processes can increase the likelihood of misleading advice, unethical practices, and unsuitable products. The forensic studies also claim that the flaws in judgment and insufficient evaluation of information usually lead to financial disputes, frauds and victimization of investors (Dorminey et al., 2012; Singleton & Singleton, 2010). Despite clear visibility of this risk, no measurement tool is available for systematically evaluating investors' decision quality from behavioral and forensic perspectives.

Simultaneously, MiFID-II and ESMA's guidelines also highlight the importance of informed decision-making, fair treatment of clients, and portfolio suitability. These regulatory frameworks have provided guidelines for strengthening investors' protection, but the guidelines and principles were not translated into validated scales either for academic research or for practical assessment. Any scale that captures these guidelines in measurements would be a bridge between forensic application, behavioral perspectives and regulatory requirements.

The current research has the objective to conceptualize, develop, and validate a multidimensional investment decision quality instrument based on well-grounded theory and regulatory standards. The model developed in the work of this paper incorporates three dimensions:

1) Process Rationality: It reflects how investors evaluate information and search for process.
2) Portfolio's appropriateness: It captures how wellthe investment aligns with suitability guidelines, risk tolerance, and goals.
3) Outcome satisfaction: It represents how an investor evaluates his/her decision after the results are unfolded.

This study fills theoretical and methodological gaps by connecting investment decision quality with behavioral finance and forensic behavioral analysis. It provides a practical and validated assessment instrument for helping policymakers, investigators, academicians, and advisors as they will have a better understanding about investor's decision making and the impact of their decisions.

2. Review of Literature

2.1 Investment Decision and Behavioral Finance

Behavioral finance prescriptive claims that an investors decision making, often influenced by several biases such past experiences, intuition and emotional cues. These biases mislead an investor in a process of assessing risk, processing information and evaluation of outcome in an effort to proceed for analytical based reasoning (Kahneman & Tversky, 1979; Tversky & Kahneman, 1974). Research studies claim that the investors use these simplified strategies for simplification of the cognitive effort however, these strategies seldom lead to the successful decisions (Shah & Oppenheimer, 2008).

According to other empirical studies of emerging markets, the biases such as overconfidence, anchoring regret aversion and herding mold behavior of investor (Ahmad & Shah, 2020; Hayat & Anwar, 2016; Hunjra et al., 2012). More recent investigations confirm that cognitive biases remain dominant predictors of suboptimal investment decisions in emerging financial systems (Chishti et al., 2025; Hussain et al., 2023). In the context of Pakistan, heuristic-driven biases strongly influence deviations from the rational investment option and predict perceived market efficiency (Khan et al., 2021; Shah et al., 2018). These gaps identify the need for integrated measurement scale to determine decision processes. Otherwise, relying solely on realized outcomes may be influenced by luck or market volatility (Bell, 1982; Shefrin & Statman, 2000).

Although the existing literature isolates individual determinants for examples, satisfaction (Rutkowska, 2015), risk tolerance (Gerrans et al., 2015) or specific heuristics (Almansour et al., 2023) however, it does not provide a holistic tool to assess the overall quality of investment decisions. This phenomenon leads to the motivation for developing a multidimension investment decision quality (IDQ) measurement scale.

2.2 Decision's Quality, Suitability and Investor's Findings

Decision Quality Theory (Howard, 1988; Spetzler et al., 2016) suggests that the potential to make high quality decisions relies on creative alternatives, reasoned arguments, trustworthy information and appropriate framing. These rules guide the information search in an organized manner, which contributes to the reduction of biases and goal orientation in investment process. These attributes are manifested in the process rationality dimension of decision quality in investment decisions.

The Portfolio's suitability is supported by Modern Portfolio Theory (Markowitz, 1952) and aligns with governing suitability guidelines such as ESMA's or MiFID-II standards. These standards require aligning investment horizon, loss bearing capacity, investor risk tolerance and diversification. Past research studies emphasize that improper diversification, unsuitable portfolios, and impulsive trading deteriorate the quality of long-term decision and result in dissatisfaction (Gerrans et al., 2015; Shefrin & Statman, 2000). Contemporary measurement research has attempted to operationalize regulatory suitability principles into empirical assessment tools (del Pozo, 2024), yet an integrated multidimensional quality construct remains absent.

The Prospect Theory shapes outcome evaluation. According to this theory, the investors evaluate performance relative to expectation rather than objective returns (Hoffmann & Post, 2017; Kahneman et al., 1986). As the outcomes are dependent on market conditions, therefore, they cannot solely indicate the success or failure of the decision. Thus, to comprehensively understand decision quality, assessment of psychological evaluation is important.

2.3 Forensic Behavioral Framework and Vulnerability of Investors

Since, the behavioral finance describes about the deviation from rationality, forensic behavior models highlight the underlying deviations, causing investors vulnerability to mis selling, un-ethical financial practices and manipulative exploitation. According to Cressey (1953) Fraud Triangle, the co-existence of pressure and opportunity cause fraud. When investors demonstrate low process rationality such as emotional decisions, depending on rumors or not being able to identify biases, they are more vulnerable to persuasive rationalization which is often used in fraudulent practices.

The Rationalization Theories are also explained by forensic psychology. The theories emphasize on cognitive distortion which offenders use to justify their manipulative practices. The investors who have weak analytical discipline or lack in information verification may inadvertently victim of these distortions. The Behavioral Red-Flag of Frauds framework discovers indicators of vulnerability, these include; inconsistent strategies of decision, overconfidence, information asymmetry and regret sensitivity. These indicators are consistent with the IDQ dimensions such as regret minimization (OS3), biases awareness (PR6) and resistant to rumors (PR4b).

Lastly, the literature on Investor Victimology e.g., Benson and Simpson (2018); Titus (1999), highlight that the factors such as cognitive limitation, emotional instability, unstructured decision process and inadequate financial literacy contribute to exploitation. The low score on IDQ, substantially reflect these susceptibility pathways and make IDQ a theoretically justifiable forensic indicator.

Recent work on bias blind spots further suggests that individuals systematically underestimate their own susceptibility to bias (Pronin & Hazel, 2023; Cruz & Mata, 2025), reinforcing the need for structured decision-quality assessment. These frameworks, in combination, position IDQ as a behavioral measure and a diagnostic tool which is capable of indicating exposure to misleading advices, manipulative and unethical investment practices and unsuitable products.

3. Theoretical and Conceptual Framework

Investment Decision Quality (IDQ) as a Multidimensional Forensic-Behavioral Construct

Investor Decision Quality (IDQ) is defined as the overall appropriateness, rationality, and effectiveness of the choices made by the investors. It reflects both how the decision is made and how effectively it

aligns with investors' goals (Nguyen et al., 2022; Shusha, 2017). The IDQ is a multidimensional evaluation construct. This construct reflects the extent to which an investor's decisions are made through a reasonable and bias-averse resistant process (process rationality), provides portfolios aligning the investor's objectives and constraints (portfolio appropriateness), and results in subjectively and objectively appropriate outcomes (outcome satisfaction). The IDQ integrates the aspects such as process, outcome, and structure into a unified higher-order construct that is appropriate for empirical measurement and forensic assessment.

In contemporary behavioral finance, the quality cannot be solely determined through realized return because the outcomes are largely influenced by risk preferences, market conditions, and biases. Therefore, the quality of decisions must be determined through a compound evaluation of three factors: (i) the decision process, (ii) the satisfaction of investors with outcomes of decisions, and (iii) the suitability of the portfolio chosen.

Consequently, IDQ is conceptualized as a multidimensional second-order construct that is comprised of three interrelated first-order dimensions. These dimensions are: process rationality, appropriateness of portfolio, and outcome satisfaction, and represent corresponding manifestations of investment decision quality (IDQ). All these dimensions are theoretically grounded in well-established decision theories and empirically supported in investment literature.

The other distinctive feature of this research is that it extends IDQ to the behavioral forensics area by the argument that quality of decision is a psychological mechanism of resistance to false reporting, misleading financial assertions, and speculative exploitation of emerging markets.

The conceptualization of IDQ in the study is based on the established theories of behavioral finance and forensic behavioral analysis. The theoretical backing points out the manner in which an investor gathers information, constitute portfolio, assemble signals, estimate choice possibilities, and assess results. The study is based on the Bounded Rationality Theory (Simon, 2013), Prospect Theory (Kahneman and Tversky, 1979), Decision Quality Theory (Howard, 1988) and (Spetzler et al., 2016) and makes the IDQ a second-order multidimensional formative construct with three coherent dimensions i.e. process rationality, portfolio appropriateness and outcome satisfaction.

Moreover, the global regulatory frameworks, such as MiFID-II and ESMA regulations, also provide regulatory support to IDQ dimensions as they strengthen the importance of structured reasoning, risk configuration, and informed consent in the investment decision process. This framework extends beyond behavioral finance and incorporates insights from forensic accounting and behavioral forensics to show the weakness of the decision process. The framework also reflects how emotional vulnerability and portfolio inappropriateness enhance the vulnerability to manipulative practices, fake information, and mis-selling (Dorminey et al., 2012; Singleton & Singleton, 2010).

These perspectives develop an integrated theoretical as well as conceptual foundation for the IDQ model and constitute it a tool for behavioral assessment and forensic diagnosis. The underlying theories provided in subsequent sections justify the multidimensional structure and elaborate on the proposed framework.

3.1 Process Rationality: The Cognitive Basis of Decision Quality

The extent to which the investment decisions are made through a structured, analytical, and bias-averse judgment is referred to as process rationality. Process rationality is fundamentally anchored in two theoretical foundations:

(i) Bounded Rationality (Simon, 2013)

According to this theory, people work under cognitive constraints, information scarcity, and time pressure. The investors rely on simplified strategies rather than optimization for reaching satisfactory options. This perspective defines rationality as the quality of process, which means how well an individual is able to gather information, compare alternative options, evaluate evidences and be responsible for uncertainties. These principles are reflected by items such as information search (PR1), alternative evaluation (PR2), and goal clarity (PR3).

(ii) Decision Quality Framework (Howard, 1988; Spetzler et al., 2016)

Several elements influence the quality of decisions, such as clear framing, reliable information, rigorous reasoning, creative options, and commitment to actions. These factors lead to behaviors such as resisting emotional impulses (PR4a), avoiding rumors (PR4b), updating decisions on the basis of fresh information (PR5), mitigating biases (PR6), and vigorously finding contradictory evidence (PR7).

Forensic Lens

The low process rationality indicates a sensitive susceptibility to misinformation, sympathy-based frauds, rumor-based manipulation, and persuasive mis-selling. Therefore, PR is not only considered a cognitive factor but also a behavioral protection against decision manipulation.

3.2 Portfolio Suitability: Alignment with Investor Goals and Suitability Norms

The Portfolio Suitability refers to how well the selected portfolio aligns with the investor's risk tolerance, diversification needs, capacity to bear financial loss, time horizon, and liquidity restrictions.

(i) Contemporary Portfolio Theory (Markowitz, 1952)

The Modern Portfolio Theory posits that the optimal portfolios maximize expected returns for a given level of risk. Diversification minimizes the unsystematic risk; therefore, allocation should indicated investor's risk profile and financial goals. These principles are operationalized by items such as (PA2) for measuring diversification, (PA1) for risk alignment, and (PA3) for long-term goal consistency.

(ii) Regulatory Standards (MiFID-II, ESMA, SECP framework)

According to global regulatory standards, the investment decisions should be appropriate for the client's circumstances. This includes risk capacity, goals, liquidity needs, and financial strength. This regulatory foundation is assessed by loss-bearing capacity, evaluation fee, liquidity, and cost, and is reflected by items PA5 and PA6.

Forensic Lens

In mis-selling and advisory misconduct cases, Portfolio misalignment is termed a classic red flag. Poor risk diversification, the risk is higher than the capacity of the investor, and the hidden costs often reflect unethical recommendations. Therefore, the appropriateness of a portfolio amplifies as a forensic suitability indicator.

3.3 Outcome Satisfaction: Psychological Evaluation of Decision Success.

The outcome satisfaction indicates the investor's subjective understanding of the ability of the decision to meet expectations and support financial decisions. It indicates the emotional and psychological assessment rather than financial metrics.

(i) Prospect Theory (Kahneman & Tversky, 1979)

The investors assess the outcomes in accordance with the expectation, not based on absolute returns. Although both gains and losses stem from sound decisions, the gains result in satisfaction, whereas the losses result in regret. Items OS1 to OS5 capture satisfaction, perceived decision, confidence, regret reduction, and ability to differentiate skill and luck.

(ii) Literature on Behavioral Performance

The research studies claim that the investors interpret outcomes on the basis of fairness, regret, emotional well-being, and perceived alignment with targets (Bell, 1982; Hoffmann & Post, 2017; Shefrin & Statman, 2000). Whereas, the outcomes satisfaction shows perceived quality of decision, not only financial performance.

Forensic Lens

The vulnerability to misleading narratives and post-decision conflicts is escalated by high regret, emotional instability, and confusion between luck and skill. These emotional vulnerabilities are thoroughly documented causes in fraud victimology and dispute investigation.

3.4. IDQ as Multidimensional Construct: Integrating Forensic and Behavioral Perspectives

Three components of a system of holistic decision quality are Process Rationality, Portfolio Appropriateness and Outcome Satisfaction.

The research study places IDQ in the intersection point of behavioral finance and forensic behavioral science. Behavioural finance explains why investors deviate from rationality, while forensic behavioural sciences clarify how such deviations increase vulnerability to exploitation and deceptive financial practices. This positioning allows IDQ to function as an early-warning behavioral signal within financial environments. Low IDQ may indicate increased susceptibility to biased thinking, distorted information, or exposure to manipulative selling practices. High IDQ, in its turn, means high quality of reasoning, suitability, and compliance, and reduced exposure to exploitative practices. Therefore, IDQ is a judgmental tool through which the researcher can interpret the quality and integrity of the decision environment without neglecting the ultimate decision of the investor.

Conceptualization of IDQ in this integrated behavioral-forensic framework allows one to examine the following:

1) How behavioral biases decrease the quality of investment decisions and result in heuristic or emotionally distorted decisions as opposed to informed decisions.
2) The way that the quality of improved decisions reduces exposure to mis-selling or unnecessary influence or misleading signals in forensic financial analysis.
3) The predictions of the downstream results, including satisfaction, possibility to complain, compliance behavior, and the protection of investors, through IDQ.

The IDQ is dual-grounded by the fact that it does not remain a mere measure of evaluation but a diagnostic forensic indicator due to its ability to increase its contribution to academia, explanatory power, and regulatory significance.

Table 1: Process Rationality, Portfolio Appropriateness, and Outcome Satisfaction (The interdependent components of three dimensions system)

Dimension	Represents	Theoretical Basis	Forensic Role
Process Rationality	How well the decision was made	Bounded Rationality; Decision Quality Framework	Detects susceptibility to bias & manipulation
Portfolio Appropriateness	Whether the decision fits investor goals & risk	Modern Portfolio Theory; Suitability Rules	Detects mis-selling & unsuitable recommendations
Outcome Satisfaction	Whether the investor perceives the decision as successful	Prospect Theory; Behavioral Performance	Detects regret, misrepresentation, & post-decision disputes

Weakness in any dimension reduces overall decision quality and signals vulnerability to financial misconduct—aligning IDQ with early-warning forensic indicators.

3.5 Proposed Theoretical-Conceptual Framework of IDQ

IDQ has been conceptualized as a multidimensional second-order formative construct on the basis of preceding theoretical foundations and forensic justifications. In this model, process rationality, portfolio appropriateness, and outcome satisfaction are the first-order reflective domains. They represent the holistic qualities of investors' decisions.

In this model, behavioral finance, decision science, regulatory compliance standards, and forensic behavioral insights have been integrated. It incorporates a unified lens for evaluating investors' decisions, determining appropriateness of those decisions, and the psychological mechanism for interpretation of the results.

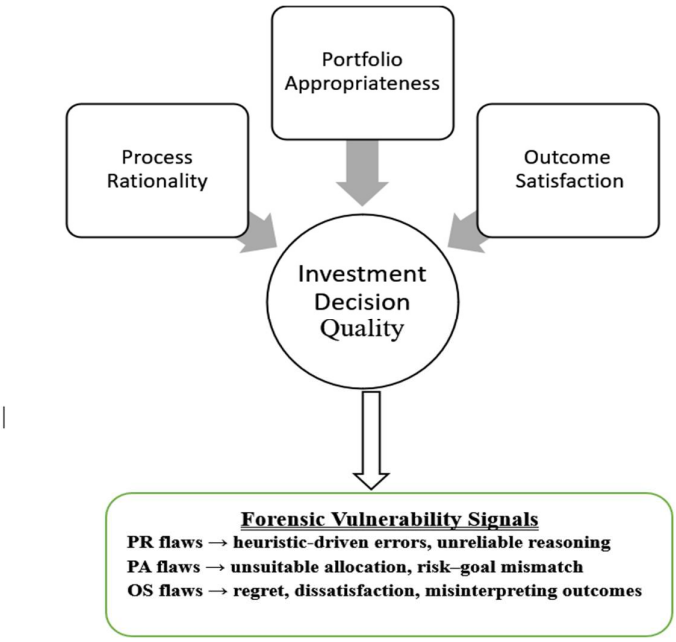

Fig 1. Research Model of Investment Decision Quality

4. Methodology

4.1 Research Design

This is a quantitative, survey-based research study conducted to develop and validate a multidimensional measurement tool (Investment Decision Quality (IDQ)) among the investors of the Pakistan Stock Exchange (PSX). The study followed the well-established scale development guidelines of Churchill (1979); DeVellis (2016), and Hinkin (1998). The process involves conceptualization, item generation, content validation, and psychometric assessment by using Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). Keeping in view of the important consideration of emerging market financial data and the complexity of the multidimensional construct, which does not strictly require normality assumptions, the EFA was done in the IBM SPSS Statistics and CFA was conducted by using Partial Least Square Structural Equation Modeling (PLS-SEM). This methodological approach of this study is adopted to ensure theoretical grounding and statistical rigor while constructing a valid and reliable investment decision quality measurement instrument.

4.2 Population and Sampling

4.2.1 Target Population

The individual investors actively trading in the Pakistan Stock Exchange constitute the target population of this study. The participants having at least one year of experience were selected so as to ensure that they are familiar with the investment decision process. As the study intended to capture a broad behavioral and forensic profile of investors, both retail and semi-professional investors were included in the population.

4.2.2 Sampling technique and size of the sample

The purposive sampling technique was used, and for this, lists of investors were assessed through brokerage networks, association groups of investors, and online trading platforms. According to the recommendation of Hair et al. (2019), there should be 5-10 respondents per item for the development of scales. As this study has an initial pool of 19 items, the minimum requirement was 190 respondents. Therefore, in order to ensure adequate power for both EFA and CFA, a total of 540 responses were obtained and processed.

4.3 Item Generation

A structured and systematic process was employed to develop the initial item pool for IDQ. This process involved the adoption and adaptation of previously validated measures, as well as the development of new items grounded in forensic behavioral considerations, established behavioral finance instruments, and conceptual foundations derived from decision quality theory. These items were categorized in three theoretically established domains, i.e. process rationality, portfolio appropriateness, and outcome satisfaction. In view of the recommendations of DeVellis (2016) and Hinkin (1998), the clarity of wording and the conceptual clarity of all items were carefully determined. The process ensured that the instrument reflects both conventional determinants of decision quality and relevant behavioral vulnerability indicators.

Table 2: Items Pool for Investment Decision Quality (IDQ) With Sources and Conceptual Rationale

Item Code	Item Statement	Dimension	Source / Basis	Conceptual Rationale
PR1	I collect and evaluate information from more than one credible source before investing.	Process Rationality	Adapted from Hunjra et al. (2012)	Represents analytical information search, central to rational decision processes.
PR2	I explicitly consider at least two alternative investments before choosing one.	Process Rationality	Adapted from Le Luong and Thi Thu Ha (2011)	Captures systematic evaluation and avoidance of single-option bias.
PR3	I set clear investment objectives and criteria before making an investment.	Process Rationality	Adapted from Hunjra et al. (2012)	Indicates clarity of goals, a foundational element of high-quality financial decisions.
PR4	My investment decisions are primarily guided by analysis rather than emotions.	Process Rationality	Revised (based on Khan et al. (2021)	Measures resistance to emotion-driven behavior—a core aspect of rationality.
PR5	I rely on verified and credible information rather than rumors when making investment decisions.	Process Rationality	Revised (based on Khan et al. (2021)	Measures resistance to noise trading and social influence.
PR6	I review and update my decisions when relevant new information becomes available.	Process Rationality	Newly Developed from Decision-Quality Theory Howard (1988))	Reflects adaptive updating—an essential property of high-quality, dynamic decisions.
PR7	I use structured strategies to minimize the influence of cognitive biases on my decisions.	Process Rationality	Revised from (Le Luong and Thi Thu Ha 2011; Hunjra et al. 2012)	Captures meta-cognitive efforts for bias mitigation.
PR8	I deliberately consider information that challenges my initial investment view.	Process Rationality	Newly Developed from confirmation bias literature (Nickerson, 1998; Klayman & Ha, 1987)	Measures active debiasing efforts—key to rational decision-making.

PA1	My portfolio allocation matches my stated risk tolerance and time horizon.	Portfolio Appropriateness	Adopted from MiFID II suitability principles; Adapted from del Pozo (2024)	Ensures portfolio–profile alignment, a key criterion of suitability.
PA2	My investments are sufficiently diversified to reduce unsystematic risk.	Portfolio Appropriateness	Adapted from Gerrans et al. (2015)	Measures diversification, essential for portfolio robustness.
PA3	I consciously structure my portfolio to support my long-term financial goals	Portfolio Appropriateness	Revised from Rutkowska (2015); MiFID guidelines	Indicates strategic alignment with investor goals.
PA4	I avoid impulsive trading and hold investments for an appropriate duration.	Portfolio Appropriateness	Adapted from Madaan and Singh (2019); Shefrin and Statman (2000)	Reflects disciplined holding behavior and reduced impulsivity.
PA5	The potential losses from my portfolio are within a range I can afford financially without impacting my essential needs.	Portfolio Appropriateness	Adapted from MiFID / ESMA frameworks	Highlights capacity to bear loss—a core suitability requirement.
PA6	I consider fees, taxes, and liquidity constraints before committing to an investment.	Portfolio Appropriateness	Newly Developed (MiFID disclosure requirements)	Captures cost-efficiency and liquidity planning.
OS1	I am satisfied with the way I make my investment decisions.	Outcome Satisfaction	Revised from Rutkowska (2015)	Measures satisfaction with the decision process, not market luck.
OS2	My investment outcomes generally reinforce my confidence in my decision-making process.	Outcome Satisfaction	Revised (based on Rutkowska (2015); Nguyen et al. (2022)	Links outcomes to perceived process quality.
OS3	Overall, I feel satisfied with the outcomes of my investment decisions.	Outcome Satisfaction	Adapted from Prospect-Theory Regret Literature; Rutkowska (2015)	Indicates reduced regret, reflecting emotional stability.

OS4	I feel that my investment results reflect the quality of my decision-making process.	Outcome Satisfaction	Newly Developed Howard (1988) and Shefrin and Statman (2000).	Connects outcomes to decision-process quality.
OS5	I feel confident in evaluating whether my investment outcomes result from sound decisions.	Outcome Satisfaction	Newly Developed from Judgment & Outcome-Evaluation Literature: (Kahneman et al. 1986; Baron, 2000; Shefrin and Statman 2000; Duke 2018).	Measures differentiation between skill and luck—high validity indicator.

Note. *PR = Process Rationality; PA = Portfolio Appropriateness; OS = Outcome Satisfaction.* Dimension Descriptions

4.3.1 Process Rationality (PR)

The extent to which investors are engaged in a structured, analytical, and bias-alert decision process has been measured by the items PR1 to PR8. The details of the behaviors captured by the eight items follow as: PR1 for information gathering, PR2 for comparison of alternatives, PR3 for establishing clear objectives, PR4 and PR5 for resisting emotions driven by rumors or emotions, PR6 for updating the decision with new information, PR7 for applying debiasing strategies, and PR8 for challenging their own assumptions.

Forensic Relevance

The items PR7-PR8 are significantly important as they depict bias recognition, resistance to manipulation, and meta-cognition. A high score will reflect that the key factors in forensic assessment of decision vulnerability, such as deceptive narrative, fraudulent schemes, or social pressures, are less likely to influence the investors.

4.3.2 Portfolio Appropriateness (PA)

Items PA1 to PA6 determine the regulatory principles aligning with MiFID and global investment guidelines. These items determine how well an investor's portfolio is aligned with liquidity constraints, financial capacity to suffer loss, time horizon, needs for diversification, and risk tolerance.

Forensic Relevance

The misalignment in some areas, such as inadequate diversification (PA2), portfolio's inconsistency with investor's goals (PA3), or exposure to unaffordable loss (PA5) is a red flag. These are generally associated with mis-selling, exploitative advice, or misleading advisory practices. The forensic evaluation is further strengthened by PA6 as it captures awareness of hidden costs and liquidity risk, which are often unnoticed in manipulative recommendations.

4.3.3 Outcome Satisfaction (OS)

The subjective evaluation of the decision process and outcomes is captured by items OS1 to OS5. The items detail follows as: OS1 for satisfaction, OS2 for confidence reinforced by outcomes, OS3 for low regret, OS4 for perceived connection between results and quality of decision, and OS5 for ability to distinguish skill from luck.

Forensic relevance

The items OS3 to OS5 are more important as they capture sensitivity to regret, emotional vulnerability, and meta-cognitive insights. These items are considered to be the core constructs in forensic analysis and behavioral finance. The item OS3 capturing high regret indicates an error-prone decision behavior. The item OS5, capturing misattribution of luck as skill, indicates vulnerability in fraud victimology. The item OS4 determines whether the perceived performance is actually linked to the decision process. This is an important check against self-deception and exploitability.

4.4 Content Validity

A panel of six experts, having specializations in behavioral finance, investment management, and forensic accounting, has determined the content validity of IDQ. The experts used a 4-point scale (1= no relevancy to 4=high relevancy) to rate items on relevancy, clarity, and representativeness. In accordance with the Lawshe (1975) guidelines, content validity ratios (CVR) were calculated. The items that did not meet the minimum threshold of 0.78 were revised for conceptual alignment, cultural fit, or clarity. In view of the feedback received from the experts, the items were refined.

4.5 Data Collection

In order to collect the data, an online questionnaire made in google form was distributed. For this purpose, brokerage networks, investors' social media groups, and email lists were used. Before surveys, informed consent was obtained for the voluntary participation of the respondents. The participants were assured of anonymity and confidentiality of information. The process of data collection took four weeks enabling the researcher to complete 540 usable responses.

4.6 Exploratory Factor Analysis (EFA)

Exploratory Factor Analysis (EFA) was conducted to examine the underlying dimensional structure of the 19-item Investment Decision Quality (IDQ) instrument prior to confirmatory assessment. Consistent with established scale-development procedures (Churchill, 1979; DeVellis, 2016; Hinkin, 1998), EFA served as an initial data-reduction and structure-identification step to determine whether the observed indicators loaded onto theoretically meaningful factors.

The analysis was performed using IBM SPSS Statistics. Principal Axis Factoring was employed as the extraction method because the objective was to identify latent constructs underlying the observed variables rather than merely to reduce variance. The suitability of the data for factor analysis was assessed using the Kaiser–Meyer–Olkin (KMO) measure and Bartlett's test of sphericity. Promax (oblique) rotation was used to permit the possibility of having correlations between latent dimensions. Oblique rotation should be used in situations where underlying factors are theoretically supposed to be

connected in line with the multidimensional conceptualization of Investment Decision Quality. The factors were retained according to the following criteria: factor loadings ≥ 0.50, cross-loadings ≤ 0.30, and communalities ≥ 0.40. These limits are in agreement with the recommended ones in scale-development studies.

The EFA results were compared to assess the similarity of the empirical factor component with the theoretically conceived three-dimensional construct of Process Rationality, Portfolio Appropriateness, and Outcome Satisfaction. The three-factor solution was clearly supported by the findings, thus justifying the next procedures of confirmatory factor analysis with the use of PLS-SEM to validate the higher-order model.

4.7 Confirmatory Factor Analysis (PLS-CFA)

The Smart-PLS was used to confirm the measurement structure that was identified in the exploratory phase through confirmatory factor analysis. Investment Decision Quality (IDQ) construct was defined as a second-order formative construct that is constituted of three first-order reflective dimensions Process Rationality, Portfolio Appropriateness, and Outcome Satisfaction. The hierarchical model was estimated using the two-stage disjoint method. There was estimation of the latent variable scores of the first-order reflective constructs in the first stage. These latent scores were taken to indicate the higher-order formative constructs in the second stage. The two-stage disjoint approach is recommended for reflective-formative hierarchical component models in PLS-SEM because it enhances estimation stability and reduces multicollinearity concerns (Hair et al., 2023). To determine the statistical significance of loading and outer weight, bootstrapping using 5, 000 resamples was conducted. The model assessment was conducted according to the existing rules of PLS-SEM (Hair et al., 2023). PLS-SEM was preferred over CB-SEM due to the formative higher-order specification of IDQ and the predictive orientation of the study.

4.8 Assessment of Reliability and Validity

Measurement quality was evaluated using standard PLS-SEM criteria. Indicator reliability was assessed through outer loadings, while internal consistency reliability was examined using Cronbach's alpha and composite reliability. Convergent validity was evaluated using Average Variance Extracted (AVE). Discriminant validity was assessed using the Fornell–Larcker criterion and the Heterotrait–Monotrait (HTMT) ratio. For the second-order formative construct, outer weights and variance inflation factors (VIF) were examined to assess indicator relevance and multicollinearity. All evaluations followed the thresholds recommended by Hair et al. (2023).

4.9 Common Method Bias (CMB) Assessment

Because data were collected using a single self-reported instrument, potential common method bias was assessed using both covariance-based and PLS-based procedures. First, Harman's single-factor test was conducted in IBM SPSS Statistics by examining the unrotated factor solution to determine whether a single factor accounted for the majority of variance. The absence of a dominant single factor indicated that common method bias was unlikely to pose a serious concern. Harman's test serves as a preliminary diagnostic tool rather than a definitive statistical remedy. Second, the full collinearity assessment approach proposed by Kock (2015) was applied using Smart-PLS. Full collinearity variance inflation factors (VIFs) were examined for all constructs, with values below 3.3 indicating the absence of both

vertical and lateral collinearity. Together, these procedures provided a robust assessment of potential method bias.

4.10 Justification of Forensic Behavior

The IDQ instrument incorporates behavioural indicators relevant to forensic assessment. Weaknesses in process rationality, portfolio appropriateness, and outcome satisfaction may signal increased susceptibility to unsuitable advice or misleading financial practices. Thus, the scale provides diagnostic value beyond conventional performance evaluation.

4.11 Nomological Validation Model

In addition to establishing measurement reliability and construct validity, scale-development research recommends examining nomological validity to determine whether a newly developed construct behaves consistently within a broader theoretical network. Nomological validity assesses whether the construct demonstrates theoretically expected relationships with conceptually related variables. Accordingly, the validated Investment Decision Quality (IDQ) construct was embedded within a behavioural framework incorporating prospect-related biases and cognitive dissonance. This analysis was conducted to strengthen the external and predictive validity of the IDQ scale rather than to test a comprehensive behavioural theory model.

Behavioural finance literature suggests that prospect-related biases, distort information processing and increase the chances of post-decision psychological discomfort. When investment outcomes conflict with prior expectations or self-beliefs, investors may experience cognitive dissonance, leading to rationalization, selective information processing, or avoidance of corrective action. Elevated cognitive dissonance can weaken structured evaluation, portfolio discipline, and objective outcome assessment—core components of Investment Decision Quality (IDQ). Consistent with these theoretical insights, prospect-related biases are expected to increase cognitive dissonance, which in turn is expected to reduce overall decision quality. These relationships provide an appropriate framework for assessing the nomological validity of the IDQ construct. Following are the hypothesis to be tested in the given nomological validation model:

H1: Prospect-related biases negatively influence Investment Decision Quality (IDQ).

H2: Cognitive Dissonance negatively influences Investment Decision Quality (IDQ).

H3: Prospect-related biases positively influence Cognitive Dissonance.

H4: Cognitive Dissonance mediates the relationship between Prospect-related biases and IDQ.

The structural model was estimated using PLS-SEM with 5,000 bootstrapping resamples to assess the statistical significance of the proposed relationships.

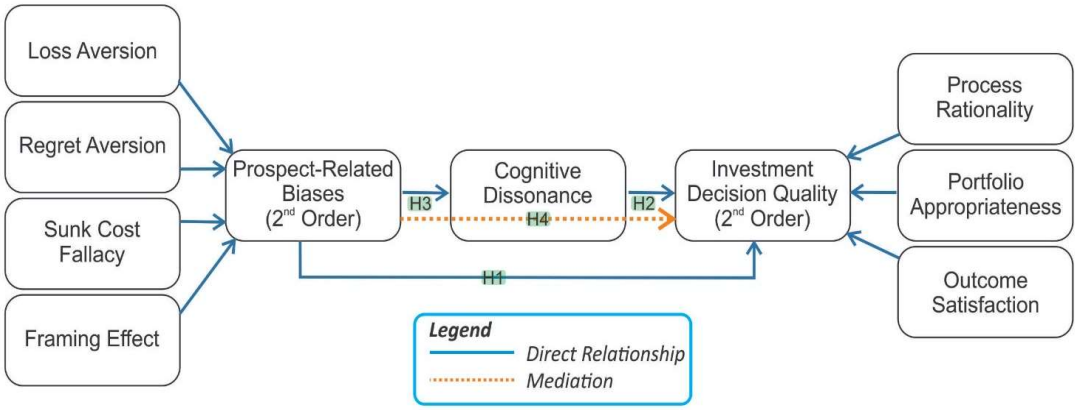

Fig 2. Structural Model for Nomological Validation

5. Results

5.1 Exploratory Factor Analysis (SPSS)

An exploratory factor analysis was conducted on 19 items using Principal Axis Factoring with Promax rotation, as inter-factor correlations were expected. The sample size (N = 540) was adequate for factor analysis. The Kaiser–Meyer–Olkin measure was 0.933, indicating excellent sampling adequacy, and Bartlett's Test of Sphericity was significant ($\chi^2(171) = 3432.427$, $p < 0.001$), confirming the suitability of the data for factor extraction. Based on the eigenvalue-greater-than-one criterion, three factors were extracted, explaining 59.46% of the total variance. All items loaded strongly on their respective factors, with loadings ranging from 0.503 to 0.737, and no substantial cross-loadings were observed. Factor correlations ranged from 0.522 to 0.559, supporting the appropriateness of the Promax (oblique) rotation and indicating that the dimensions are related yet distinct. The results support a three-factor structure corresponding to Process Rationality (PR), Portfolio Appropriateness (PA), and Outcome Satisfaction (OS).

5.2 Confirmatory Factor Analysis (PLS-SEM)

Following exploratory factor analysis, confirmatory factor analysis (CFA) was conducted to validate the measurement structure and assess the reliability and validity of the proposed constructs. CFA enables the evaluation of the theoretical measurement model by examining indicator reliability, internal consistency, convergent validity, discriminant validity, and higher-order construct specification.

5.2.1 Measurement Model Assessment of Lower order Constructs

5.2.1.1 Indicator Reliability and Collinearity

Indicator reliability was assessed by examining outer loadings of all reflective measurement items and to assess potential multicollinearity, variance inflation factor (VIF) values were examined. This was done by running the 1st stage of 2 stage method. As presented in Table 3, all loadings exceeded the recommended threshold of 0.70, with the exception of LA2 (0.665), which was retained due to its theoretical relevance and acceptable contribution to construct reliability. Loadings ranged from 0.665 to 0.900, indicating satisfactory indicator reliability. All VIF values ranged between 1.636 and 2.751, remaining well below the conservative threshold of 3.3, thereby indicating the absence of multicollinearity concerns.

Table 3: Indicator Loadings and Collinearity Statistics

Constructs	Code	Loadings	VIF
Cognitive Dissonance	CD1	0.816	1.841
	CD2	0.747	1.657
	CD3	0.782	1.70
	CD4	0.803	1.932
	CD5	0.824	2.038
Framing Effect	FE1	0.845	2.394
	FE2	0.886	2.446
	FE3	0.850	2.403
	FE4	0.900	2.555
Loss Aversion	LA1	0.897	1.636
	LA2	0.665	1.834
	LA3	0.877	1.897
Outcome Satisfaction	OS1	0.779	1.809
	OS2	0.852	2.281
	OS3	0.822	2.089
	OS4	0.813	1.922
	OS5	0.819	1.995
Portfolio Appropriateness	PA1	0.800	2.006
	PA2	0.775	1.879
	PA3	0.859	2.607
	PA4	0.800	2.007
	PA5	0.846	2.393
	PA6	0.782	1.919
Process Rationality	PR1	0.743	1.841
	PR2	0.799	2.180
	PR3	0.801	2.196
	PR4	0.813	2.310
	PR5	0.822	2.366
	PR6	0.853	2.751
	PR7	0.798	2.183
	PR8	0.799	2.195
Regret Aversion	RA1	0.851	2.366
	RA2	0.850	2.399
	RA3	0.865	2.432
	RA4	0.839	2.353
	RA5	0.848	2.489
Sunk Cost Fallacy	SC1	0.857	2.240
	SC2	0.892	2.386
	SC3	0.836	2.30
	SC4	0.862	2.288

5.2.1.2 Reliability and Convergent Validity

Internal consistency reliability was evaluated using Cronbach's alpha and composite reliability (CR). Convergent validity was assessed using Average Variance Extracted (AVE).

Table 4: Construct Reliability and Convergent Validity

Construct	Cronbach's alpha	Composite reliability	AVE
Cognitive Dissonance	0.854	0.86	0.632
Framing Effect	0.896	0.933	0.758
Loss Aversion	0.81	0.727	0.672
Outcome Satisfaction	0.876	0.878	0.668
Portfolio Appropriateness	0.896	0.897	0.658
Process Rationality	0.922	0.923	0.646
Regret Aversion	0.905	0.91	0.724
Sunk Cost Fallacy	0.886	0.911	0.743

As shown in Table 4, all constructs demonstrated satisfactory reliability, with Cronbach's alpha values ranging from 0.810 to 0.922 and composite reliability values exceeding the recommended threshold of 0.70. All constructs exhibited AVE values above 0.50, ranging from 0.632 to 0.758, confirming adequate convergent validity.

5.2.1.3 Discriminant Validity

Discriminant validity was examined using the Heterotrait–Monotrait (HTMT) ratio, the Fornell–Larcker criterion and cross loadings. Similarly, HTMT ratios (Table 5) were below the recommended threshold of 0.85 across all construct pairs, further confirming discriminant validity.

Table 5: Heterotrait–Monotrait (HTMT) ratio

	CD	FE	LA	OS	PA	PR	RA	SC
CD								
FE	0.142							
LA	0.249	0.047						
OS	0.353	0.105	0.186					
PA	0.316	0.116	0.173	0.689				
PR	0.301	0.054	0.149	0.677	0.665			
RA	0.152	0.055	0.068	0.154	0.144	0.14		
SC	0.156	0.059	0.038	0.07	0.053	0.071	0.043	

Table 6: Fornell–Larcker criterion

	CD	FE	LA	OS	PA	PR	RA	SC
CD	0.795							
FE	0.131	0.871						
LA	0.208	-0.038	0.82					
OS	-0.308	-0.094	-0.166	0.817				
PA	-0.279	-0.106	-0.147	0.613	0.811			
PR	-0.269	-0.038	-0.152	0.61	0.606	0.804		
RA	0.137	-0.039	0.075	-0.139	-0.131	-0.13	0.851	
SC	0.136	-0.058	-0.024	-0.053	-0.031	-0.062	0.023	0.862

The Fornell–Larcker matrix (Table 6) shows that the square root of AVE for each construct exceeded its correlations with other constructs, satisfying the criterion for discriminant validity.

Table 7: Cross Loadings

	CD	FE	LA	OS	PA	PR	RA	SC
CD1	0.816	0.144	0.142	-0.289	-0.243	-0.231	0.103	0.096
CD2	0.747	0.076	0.129	-0.201	-0.182	-0.187	0.07	0.107
CD3	0.782	0.119	0.163	-0.257	-0.226	-0.217	0.147	0.08
CD4	0.803	0.078	0.209	-0.258	-0.225	-0.211	0.109	0.134
CD5	0.824	0.091	0.186	-0.208	-0.226	-0.219	0.11	0.131
FE1	0.096	0.845	-0.068	-0.098	-0.112	-0.024	0.017	-0.005
FE2	0.129	0.886	-0.004	-0.112	-0.146	-0.073	-0.035	-0.052
FE3	0.089	0.85	-0.067	0.001	-0.022	0.002	-0.076	-0.039
FE4	0.128	0.9	-0.017	-0.098	-0.079	-0.024	-0.038	-0.084
LA1	0.176	-0.039	0.897	-0.168	-0.143	-0.125	0.069	-0.023
LA2	0.158	-0.018	0.665	-0.107	-0.118	-0.059	0	-0.031
LA3	0.195	-0.027	0.877	-0.125	-0.117	-0.145	0.064	-0.02
OS1	-0.248	-0.103	-0.125	0.779	0.428	0.481	-0.108	0.022
OS2	-0.284	-0.051	-0.117	0.852	0.542	0.532	-0.103	-0.048
OS3	-0.262	-0.086	-0.125	0.822	0.485	0.454	-0.093	-0.071
OS4	-0.234	-0.081	-0.158	0.813	0.529	0.508	-0.174	-0.083
OS5	-0.23	-0.067	-0.154	0.819	0.509	0.51	-0.088	-0.029
PA1	-0.223	-0.1	-0.155	0.487	0.8	0.488	-0.143	-0.009
PA2	-0.198	-0.066	-0.106	0.465	0.775	0.476	-0.125	-0.047
PA3	-0.244	-0.078	-0.133	0.518	0.859	0.502	-0.132	-0.062
PA4	-0.212	-0.094	-0.128	0.509	0.8	0.468	-0.046	0.029
PA5	-0.26	-0.088	-0.113	0.515	0.846	0.549	-0.09	-0.024
PA6	-0.217	-0.092	-0.08	0.485	0.782	0.46	-0.102	-0.037
PR1	-0.24	0.007	-0.129	0.445	0.425	0.743	-0.084	-0.07
PR2	-0.22	-0.001	-0.117	0.49	0.505	0.799	-0.104	-0.058
PR3	-0.18	-0.004	-0.133	0.5	0.477	0.801	-0.082	-0.004
PR4	-0.218	-0.038	-0.113	0.516	0.47	0.813	-0.11	-0.061

PR5	-0.249	-0.059	-0.092	0.458	0.525	0.822	-0.148	-0.081
PR6	-0.247	-0.086	-0.119	0.524	0.547	0.853	-0.113	-0.034
PR7	-0.192	0.007	-0.13	0.494	0.461	0.798	-0.11	-0.027
PR8	-0.181	-0.058	-0.147	0.49	0.478	0.799	-0.083	-0.066
RA1	0.112	-0.018	0.065	-0.113	-0.108	-0.109	0.851	0.025
RA2	0.14	-0.019	0.062	-0.137	-0.15	-0.131	0.85	0.02
RA3	0.142	-0.054	0.087	-0.138	-0.122	-0.14	0.865	-0.024
RA4	0.099	-0.055	0.059	-0.087	-0.088	-0.088	0.839	0.023
RA5	0.081	-0.015	0.042	-0.111	-0.083	-0.078	0.848	0.064
SC1	0.135	-0.055	-0.015	-0.071	-0.061	-0.08	0.005	0.857
SC2	0.126	-0.064	-0.036	-0.038	-0.021	-0.055	0.015	0.892
SC3	0.099	-0.032	-0.025	-0.028	-0.028	-0.034	0.024	0.836
SC4	0.105	-0.041	-0.005	-0.042	0.003	-0.04	0.039	0.862

5.2.2 Higher-Order Construct Measurement Model Assessment

The second-order formative constructs (IDQ and Prospects) were assessed using outer weights, outer loadings, and collinearity diagnostics which were taken after running 2nd stage from latent scores of 1st stage. Results are presented in Table 7.

Table 8: Validity and Collinearity Statistics of HOC

HOC	LOC	Outer Weight	T Statistics	P Values	Outer Loadings	VIF
IDQ	PR	0.244	1.647	0.1	0.795	1.846
	PA	0.349	2.48	0.013	0.839	1.856
	OS	0.558	4.219	0	0.92	1.87
Prospects	LA	0.669	7.5	0	0.677	1.008
	RA	0.46	4.5	0	0.501	1.008
	FE	0.466	4.619	0	0.401	1.006
	SC	0.377	3.212	0.001	0.344	1.005

For the Investment Decision Quality (IDQ) construct, Portfolio Appropriateness ($\beta = 0.349$, $p = 0.013$) and Outcome Satisfaction ($\beta = 0.558$, $p < .001$) contributed significantly to the higher-order construct. Although Process Rationality did not reach conventional significance ($p = 0.10$), its outer loading (0.795) remained substantial, justifying its retention based on theoretical and substantive importance (Hair et al., 2023). All VIF values were below 3.3, indicating no multicollinearity among formative indicators.

For the Prospects higher-order construct, all first-order dimensions (Loss Aversion, Regret Aversion, Framing Effect, and Sunk Cost Fallacy) demonstrated significant outer weights ($p < .01$), supporting the formative specification of the construct.

5.2.3 Structural Model Assessment (Nomological Validation)

Following confirmation of measurement model adequacy, the structural model was assessed to examine the nomological validity of the Investment Decision Quality (IDQ) construct. Path coefficients were estimated using bootstrapping with 5,000 resamples. The results are summarized in Table 9.

Table 9: Path Coefficients

Hypothesis	Relationship/Effect	Effect Type	β	t-value	P values	Result
H1	PROSPECTS -> IDQ	Direct	-0.171	3.897	0	Supported
H2	CD -> IDQ	Direct	-0.281	6.638	0	Supported
H3	PROSPECTS -> CD	Direct	0.315	8.183	0	Supported
H4	PROSPECTS -> CD -> IDQ	Mediation (Indirect)	-0.088	4.909	0	Supported (Partial)

Prospect-related biases negatively influenced IDQ ($\beta = -0.171$, $t = 3.897$, $p < .001$), supporting H1. Prospect-related biases positively influenced Cognitive Dissonance ($\beta = 0.315$, $t = 8.183$, $p < .001$), supporting H3. Cognitive Dissonance, in turn, negatively affected IDQ ($\beta = -0.281$, $t = 6.638$, $p < .001$), supporting H2. The indirect effect of Prospect-related biases on IDQ through Cognitive Dissonance was statistically significant ($\beta = -0.088$, $t = 4.909$, $p < .001$), indicating partial mediation and supporting H4.

Overall, the structural relationships were consistent with theoretical expectations, thereby providing evidence for the nomological validity of the IDQ construct.

5.3 Assessment of Common Method Bias (CMB)

Harman's single-factor test was conducted using IBM SPSS Statistics. The first unrotated factor accounted for 38.723% of the total variance, which is below the 40% threshold, indicating that common method bias is unlikely to be a major concern.

Additionally, the full collinearity assessment approach proposed by Kock (2015) was applied in Smart-PLS. All variance inflation factor (VIF) values were below 3.3, further confirming the absence of common method bias.

6 Discussion

The purpose of the study is to establish and test a multidimensional investment decision quality (IDQ) scale to measure both process and outcome aspects of financial decision making and its applicability to forensic vulnerability. IBM SPSS Statistics was employed in the study to carry out EFA and PLS-SEM to carry out CFA. The results were highly empirical in supporting a three-dimensional, second-order formative structure, which included process rationality, portfolio appropriateness, and outcome satisfaction.

6.1 Theoretical Contributions

The article fills a significant gap in the field of behavioral finance by defining the quality of investment decisions (IDQ) as a multidimensional construct instead of decision outcomes, satisfaction, or behavioral bias being treated as single phenomena. The results show that IDQ cannot be considered a unitary behavioral attribute. Instead, it is a hierarchy, which consists of process rationality, portfolio appropriateness, and outcome satisfaction. The current models focus on investment performance, decision process, and the satisfaction of the investors as individual constructs rather than as the integrated conceptualization approach which assumes these dimensions are interdependent parts of a quality of higher order system of decision making that provides a more holistic theoretical framework of studying and assessing the financial decision of the investors.

6.2 The contribution to Forensic Behavioral Finance

The other value of the study is that the scale applies to forensic finance whereby the low-quality investment decisions can reveal practices of misrepresentation, fraud, exploitative advice or speculative manipulation.

The items of the process rationality dimension comprise the bias awareness, analytical discipline, and structured evaluation which are the signs of forensic vulnerability as pointed out by Dorminey et al. (2012). Poor process rationality can expose people to persuasive fraud and advisory misconduct. The portfolio appropriateness also provides a quantifiable procedure to assemble the suitability and compatibility of the investments by the investor.

Finally, outcome satisfaction is an early sign of stress, regrets, or mental conflicts. These feelings lessen the watchfulness and make one more susceptible to misinformation. All these results indicate that IDQ is a behavioral construct besides being an early warning measure of exposure to forensic risk. It also provides a systematic framework, which could help financial advisors and regulators detect possible vulnerability trends.

6.3 Methodological Contributions.

The present study chose a clear two-step design in utilizing SPSS to perform exploratory factor analysis (EFA) and PLS-SEM to perform confirmatory factor analysis (CFA) and higher-order modeling. The factor structure underlying was determined by EFA and PLS-SEM was used to verify the measurement model and measurement of the higher-order construct by the two-stage disjoint method. The robustness of the measurement model is assisted by strong item loadings, as well as, satisfactory reliability and validity.

Altogether, SPSS and PLS-SEM, together with the two-step disjoint strategy, is a viable and efficient way of confirming a multidimensional construct of decision quality in investments, especially when data are not necessarily of a high quality to satisfy the strict normality condition in behavioral finance studies.

6.4 Practical Implications

The IDQ tool has a number of applications in practice among the stakeholders. This will assist individual investors to determine flaws in their investment strategy such as cognitive blindness and portfolio misfit. It will also offer a systematic diagnosis model in order to facilitate more sensible decision-making regarding investments. This scale can be applied by the financial advisor and planners

to assess the quality of the decision-making of a client prior to the recommendation of the financial products. This will assist in reinforcing the suitability test and finding the need of education of the client. This scale will be a good initial-investigation tool among the regulators and forensic investigators in investigations of mis-selling where the pattern of low process rationality or portfolio appropriateness will provide red flags during compliance audit or during the dispute resolution process. The scholars of the academics would apply this scale to the conceptualization of the decision quality to be measured as a quantifiable construct that can enrich the models of behavioral finance, conduct mediation-moderation analysis, as well as contribute to the knowledge base in the area of the forensic financial behavior.

6.5 Implications to the Financial Context of Pakistan.

The outcome of this research has a high contextual implication since the sample of Pakistan was chosen. The new markets tend to exhibit low degree of financial literacy, greater exposures to misinformation, increased market volatility, rumors and high degree of reliance on informal advisory services. In this situation, a validated IDQ instrument can be a valuable tool in security of investors, bettering the advisory system, and beefing up the regulatory framework. The IDQ scale can also facilitate the incorporation of the behavioral and forensic perspectives into the Pakistani market governance structure. This is what is usually overlooked though it is important in ensuring investors are not subjected to malpractices and fraud.

6.6 Limitations and Future Research Directions.

This research study is limited in a number of ways which can be possibly considered in future studies. The sample itself has been selected in one of the emerging markets, which also points to the necessity of cross-cultural validation of the creation of global applicability. The research is based on self-reported data that implies that additional research can include objective indicators of behavior, i.e., trading logos, advisor evaluation, or portfolio record. The stability in a serial order has not been investigated. The longitudinal design will probably assist in estimating the way IDQ would change with the learning process and experiences of investors and the fluctuating market cycles. Besides, in their work in the future researchers can consider key behavioral biases (i.e overconfidence, loss aversion or herding) as moderators or predictors to further develop the theoretical knowledge on the formation of IDQs. Finally, applying IDQ to a real-life setting of forensic (i.e. mis-selling investigations or investor complaints) would assist in determining and narrowing the diagnostic power of IDQ in a particular regulatory setting.

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