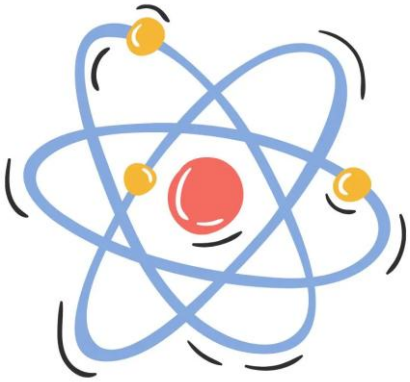

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MAPPING THE DIMENSIONS OF NEUROFINANCE: A CONCEPTUAL FRAMEWORK FOR NEURAL, COGNITIVE, EMOTIONAL, AND PERCEPTUAL PROCESSES IN FINANCIAL DECISIONS

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MAPPING THE DIMENSIONS OF NEUROFINANCE: A CONCEPTUAL FRAMEWORK FOR NEURAL, COGNITIVE, EMOTIONAL, AND PERCEPTUAL PROCESSES IN FINANCIAL DECISIONS

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Abstract: *Neurofinance, the integration of neuroscience, psychology and financial decision making, has emerged as a novel neural framework which try to explain why investors deviate from the rational behaviour. The implementation of neuro finance continues to face significant challenges, despite the rapid growth and advancement in this field of study. Despite of many bibliometric studies in the field of neurofinance, there is no study which outlays the consolidated dimensional map of this domain of study. This conceptual paper adopts PRISMA framework and compiles the findings of manuscripts retrieved from WoS and Scopus databases by using keywords like "Neurofinance", "Neuro-finance", "Neuroscience and Finance". The purpose of this study is to identify and articulates 7 broad dimensions of neurofinance, each dimension anchored to specific brain region, neural mechanism and empirical evidence. Out of these seven dimensions, 2 dimensions that are, risk perception and color perception are given special emphasis as they are under-explored but practically urgent areas. The paper provides a tabular framework suitable for future empirical research, investor education and regulatory policy design.*

Keywords

Behavioural Finance; Brain Regions; Color Perception; Dimensions; EEG; Investor Behaviour; Neurofinance; Neurotransmitters; Risk Perception.

JEL CODE *- D87, G41, D91*

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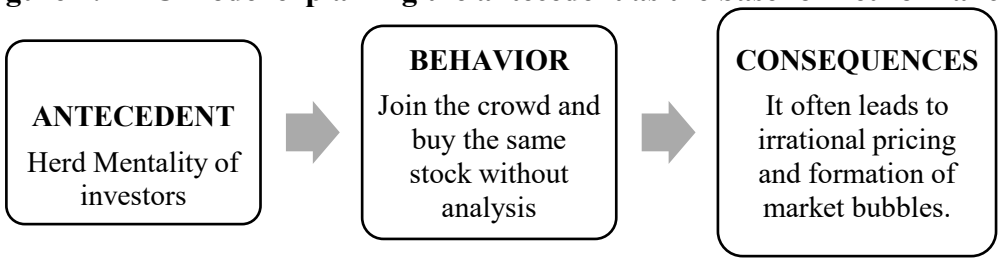
1. Introduction

The research in neurofinance is vast but fragmented. the studies done previously in this field are amalgam of 2 domains neuroscience and finance, published and presented in the area of neuroeconomics. It was only post 2000 that neurofinance gain popularity smongst researchers as the independent domain.

The traditional framework of finance, grounded in the Efficient Market Hypothesis (Fama, 1997) and Expected Utility Theory (von Neumann & Morgenstern, 1944) rely on the assumption that investors are fully rational. Still market history consistently records such episodes which defy rationality like: speculative bubbles, panic crashes, persistent anomalies which can be explained neither by EMH (Efficient Market Hypothesis) nor standard portfolio theory adequately. Behavioral finance attempts to explain the cognitive biases under these anomalies but could not explain their neurobiological origin. Thereafter, Neurofinance constitutes the next logical step: it examines the structure of brain, its chemistry and plasticity to elaborate further not only what investors do, but the reason behind their actions at neural level (Miendlarzewska et al., 2019).

The ABC i.e., Antecedent, Behavior and Consequences model can explain the neurofinance properly. In ABC model, A stands for antecedent which is the actual cause before behavior happens. B stands for behavior, this is the actual action which can be observed or measured as the reponse of an investor. Lastly, C stands for Consequences, it happens after the behavior which can either enforce or discourage the future decision. Basically, neurofinance is the domain of study which focuses on antecedent, it studies the root cause behind the behaviors of the investors. This can be understood with the help of following diagram.

Figure 1: ABC model explaining the antecedent as the base for neurofinance



Source: Adapted from Albert Ellis (1957), Rational Psychotherapy and Individual Psychology.

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The evolution of neurofinance is a recent interdisciplinary extension and it gained momentum in the early 2000s by integrating neuroscience with financial decision-making. Researchers named Camelia Kuhnen and Brian Knutson (2005) defined "neurofinance as the study of how brain activity influences financial choices under risk and uncertainty". Further, Khan & Mubarak, (2020) defines neurofinance as "an emerging area of neuro-economics, explaining the connection between human brain activity and financial behaviour by integrating neurology, psychology, and finance. It emphasizes the role of neurotransmitters in shaping risk attitudes, optimism, and investment choices.". These definitions highlight that financial decision-making is not a purely rational process but it is significantly shaped by neural processes, emotions, and cognitive limitations.

Despite the rapid expansion of literature in this domain, the field remains conceptually fragmented, with limited consensus regarding its major dimensions and structural framework. Therefore, identifying and classifying the key dimensions of Neurofinance is essential for developing a comprehensive understanding of the field and establishing future research directions. To the best of researcher's knowledge no study has identified the major dimensions of neurofinance yet. To address this gap, this study conducts a comprehensive systematic literature review, guided by the following main research questions (RQ):

RQ1: What are the major and significant dimensions underlying the field of Neurofinance?

RQ2: How can these dimensions be classified based on existing literature?

RQ3: What are the emerging dimensions of Neurofinance in the context of neuroscience, behavioral finance, and financial decision-making?

By focusing on this crucial theme, we aim to generate valuable insights that could encourage researchers, policy makers, government and financial institutions to develop initiatives tailored to investors. Such initiative would develop the major gap in the existing literature to facilitate the researchers with the major themes on which they want to focus in future.

The rest of the paper is organised as follows: Section 2 provides the review of extant literature in this field, section 3 outlines the methodology adopted, detailing the PRISMA technique for identifying, screening, selecting, and including relevant research studies through a flow diagram and reporting checklist, additionally including the word cloud with the help of VosViewer, along with the seven major dimesions of neurofinance identified on the basis of systematic literature review. Section 4 presents the main discussion and findings from the

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systematic review, organised into thematic clusters. Section 5 concludes the study. Section 6 provides limitation and future scope and lastly section 7 presents the implications of this study.

1. Literature Review

The research in the field of neurofinance is growing rapidly. For instance, Srivastava et. al., 2026) provides a significant study by publishing a bibliometric analysis which shows that research in this field is expanding across multiple countries although the total sample is limited then it should be to generalise the findings. USA has emerged as the leading contributor to research in this domain. Ortiz-Teran et al 2021 performed a meta-analysis of 16 fMRI (Functional Magnetic Resonance Imaging) studies related to neurofinance and found out that the financial decision making involves certain specific brain regions namely the ventral striatum, anterior insula, amygdala, and anterior cingulate cortex. They are responsible and closely related with processing risk, reward, emotions and conflicts while making financial decisions.

Moreover, the advancement in technologies have improved the research in this field. Real time brain imaging techniques like PET (Positron Emission Tomography) scan, MRI (Magnetic Resonance Imaging), fMRI (Functional Magnetic Resonance Imaging), fNIRS (Functional Near-Infrared Spectroscopy), eye-tracking, EEG (Electroencephalography) etc are witnessing extensive adoption to understand the thinking and behaviour of investors (Frydman, 2025). The brain imaging techniques allow researchers to capture and study both neural activities and behavioural patterns in depth.

Moreover, a comprehensive bibliometric analysis of 507 neuroeconomics and neurofinance research studies which are published between 1994 and 2024 elucidate that most researches focus on evaluation stage of decision-making process. It includes how the individual assesses various factors such as reward, risk, value and choices before making financial decisions.

Comparatively, less attention has been given to factors like what happens before the decisions are made, such as how the information is perceived. Including aspects like the color perception, risk perception, attention span of an investor, design of the document etc. Additionally, what

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actually happens after the decision is taken like regret and satisfaction. (Bayramoğlu & Öztürk, 2025)

This paper addresses the gap by synthesising evidences from selected research studies into seven broad dimensions of neurofinance after applying PRISMA technique. It is supported by a consolidated tabular framework mapping each dimension to its neural mechanism and brain region.

2. Methodology

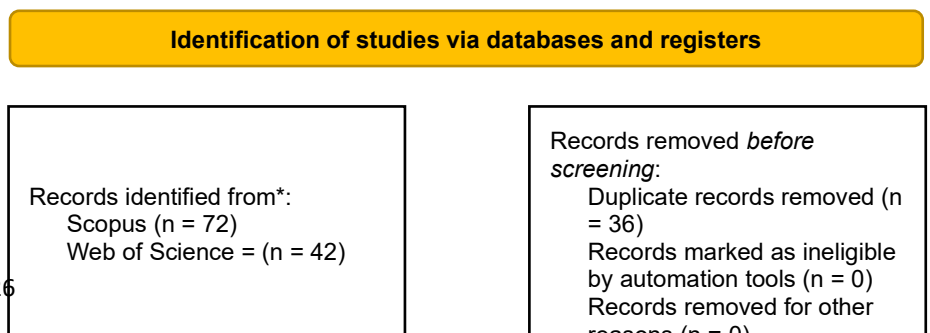
This study adopts the PRISMA model to ensure transparent and systematic identification, screening, eligibility assessment, and inclusion of relevant scholarly literature. The PRISMA approach, as shown in figure 1.1 provides structured procedure for collecting and refining research articles using predefined inclusion and exclusion criteria which minimize the selection bias and replicability. The researcher selectively gathered materials that helped in maintaining focus and advance the investigation efficiently. These articles were sourced from reputed academic database like Scopus and WoS.

3.1 PRISMA

This paper adopts a qualitative approach by reviewing the 49 papers. The identification of these papers is carried out by using PRISMA framework. In the initial step, the author identified 114 manuscripts, i.e., 42 and 72 manuscripts from WoS and Scopus databases respectively, by using keywords “Neurofinance”, “Neuro-finance”, “Neuroscience and Finance” and their combination. After identifying the papers, 36 duplicate records identified across databases were removed during the screening process. Out of remaining 78 manuscripts, 21 manuscripts were excluded, as they were not fitting the inclusion criteria of research papers. The author is able to retrieve 54 papers out of which 5 papers were excluded due to different languages.

Finally, 49 studies were included in the qualitative synthesis, and were incorporated into the quantitative or conceptual framework analysis. This systematic process ensures transparency, reliability, and methodological soundness in the selection of literature for the study.

Figure 2: The PRISMA 2020 flow diagram for the selection of the included studies



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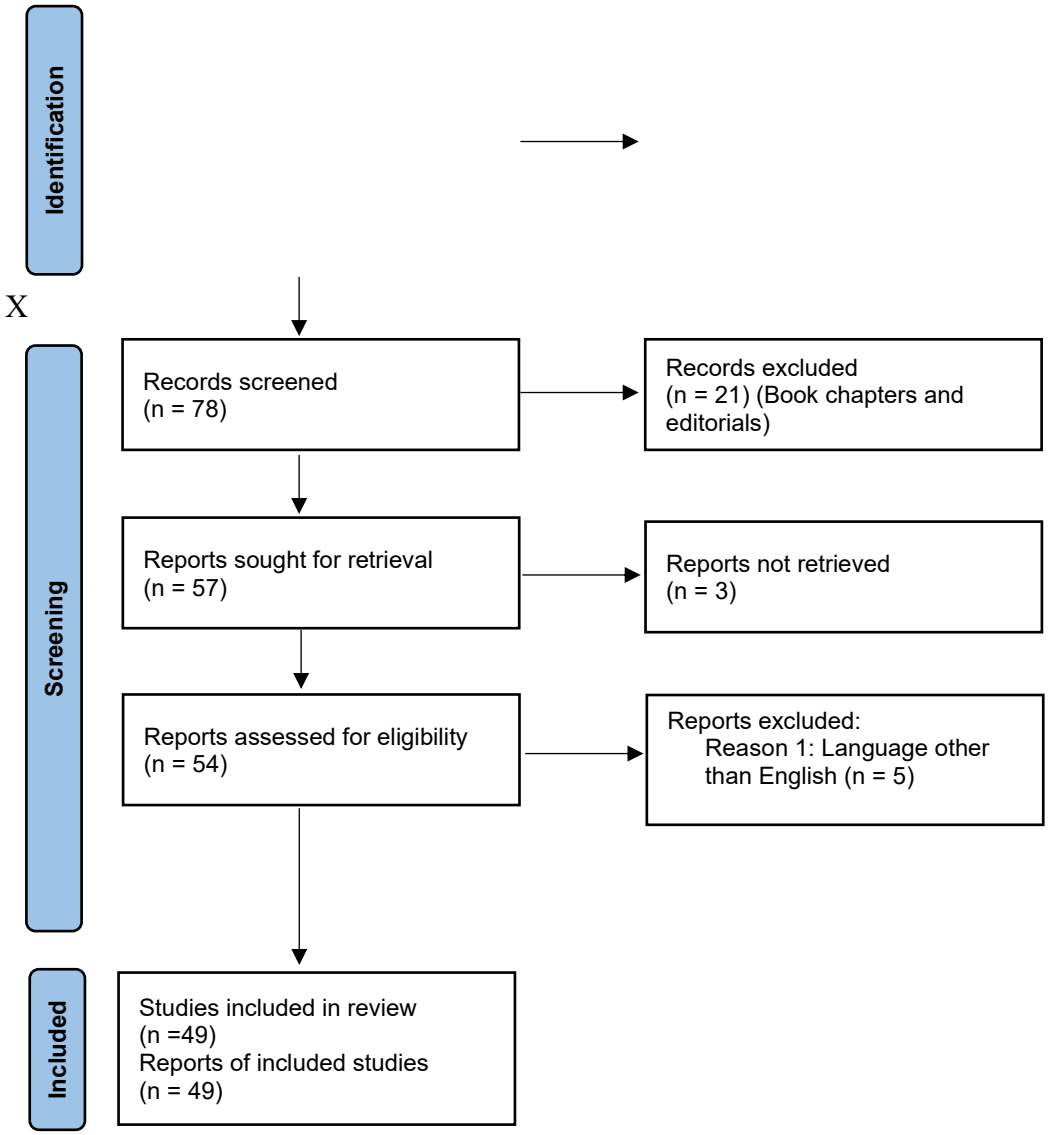

Source: Adapted from Page et al. (2021), PRISMA 2020 Statement.

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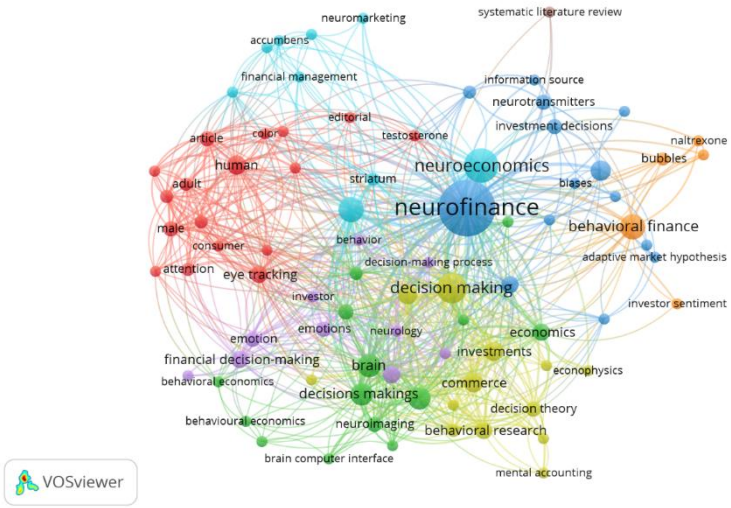
2.2. Emerging Themes

There are various emerging themes which is visualised with the help of VoSviewer through keyword occurrence network represented by Figure 1. It presents the co-occurrence relationship between keywords, extracted from the selected neurofinance literature.

The base of visualization is VOS mapping and clustering technique, where the nodes represent terms and their relationship are represented through connecting lines. The generated visualization map consists of 83 items, 8 clusters, 785 links and a total link strength of 1218, which indicates a highly interconnected and multidisciplinary structure of knowledge.

The visualization map clearly demonstrates that, "neurofinance" is the largest and central node in the network, showing that it acts as the core integrating concept which connects multiple research domains. There are certain terms which are closely related to neurofinance such as "decision making," "behavioral finance," "neuroeconomics," "investment decisions," "brain," and "neuroscience,". It highlights that the field is rooted in understanding financial decision-making through psychological, neurological, and behavioral perspectives.

Figure 3: Keyword Co-occurrence



Source: VOSviewer

Overall, the visualization map demonstrates that neurofinance is a highly interdisciplinary and evolving research field that integrates finance, neuroscience, psychology, economics,

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behavioral science, and computational technologies. The interconnectivity among clusters suggests that contemporary neurofinance research no longer studies financial behaviour only from the perspective of traditional financial assumptions, but increasingly explains investor actions through neural mechanisms, emotional processing, behavioral experimentation and technological modelling. The map also highlights the gradual transition of neurofinance toward data-driven, technologically intensive, and biologically grounded approaches for understanding financial markets and investor behaviour.

3.3 Dimensions of Neurofinance

This study is based on systematic and critical analysis of 49 research studies. There are seven broad dimensions that have been identified explaining the multilevel neurobiological process while taking the financial decisions. The seven broad dimensions are: Cognitive biases, Emotional and Neural biases, Perceptual and Sensory inputs, Social and Collective behavior, Demographic influences and lastly Policy and Technological application. There is further division of these dimensions explaining the main attributes of the studies under neurofinance. The dimensions can be understood in detail with the help of following table and its explanation thereafter:

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Table 1: Dimensions of neurofinance along with it sub categories

Seven Broad Dimensions	Sub-dimensions
Cognitive Dimension	• Disposition effect (Shefrin & Statman, 1985) • Loss aversion (Kahneman & Tversky, 1979) • Affect heuristic (Sahi, 2012) • Framing (Tversky & Kahneman, 1981) • Anchoring (Tversky & Kahneman, 1974) • Overconfidence (Sahi, 2012) • Bounded rationality (Tseng, 2006) • Memory Experience (Srivastava et al., 2020)
Emotional Dimensions	• Emotional arousal (Wu et al., 2012) • Stress responses (Srivastava et al., 2019) • Mood states influencing investment (Srivastava et al., 2019) • Emotional contagion in trading environments (Wu et al., 2012) • Investor mental health (Srivastava et al., 2019)
Neural Dimensions	• Brain regions: amygdala, prefrontal cortex (PFC), striatum, hippocampus (Wu et al., 2012; Srivastava et al., 2019) • Risk perception: insula & anterior cingulate cortex (ACC) (Ortiz-Teran et al., 2021) • Reward anticipation: nucleus accumbens activity (Wu et al., 2012) • Neurotransmitters: dopamine, serotonin, testosterone (Khan & Mubarak, 2020) (Nadler et al., 2018) • Neural dysfunctions affecting financial behavior (Srivastava et al., 2019)
Perceptual & Sensory Dimensions	• Colour perception (red vs. blue bias in finance) (Ceravolo et al., 2019; Bussoli et al., 2022) • Visual anchoring (Ceravolo et al., 2019) • Attention allocation (Srivastava et al., 2026)

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Social & Collective Dimensions	• Herd behaviour (da Rocha Lima Filho & Rocha, 2017) • Conformity effects (Shen et al., 2017) • Sentiment contagion (Shen et al., 2017) • Schadenfreude effect (Frydman, 2025) • Social media influence (Shen et al., 2017) • Digital community dynamics (Cookson & Niessner, 2020)
Policy & Demographic Dimensions	• Age differences in financial decision-making (Kuhnen, 2025) • Gender differences in risk tolerance (Nadler et al., 2018) • Socio-economic factors in financial inclusion (Panetta et al., 2025) • Regulation frameworks (Affinito et al., 2026) • Consumer protection policies (Affinito et al., 2026) • Ethical investing principles (Affinito et al., 2026)
Technology & Methods Dimensions	• EEG emotion recognition (Razi et al., 2017) • fMRI / brain imaging (Ortiz-Teran et al., 2021) • Eye-tracking & physiological monitoring (Srivastava et al., 2026) • Neuroplasticity & training interventions (Erkut et al., 2018) • AI & ML classification for investor profiling (Bormpotsis et al., 2025) • Digital finance adoption & fintech platforms (Panetta et al., 2025)

Source: Compiled by the author

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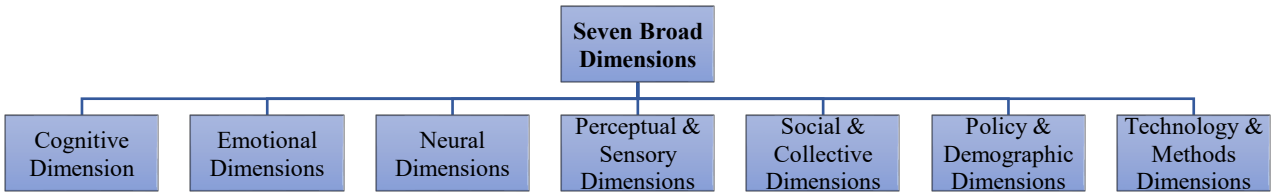
Figure 4: Flow chart of the seven major dimensions of the neurofinance



Source: Authors compilation from the systematic literature review

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2.2.1 Cognitive Dimension

The cognitive aspect of neurofinance focuses on the mental processes involved in thinking and decision making. It basically tells that how a person is thinking. The decisions taken by investors are unconsciously shaped by systematic biases like loss aversion (Kahneman & Tversky, 1979), disposition effect (Shefrin & Statman, 1985), overconfidence (Sahi, 2012), anchoring (Tversky & Kahneman, 1974), framing (Tversky & Kahneman, 1981), Affect heuristic (Sahi, 2012), bounded rationality (Tseng, 2006), and memory experience (Srivastava et al., 2020). These cognitive shortcuts help in explaining the deviations from rational decision models and theories. Here, it can be understood that investors often misjudge probabilities, they hold on to reference points, and even prematurely liquidate the profitable stocks.

For instance: In a group of people, a person sees that his friends are making profits from cryptocurrency on social media. He invests in cryptocurrency without doing a proper research, as he was under FOMO (Fear of Missing Out). One week later, the market crashed and he started regretting his decision. In this case, he unknowingly was acted under the influence because of herding bias and FOMO.

2.2.2 Emotional Dimension

In financial decision-making psychological states, like emotional arousal (Wu et al., 2012), stress responses, mood states (Srivastava et al., 2019), emotional contagion (Wu et al., 2012), and mental health (Srivastava et al., 2019), play an important role in shaping the investment behaviour. For example, stress responses increase the chances of risk aversion, whereas emotional contagion can lead to either collective fear or euphoria across the markets. Likewise, mental health of an investor establishes the stability in his decisions.

For instance: Mr. A watches the stock market suddenly fall by 25%, even after the expert's advice to wait calmly, he became anxious and sold the shares to avoid further losses. Here, the emotions like fear, anxiety, panic reaction and emotional stress overtook the rational thinking.

2.2.3 Neural Dimension

Neurofinance helps us to identify the specific brain regions and neurotransmitters which are directly linked to the financial behaviour. For instance: amygdala plays an important role in

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fear processing, prefrontal cortex facilitates planning (Wu et al., 2012; Srivastava et al., 2019), Anterior Cingulate Cortex (ACC) and the insula regulate risk perception (Ortiz-Teran et al., 2021). Whereas, reward anticipation is done by nucleus accumbens activity (Wu et al., 2012). While neurotransmitters like dopamine, serotonin and testosterone influences and modulates speculation, and risk-taking capabilities of an investor (Khan & Mubarak, 2020) (Nadler et al., 2018). The dysfunction in neural activities can lead to distorted decision making. These biological substrates can directly lead to market anomalies (Srivastava et al., 2019).

For instance: Mr. Z was watching the stock market rise rapidly. Whenever, he made profit, his brain releases dopamine because of this he became excited and overconfident. Scientists observed his brain with the help of fMRI brain-imaging technique. In this study, it was found that there was strong activity in the reward system of the brain of Mr. Z, as the Nucleus Accumbens and VTA (Ventral Tegmental Area) were highly active.

2.2.4 Perceptual and Sensory Dimension

There are certain perceptions and sensory feelings which form an important dimension like color perception (Ceravolo et al., 2019; Bussoli et al., 2022), visual anchoring (Ceravolo et al., 2019), and attention allocation (Srivastava et al., 2026) unconsciously shape investor evaluation. Red color in financial documents release the feeling of cautiousness while blue enhances trust and desirability (Ceravolo et al., 2019).

Anchoring bias makes people rely on initial cues and this attention allocation on first piece of information determines which information is prioritised by investors (Bussoli et al., 2022).

Sensory inputs like dwelling time on disclosure and design of financial platforms influences the engagement of investors. Eye-tracking research studies have shown the direct relation between longer dwelling time and favorable product assessment. While sensory design elements help in guiding investor's focus and evaluation (Srivastava et al., 2026).

For instance: A trader, suddenly notices the flashing red signals on the screen while trading. He reacted immediately to these strong visual stimulus. He sold the stock thinking that it was shown in bright red color means it was making huge loss, without even consciously analysing the information. Here, trader's senses snd prior perceptions played the trick.

2.2.5 Social and collective behavior Dimension

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A prevailing assumption among individual is that they are taking independent financial decision, but in reality, these decisions are shaped by distinct factors. The financial market is shaped by various factors like: herd behaviour (da Rocha Lima Filho & Rocha, 2017), Conformity effects (Shen et al., 2017), Sentiment contagion (Shen et al., 2017), Schadenfreude effect (Frydman, 2025), Social media influence (Shen et al., 2017) and others. Herding behaviour led to creation of market bubbles and crashes, while sentiment contagion increases collective optimism or pessimism. Schadenfreude reflects the satisfaction derived from others' losses and social media reinforces the spread of contagion effects in digital communities (Cookson & Niessner, 2020).

For instance: Mr.P wants to invest in a startup which is risky as per the market information. However, the family of Mr. P repeatedly told him to choose safer investment rather like Fixed Deposits, government bond, and in commodities like gold and silver. Eventually, he invested in FD to the approval of family and avoid criticism in future. Here, in this scenario it was proved that out financial decisions are often shaped by social relationships and surroundings. As the social dimension like family influence, social approval, and cultural expectations overstepped the rational thinking process.

2.2.6 Policy and Demographic Dimension

Another important dimension under neurofinance is policy and demographic dimension, as they carry the potential to influence the financial decision making. For instance: Age differences in financial decision-making (Kuhnen, 2025), Gender differences in risk tolerance (Nadler et al., 2018), Socio-economic factors in financial inclusion (Panetta et al., 2025), Regulation frameworks (Affinito et al., 2026), Consumer protection policies (Affinito et al., 2026), Ethical investing principles (Affinito et al., 2026). The policy dimension helps in emphasising regulation framework and converting neurofinance insights into practical safeguard for investors.

For instance: It has been discovered after intensive research, that the young investors are making investment influenced by social media trading trends which hyped the dopamine level. Based on these findings, educational authorities made the compulsory financial literacy program to teach emotional control, decision biases and risk perception before students begin investing. Policy dimension of neurofinance aims to reduce cognitive and emotional biases so that the rational financial decision making can be improved.

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2.2.7 Technology and Methods Dimensions

The advancement in brain imaging techniques and tools is growing rapidly. These techniques help researcher and other stakeholders to get to know the root cause that in antecedent behind the market bubbles and anomalies. Advancement in techniques like EEG (Razi et al., 2017), fMRI (Ortiz-Teran et al., 2021), Eye-tracking & physiological monitoring (Srivastava et al., 2026), Neuroplasticity & training interventions (Erkut et al., 2018), AI & ML classification for investor profiling (Bormpotsis et al., 2025).

Digital finance adoption & fintech platforms (Panetta et al., 2025) provide methodological tools for decoding the investors' behaviour. EEG facilitates the recognition of emotions which helps in predicting decision tendencies (Razi et al., 2017), while AI framework integrates the neuroscience with computational models to increase the accuracy in predictivity. Neuroplasticity suggest that strategic training can reshape decision circuits, it bridges the laboratory neuroscience with applied finance (Bormpotsis et al., 2025; Erkut et al., 2018).

For instance: Researchers conducted an experiment to check the change in cortisol level of investors with the help of saliva, before and after intense trading session. It was found that the cortisol level increase during market uncertainty. Similarly, researchers conducted another experiment in which the respondent was told to wear the eye-tracking device, and he was instructed to anlayse multiple stock charts. This experiment helped the researchers to understand how the investors visually process financial information. Therefore, technologies and methodological advancement is helping researchers' to find out the actual root cause.

3. Findings and Discussion

This conceptual paper review 49 existing studies, to understand how the neurofinance has developed over time as a domain or as a field of study. It identifies that researches connecting neuroscience and financial decision making, started in the early 2000s. This paper also shows that most of the researches focuses on how investors make evaluation of risk and return while taking financial decisions. However, questions like what happens before a financial decision is taken such as the role of attention or perception before making any final decision, and what happens after the financial decision is taken like feeling of regret or satisfaction, are still underexplored and understudied. Therefore, this paper highlights a gap in the literature and suggests seven dimensions of neurofinance. Also, the future research should focus on the less explored dimensions.

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The neurofinance being a multidimensional field. It is an integration of various dimensions like: cognitive, emotional, neural, social, perceptual, and demographic dimensions. Cognitive dimensions like loss aversion, anchoring and representativeness plays a central role in explaining investors irrationality (Kahneman & Tversky, 1979). Emotional factors like amygdala activation, insula risk coding, shape the investors' behaviour (Srivastava et al., 2019). Neural dimensional mechanism like dopamine, serotonin and testosterone are the antecedents behind risk taking behaviour and reward anticipation (Wu et al., 2012; Srivastava et al., 2019). Perceptual and sensory inputs like perception of color, and risk associated with them leads to the disclosure bias in the financial reports by organisations (Ceravolo et al., 2019; Bussoli et al., 2022).

Social dimension like herd behaviour increases the volatility especially during crises and through social media influence (da Rocha Lima Filho & Rocha, 2017; Shen et al., 2017). The demographic dimensions like age, gender extends the scope of study under this discipline. Finally, technological dimensions like brain imaging techniques, AI and ML supported studies increases the inclusivity, regulation and horizon of the field (Bormpotsis et al., 2025).

The findings of this study provide insights into the research questions proposed. With regards to the first research question, the identification of major and significant dimensions of the neurofinance. The findings from the extant literature states that the dimensions of neurofinance can be classified into seven broad categories. The seven broad dimensions are: cognitive, emotional, neural, perceptual & sensory, social & collective, policy & demographic and technological & methodological dimension.

In relation to the second research question, the findings related to the categorisation of neurofinance, literature indicates that the field has evolved into distinct yet interconnected dimensions. A systematic examination of the existing literature revealed that neurofinance research can be broadly classified by clubbing together the sub dimensions on the basis of their functions. The sub dimensions measuring similar aspects were clubbed together.

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Addressing the third research question, the identification of emerging dimensions of neurofinance beyond the traditional and behavioral finance. the emerging dimensions included neurochemical influence, which examines the role of neurotransmitters and hormones in shaping the investors' financial decision making; sensory and perceptual dimension specifically the visual cues, color perception and its influence on risk perception. Additionally, advancement in brain imaging tools like EEG, fMRI, eye-tracking and etc.

The emergence of the mentioned dimensions of neurofinance, highlights the evolution of neurofinance into a more comprehensive and multidisciplinary domain. These development in the field of finance not only broaden the scope of neurofinance research but also provide the guide to researcher for theoretical and empirical exploration.

4. Conclusion

The substantial body of literature highlight the need for multidimensional neurofinance models and frameworks in order to understand the investor behaviour in more comprehensive manner. The identified dimensions named as cognitive, emotional, neural, perceptual, social, demographic and technical dimensions can collectively explain the complexity of financial decision making. This conceptual study shows that neurofinance can provide a holistic framework which can explain that financial decisions are not rational and always analytical rather the roots of these decisions is deeply embedded in neurobiological and psychological processes.

The consolidation of insights from the field of neuroscience, behavioural finance, psychology and technologies like EEG, fMRI to study the brain, strengthens the ability to explain the reason behind market anomalies like bubbles and crashes in the market. These dimensions also focus on practical implications, providing investor education, financial records disclosure design and AI driven predictive models that can help in enhancing market stability and investor protection.

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Overall, the findings from this study highlights the importance of incorporating neurobiological and behavioural dimensions to facilitate both the theoretical understanding and real-world financial decision making.

5. Limitation and future scope

The nature of existing literature, despite its breadth, neurofinance research faces several limitations. First, most of the studies are conceptual and experimental, as relying on artificial laboratory settings may not capture real-world complexity (Sahi, 2012; Srivastava et al., 2020).

Second, findings are fragmented across different disciplines like neuroscience, psychology, and finance. Therefore, there is lack in potential and unified theoretical framework which leads to lack of precision in practical application (Gippel, 2013; Tseng, 2006). Even, before early 2000s the neurofinance researches were performed under the domain named neuroeconomics.

Third, there are methodological constraints such as small sample size, limited cross-cultural validation which restricts generalizability (Srivastava et al., 2019). Final, the policy implications are under explored where regulators can provide framework for investors' protection (Affinito et al., 2026).

Future research in neurofinance should focus on developing theoretical framework which integrates various dimensions. Areas like color perception and risk perception have been studied widely in other domains, they should also be studied in financial aspects. Colour and design in financial documents can unconsciously influence investor decisions, making it important for better regulation and transparency.

Research should also explore differences across age, gender and socio-economic segments in context of finance because major studies under neurofinance are done under laboratory setting and on people facing medical issues. The use of technologies like artificial intelligence and machine learning can help in understanding decision-making and improving financial platforms.

Finally, applying neurofinance concepts in policies, investor education, and disclosure practices can improve investor protection and make financial systems more stable and inclusive.

6. Implications

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This study contributes to the body of neurofinance literature by providing structured and major dimensions of the field. The insights from neuroscience, psychology and finance provides a comprehensive framework for understanding biological and behavioral mechanism underlying the financial decisions. The categorisation of dimensions of finance can serve as a foundation for future researches and development of theories. The findings are useful for investors, financial advisors, policy makers, practitioners, researchers and academicians.

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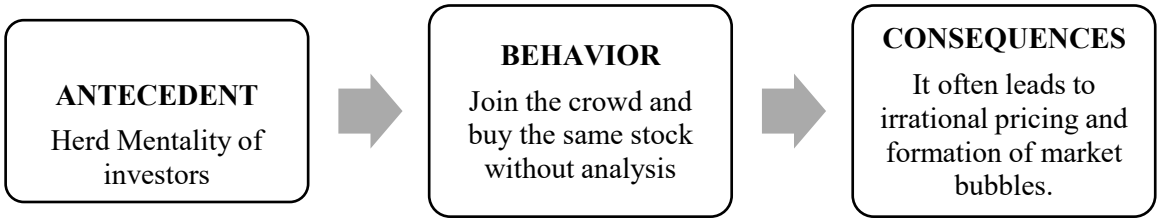
List of Figures and tables used in this paper

1) Figure 1 has been used in introduction section of this paper.

Figure 1: ABC model explaining the antecedent as the base for neurofinance



Source: Adapted from Albert Ellis (1957), Rational Psychotherapy and Individual Psychology.

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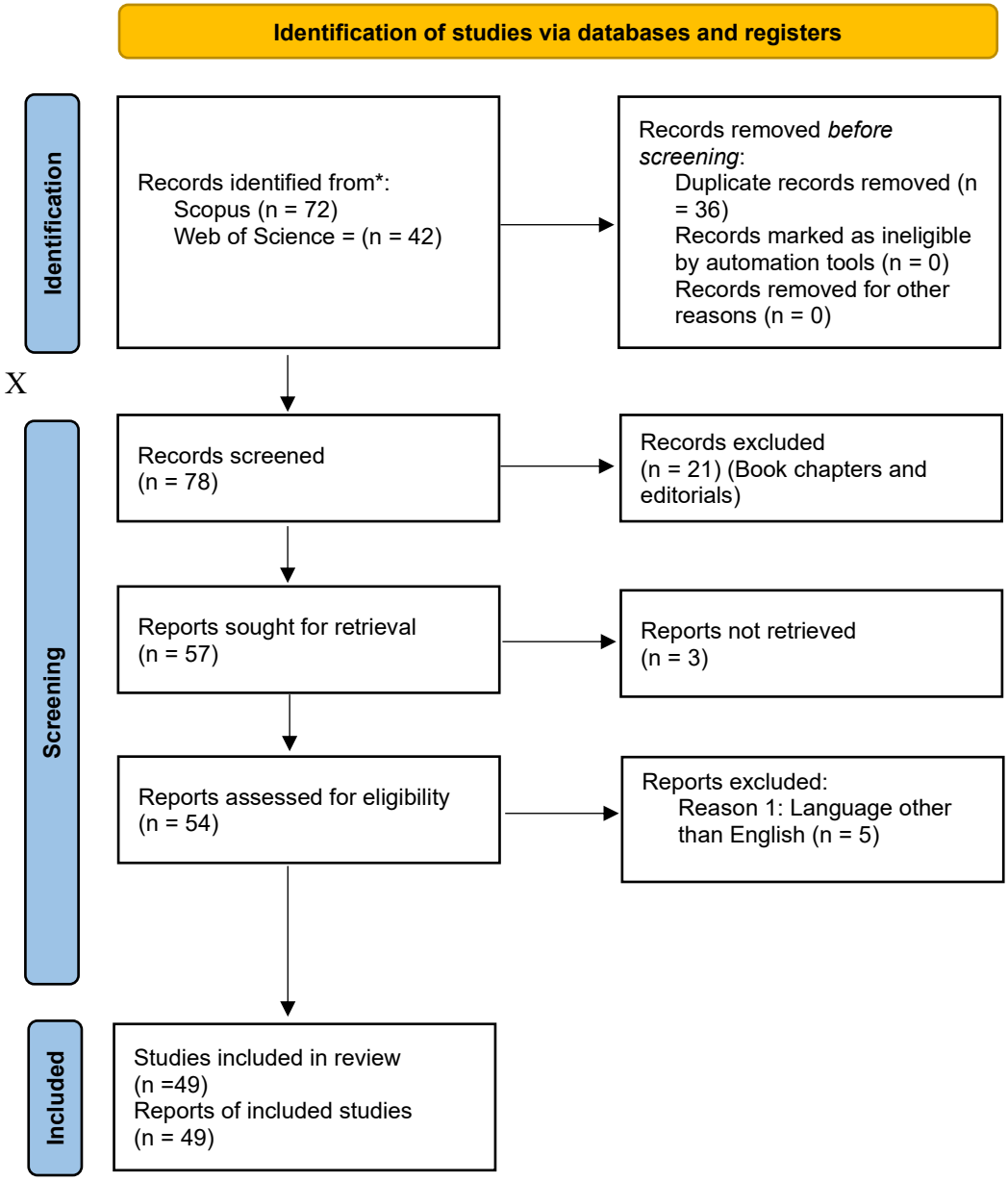
2) Figure 2 has been used under the methodology section section of this paper in sub-section 3.1.

Figure 2: The PRISMA 2020 flow diagram for the selection of the included studies



Source: Adapted from Page et al. (2021), PRISMA 2020 Statement.

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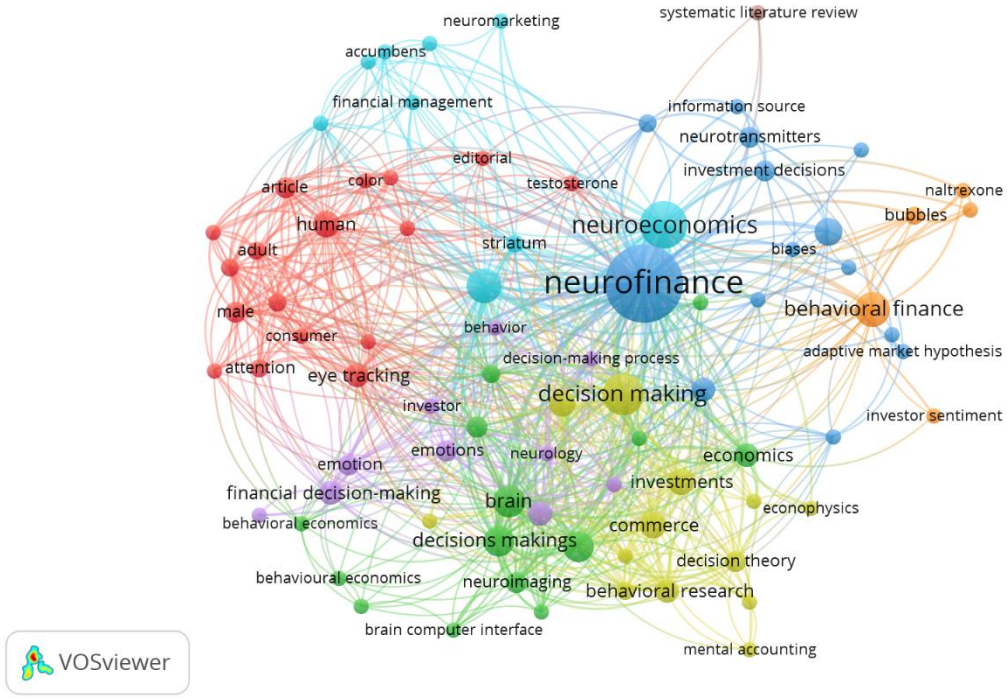
3) This figure has been used in Methodology section of this paper in sub section 3.2.

Figure 3: Keyword Co-occurrence



Source: VOSviewer

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4) This table has been used under the methodology scetion of this paper under sub-section 3.3.

Table 1: Dimensions of neurofinance along with it sub categories

Seven Broad Dimensions	Sub-dimensions
Cognitive Dimension	• Disposition effect (Shefrin & Statman, 1985) • Loss aversion (Kahneman & Tversky, 1979) • Affect heuristic (Sahi, 2012) • Framing (Tversky & Kahneman, 1981) • Anchoring (Tversky & Kahneman, 1974) • Overconfidence (Sahi, 2012) • Bounded rationality (Tseng, 2006) • Memory Experience (Srivastava et al., 2020)
Emotional Dimensions	• Emotional arousal (Wu et al., 2012) • Stress responses (Srivastava et al., 2019) • Mood states influencing investment (Srivastava et al., 2019) • Emotional contagion in trading environments (Wu et al., 2012) • Investor mental health (Srivastava et al., 2019)
Neural Dimensions	• Brain regions: amygdala, prefrontal cortex (PFC), striatum, hippocampus (Wu et al., 2012; Srivastava et al., 2019) • Risk perception: insula & anterior cingulate cortex (ACC) (Ortiz-Teran et al., 2021) • Reward anticipation: nucleus accumbens activity (Wu et al., 2012) • Neurotransmitters: dopamine, serotonin, testosterone (Khan & Mubarak, 2020) (Nadler et al., 2018) • Neural dysfunctions affecting financial behavior (Srivastava et al., 2019)
Perceptual & Sensory Dimensions	• Colour perception (red vs. blue bias in finance) (Ceravolo et al., 2019; Bussoli et al., 2022)

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	• Visual anchoring (Ceravolo et al., 2019) • Attention allocation (Srivastava et al., 2026)
Social & Collective Dimensions	• Herd behaviour (da Rocha Lima Filho & Rocha, 2017) • Conformity effects (Shen et al., 2017) • Sentiment contagion (Shen et al., 2017) • Schadenfreude effect (Frydman, 2025) • Social media influence (Shen et al., 2017) • Digital community dynamics (Cookson & Niessner, 2020)
Policy & Demographic Dimensions	• Age differences in financial decision-making (Kuhnen, 2025) • Gender differences in risk tolerance (Nadler et al., 2018) • Socio-economic factors in financial inclusion (Panetta et al., 2025) • Regulation frameworks (Affinito et al., 2026) • Consumer protection policies (Affinito et al., 2026) • Ethical investing principles (Affinito et al., 2026)
Technology & Methods Dimensions	• EEG emotion recognition (Razi et al., 2017) • fMRI / brain imaging (Ortiz-Teran et al., 2021) • Eye-tracking & physiological monitoring (Srivastava et al., 2026) • Neuroplasticity & training interventions (Erkut et al., 2018) • AI & ML classification for investor profiling (Bormpotsis et al., 2025) • Digital finance adoption & fintech platforms (Panetta et al., 2025)

Source: Compiled by the author

5) This figure has been used under the methodology scetion of this paper under sub-heading 3.4.

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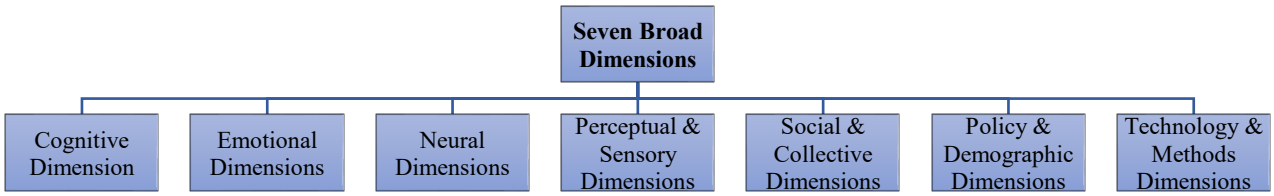
Figure 4: Flow chart of the seven major dimensions of the neurofinance.



Source: Authors compilation from the systematic literature review