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Presenting a Self-Regulation Model for Cryptocurrency Market Traders and its Impact on Trading Volume Fluctuations

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Abstract

This research aims to present a self-regulation model for cryptocurrency market traders and its impact on trading volume fluctuations. This study was conducted in two phases: qualitative and quantitative. In the qualitative phase, thematic analysis and grounded theory were employed. The interviewees in the qualitative section were academic experts with a scientific background related to financial and cryptocurrency markets, with 10 individuals considered as the expert group. The statistical population in the quantitative phase consisted of those who had traded in financial markets at least once, totaling 384 individuals. After coding the interviews at three levels—initial, axial, and selective—148 initial concepts were extracted, which were categorized into 37 subcategories and seven dimensions. Subsequently, the results of the qualitative section of research were confirmed using the Delphi method and structural equation modeling. The results indicate that the strategies of the model include creating a trading plan, using algorithms and analytical tools, controlling emotions, setting specific goals, continuous education and learning, regular analysis and evaluation, and risk management. Ultimately, the self-regulation of cryptocurrency market traders leads to consequences such as access to new technologies, effective governance, access to financial and technological resources, expansion of research and development areas, increased productivity, development of financial technologies, enhanced creativity and innovation, agility, system transparency, service diversity, improvement of services and security, joint

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investment, newer and faster services, creation of a collaborative ecosystem, improved customer experience, increased credibility, new market opportunities, cost reduction, and the establishment of a shared understanding of goals and needs.

Keywords: Self-regulation, Cryptocurrency Market, Trading Volume Fluctuations.

1. Introduction

Cryptocurrencies are software designed as electronic money. Although they have not replaced fiat currencies, they have become popular as risky investments due to their challenging growth and volatility nature. The cryptocurrency market experienced its highest growth in 2021, seeing its market capitalization increase from $400 billion in November 2020 to $2.8 trillion a year later. The rapid growth in the value of cryptocurrencies has widely attracted the attention of investors and traders. Traders gain exposure to cryptocurrencies through multiple avenues, such as exchange-traded funds (ETFs), direct purchases, and cryptocurrency exchanges such as Binance and Coinbase. These exchanges are very popular, with Coinbase reporting $7.4 billion in revenue in 2021, more than the New York Stock Exchange ($7.1 billion) and Nasdaq ($5.8 billion) (Yahoo Finance, 2022). These marketplaces allow users to buy and sell various cryptocurrencies (Binance Exchange, 2022).

In such a market, many traders engage in speculative trading patterns that resemble gambling (Androulakis et al., 2022). Transactions in this market are particularly attractive to risk-seeking traders (Johnson et al., 2022). For instance, day trading in this market is a high-risk strategy involving the buying and selling of cryptocurrencies for short-term price fluctuations. Additionally, leveraged trading is popular in this market; in these transactions, traders increase their positions by borrowing funds from third parties. While these conditions enhance potential returns, they also increase the potential for losses. Furthermore, if the price of an asset fluctuates significantly, traders are exposed to risk and may lose their capital (Dewi & Widakdo, 2022).

In such conditions, self-regulation in the cryptocurrency market becomes crucial as it helps protect investors against various risks associated with this market. Self-regulation enhances trust in the market and its stability, and by establishing logical procedures, it contributes to the growth and development of the market and its overall stability. Self-regulation can increase transparency and reduce systemic risks, ultimately leading to the creation of a safer and more stable environment for all participants in this market (Delfabbro et al., 2021).

Self-regulation, from a psychological perspective, refers to an individual's ability to manage and control their emotions, behaviors, and thoughts to achieve personal or social goals. This process involves identifying and regulating emotions, fostering motivation, and making informed decisions that help individuals perform well in the face of challenges and environmental pressures. Self-regulation enables individuals to enhance their performance and improve their quality of life through self-control skills, effective coping strategies, and planning. This trait plays a significant role not only in personal successes but also in social and professional relationships, as well as in financial markets (Rory, 2019).

In financial markets and the cryptocurrency sector, self-regulation refers to the process of establishing and implementing internal and individual rules and standards by traders, institutions, and companies active in this field, aimed at maintaining market integrity, protecting investors, and increasing transparency. This type of regulation helps reduce fraud and extreme price fluctuations by adhering to ethical principles and best practices, thereby enhancing public trust in the market. Self-regulation can also contribute to the sustainable development of the cryptocurrency industry and mitigate external pressures, steering the market towards a safer and more efficient environment (Kim et al., 2020; Aliahmadi et al., 2015).

Self-regulation in financial markets is of great importance as it helps maintain the stability and integrity of these markets. Self-regulation increases investor confidence and their participation in the market, ultimately leading to the sustainable growth and development of financial markets. These factors are critical for the optimal functioning of the market. Given the above, financial markets,

especially the cryptocurrency market, have rapidly established their position in the global financial landscape as digital currencies that can be exchanged without a central intermediary.

Considering the innovation and high potential of blockchain technology, which underpins these currencies, managing the risks associated with cryptocurrencies is deemed essential and crucial. One of the risk management approaches in this market is the self-regulation of traders. The cryptocurrency market has been examined from various dimensions in different studies; however, the topic of traders' self-regulation in this market has not received the attention it deserves, despite its significance due to its nature and implications for the market. Therefore, this research aims to address the issue of traders' self-regulation in this market and its impact on the volatility of trading volume. Consequently, the question arises: what dimensions and components does the self-regulation of cryptocurrency traders encompass, and what effect does it have on the volatility of market trading volumes?

2. Litrature Review

One of the prominent concepts in contemporary educational and cognitive psychology is self-regulated learning (Asadi, 2022). Self-regulation plays a crucial role in the processes and outcomes of learning and education, with multiple definitions provided for self-regulated learning. Self-regulated learning encompasses strategies that students employ to manage their cognition as well as management strategies they use to control their learning (Mahmoudi Noudaj, 2023). According to Petrovich, the most important self-regulation strategies include cognitive strategies, metacognitive strategies, and resource management strategies (Kelly, 2023). Almoos (1999) argues that self-regulation refers to an individual's ability to analyze behaviors according to external and internal environmental conditions and changes. He explains that self-regulation involves the individual's capacity to organize behavior according to goals and self-management of various learning processes (Bahravandi Sheikhi, 2020; Aliahmadi et al., 2013).

Although there is a vast and diverse literature on self-regulation, it can generally be stated that older definitions emphasized the cognitive aspects of self-regulated learning without considering its emotional, affective, and motivational dimensions. In contrast, newer definitions and literature aim to integrate both the "cold" and "hot" aspects of learning, such as cognition, emotions, and motivations (Asmara, 2023). Accordingly, self-regulated learning can be understood as encompassing all cognitive and motivational processes through which an individual sets goals and plans for their learning activities, applies necessary management, monitoring, and evaluation strategies according to circumstances, and, if needed, utilizes other resources such as individuals with capabilities to effectively advance their plans. This perspective focuses on the self-directed learning of the student and emphasizes student-centeredness. According to some experts, self-regulation in learning significantly explains the differences between successful and unsuccessful students. Successful students employ self-regulated learning strategies and motivational patterns to achieve success and tackle challenging activities while setting goals. In contrast, less successful students tend to exert less effort, show less interest in activities, struggle to set goals, and utilize learning strategies, possess low self-efficacy, and rarely reach high levels of success (Ji, 2023). Following this, relevant theories related to self-regulation will be presented.

2.1 The theory Bouffard, Vezio, Bordalo and LaRoche

Given the importance of self-regulated learning, various models have been proposed for it. Among them, the model by Bouffard, Viau, Bordalo, and Larochelle (1998) can be mentioned. According to this model, the construct of self-regulation includes the components of metacognition, cognition, and motivation. The metacognitive component involves students' planning and strategies when studying, such as scheduling study time, summarizing, organizing, and monitoring their study. The cognitive component includes strategies that students use to learn and better understand the material, while the motivational component encompasses the level of interest, persistence, and engagement of the student concerning the academic content. Self-regulation in learning focuses on the individual's role in the learning process. This construct was initially introduced by Bandura in 1997 (Baker, 2018). It has been addressed in various psychological theories, including behavioral cognitive theories, social cognition, and constructivism. Different scholars have proposed various models of self-regulation in learning. One of these models is the Petrovich model (1989), which defines self-regulation in learning as the use of

cognitive, metacognitive strategies, and resource management (Hakimi Farimani, 2022; Nozari & Szmelter-Jarosz, 2022).

Cognitive strategies refer to the techniques that students use for learning, memorization, retrieval, and comprehension. These strategies are applicable for both simple tasks that require rote memorization and more complex tasks that necessitate understanding and comprehension. Metacognitive strategies are those used for planning, reviewing, and adjusting cognitive activities. They help students to reflect on their learning processes and make necessary adjustments to improve their understanding and performance. Resource management strategies are those that learners use to control and manage their environment, such as time management, effort regulation, selecting study environments, and utilizing others like teachers, peers, and resources. These strategies assist students in adapting to their environment and modifying it according to their goals and needs (Habibi, 2023).

2.2 The theory of Zimmerman & Ponzio

According to the theory of Zimmerman and Ponzio (1988), self-regulated learning strategies have several subcategories, which include: behavioral self-regulation, motivational self-regulation, cognitive self-regulation, and metacognitive self-regulation. Behavioral self-regulation refers to the optimal use of various resources that enhance learning. These resources include time, location, and how to seek help from available sources such as teachers, parents, friends, and educational materials. Motivational self-regulation refers to the active application of motivational strategies to enhance learning, where learners with motivational self-regulation consider themselves self-efficacious and independent throughout the learning process. From a cognitive and metacognitive perspective, self-regulated learners are those who utilize planning, organization, self-directed learning, self-control, and self-assessment in their learning process. The construct of self-regulation refers to the teaching of strategies that enable individuals to develop their goal orientation in the learning process; in other words, self-regulated learning not only enhances students' learning but also provides them with opportunities to actively manage processes such as goal setting, self-control, self-assessment, and self-motivation (Mir Hosseini, 2022; Movahed et al., 2024).

2.3 The theory of Pintrich and De Groot (1990)

Pintrich and De Groot (1990) proposed the following model for self-regulated learning. The theoretical model of self-regulated learning by Pintrich and De Groot (1992) is based on this framework, which considers self-efficacy (the set of beliefs students have about their abilities to perform tasks), task value (the importance a student assigns to a specific task or subject), and test anxiety (a specific emotional state experienced during formal exams and evaluation situations) as motivational beliefs. Cognitive and metacognitive processes are viewed as components of self-regulated learning. Cognitive processes refer to the strategies and techniques that facilitate the learning process and enhance learners' academic performance. Additionally, metacognitive beliefs encompass the processes of planning, monitoring, and revising cognitive activities. Self-regulation means that students possess skills to design, control, and direct their own learning, and they are inclined to evaluate and reflect on the entire learning process. The self-regulated learning process includes motivation (self-efficacy, attribution, motivation, task value), cognitive and metacognitive activities, self-control, and self-evaluation (Ahmadi, 2021; Nozari et al., 2024).

Self-regulation is a critical factor in effectively managing impulse control, time management, and coping with psychological stress. Motivation, cognition, and metacognition are essential components of self-regulation models and learning processes. According to Zimmerman and colleagues (1989), the foundation of self-regulation lies in how students organize their learning in terms of metacognitive, motivational, and behavioral aspects. Zimmerman (1995) argues that the self-regulation of students who experience academic failure depends on their metacognitive skills and abilities (Baker, 2018). Ngowi(2007) points out that self-regulated learners lead the emotional and cognitive processes necessary for academic success. Bouffard and colleagues (1995), drawing from existing models, identified three components—cognitive, metacognitive, and motivational—for the self-regulation process. In this model, the metacognitive component includes the planning and organization of students while studying. Research has shown that self-regulated learners perform significantly better

academically than other students who do not exhibit self-regulated learning behaviors (Napolitano, Sewell, Yoon, Elmi, Roberts, 2024).

The theory of Pintrich and De Groot (1990) is one of the prominent theories in the field of self-regulation, which highlights three key components:

a. Metacognition: This includes strategies for monitoring, guiding, changing, and revising cognition. In other words, metacognition refers to the active oversight of cognitive processes and the strategies used to optimize cognitive functioning.

b. Management Strategies: These are the control methods that an individual applies to their efforts.

c. General Cognitive Skills: This encompasses the skills that an individual utilizes when learning, recalling, and understanding information (Qazvineh, 2023).

2.4 Self-Regulation in Financial Markets

Self-regulation in financial markets, as a key concept, refers to the ability of institutions, traders, and investors to adjust their behavior and adapt to market conditions. This concept is particularly significant in financial and economic contexts, as it can enhance market performance and reduce misconduct. The first aspect of self-regulation is the ability of traders and investors to manage their behavior in the face of market fluctuations. This ability includes controlling emotions, making rational decisions, and adhering to investment strategies. Traders must be able to avoid emotional decision-making in high-stress situations and remain committed to their principles and strategies. The second aspect is the impact of self-regulation on collective behavior in the market. Herd behavior is one of the main challenges in financial markets, which can lead to severe volatility and instability. Self-regulation can help mitigate these herd behaviors, as traders with self-regulatory capabilities are better able to avoid groupthink and act based on their analyses (Antoon, 2019). The third aspect is the role of self-regulatory organizations. These entities, such as exchanges and professional associations, help regulate and oversee the behavior of traders and companies. They can establish standards that contribute to maintaining transparency and fairness in the market. These organizations can also focus on educating and enhancing self-regulatory skills among traders. The fourth aspect is the importance of education in developing self-regulation. Training related to risk management, market analysis, and financial behaviors can help traders strengthen their self-regulatory skills. Such training can include educational courses, workshops, and online resources that assist traders in becoming familiar with the tools and techniques necessary for managing their behavior (Mauricio, 2008).

The fifth aspect is the impact of technology and big data on self-regulation. With advancements in technology and access to big data, traders can have better market analyses and make more informed decisions. These tools can help them better understand and improve their behaviors. The sixth aspect involves the challenges related to self-regulation in financial markets. Some traders may struggle to self-regulate effectively due to psychological pressures, lack of confidence, or unawareness of appropriate strategies. These challenges can lead to poor decisions and financial losses.The seventh aspect is the influence of psychology on self-regulation. Emotions and individual psychology can play a significant role in a trader's self-regulatory abilities. Traders must be able to manage their emotions and prevent negative influences from affecting their financial decision-making (Anton, 2019).

The eighth aspect highlights the importance of feedback in the self-regulation process. Continuous feedback on performance can help traders identify their strengths and weaknesses and improve accordingly. This feedback can be obtained through personal analyses, professional consultations, and peer reviews. The ninth aspect is the impact of self-regulation on market stability. Markets where self-regulation is effectively implemented tend to be more stable and less prone to severe fluctuations. This stability can enhance investor confidence and attract new capital. Self-regulation in financial markets not only aids in improving individual traders' performance but can also lead to overall market performance enhancement and a reduction in misconduct and volatility. Given the importance of this concept, investing in education and the development of self-regulatory skills should be prioritized to move financial markets towards greater stability and transparency (Primavera, 2014).

1. Background of the Research

Bakhtiari et al. (1403) examined the attitudes towards investing in cryptocurrencies from the perspective of Iranian economic actors on social networks. This qualitative study utilized thematic analysis, and the findings indicate that cryptocurrencies hold significant importance in economic transactions due to their

speed, efficiency in payments, and security in currency exchanges. Mehrabian et al. (1402) investigated the factors influencing consumer trust in e-commerce, with an emphasis on purchasing digital currencies. This research combined documentary and quantitative survey methods, revealing that various factors, such as perceived credibility and electronic infrastructure, significantly impact consumer trust.

Rafiei et al. (1402) analyzed the legal rulings regarding cryptocurrency transactions from the viewpoint of religious scholars, particularly Ayatollah Khamenei. This descriptive-analytical study concluded that while some scholars deem cryptocurrency transactions impermissible, Ayatollah Khamenei has permitted them as long as they do not contradict existing laws.

Sakrzadeh and Rouhi (1401) explored herd behavior in the cryptocurrency market. Utilizing a library method and examining the top 200 cryptocurrencies, the results showed that herd behavior exists in bullish markets and is more intense than in bearish markets.

Ghadamzan and colleagues (1402) identified the main dimensions of the impact of cryptocurrencies on the strategic management of investment holding companies. This mixed-method research concluded that cryptocurrencies affect various business strategies and present challenges.

Liuba et al. (2024) investigated the behavior of professional traders, retail investors, and liquidity providers in decentralized exchanges and the impact of front-running attacks on these markets. This study employed game theory modeling and concluded that with less than 1% of order flow from retail traders, market interests align, and front-running attacks are eliminated, although the benefits of adopting this new market are generally small.

Seniya and Khachaturova (2024) examined the need for regulating trader behavior in the current economic and political conditions and provided a comparative analysis of ethical regulatory approaches in foreign jurisdictions. This research included an analysis of foreign experiences, revealing that foreign institutions supervise stock exchange activities and offer recommendations regarding desirable and undesirable market behaviors.

Ralph (2024) analyzed the strengths and weaknesses of government regulatory activities and introduced self-regulation as an effective tool in markets. This research included an analysis of self-regulatory models and explored the potential for developing a co-regulatory approach, concluding that this approach could offer significant benefits and improve regulatory processes.

B.A (2022) investigated the concept of "self-regulatory organization" and established its legal framework, reviewing existing self-regulatory models. This research included a comparative analysis of self-regulatory organizations in different countries, identifying key weaknesses in these organizations and proposing actions to address them.

Silvester (2021) examined the role of self-regulatory organizations (SROs) in the industry and the need for complementary government oversight. This research utilized a formal model for the financial sector, highlighting that a lack of commitment from SROs may necessitate government oversight and emphasizing the importance of government regulation in maintaining industry standards and regulations.

3. Research Methodology

The present research methodology is designed as a mixed-method approach, sequentially comprising two phases: qualitative and quantitative. In the first phase, a comprehensive review of the literature and research background was conducted to gain an in-depth understanding of the concepts and topics related to self-regulation. In this context, over 50 studies in the field of self-regulation were examined, and various sources, including books, articles, and online resources, were meticulously studied and analyzed to extract concepts, definitions, and constructs related to self-regulatory models.

In the second phase, an initial conceptual model was proposed using insights from a selected group of experts, consisting of 10 specialists in the field of cryptocurrency markets. This model was then evaluated using structural equation modeling to elucidate the interrelationships between the main and sub-components, leading to the presentation of the final model. This process systematically and comprehensively analyzed data in both qualitative and quantitative phases, assisting in addressing the research questions and achieving its objectives.

In this section, the characteristics of the experts in the research field who participated in the qualitative phase are presented.

Table 2. Demographic characteristics of the qualitative phase sample

Feature	Frequency	Percentage frequency feature
age		
35-45	4	40
46--55	5	50
56<	1	10
Work history		
5-10	4	40
10-20	4	40
21<	2	20
Education		
Bachelor's	4	40
Master's	5	50
Doctorate and above	1	10

The following shows the demographic characteristics of the research sample in the quantitative phase:

Table 2. Demographic characteristics of the quantitative phase sample

Feature	Frequency	Percentage frequency feature
Gender		
Female	125	33
Male	259	67
Age		
22-30	75	19
31-38	105	27
39-46	65	18
47-54	50	13
55<	89	23
Education		
Bachelor's	136	35.41
Master's	168	43.75
Doctorate and above	80	20.84

To assess the validity and reliability of the present research, it is essential to clarify that validity refers to whether the tools and methods used in the research genuinely measure what they intend to measure. In this study, validity was ensured through qualitative methods such as thematic analysis and grounded theory. Additionally, selecting interviewees from among academic experts with relevant scientific backgrounds in financial markets and cryptocurrencies contributes to enhancing the validity of the results. Furthermore, the use of the Delphi method and structural equation modeling to confirm the findings of the qualitative section has added to the credibility and validity of the results. Reliability, on the other hand, refers to the stability and reproducibility of the research results. In this study, reliability can be ensured through the precise and systematic coding of interviews at three levels: initial, axial, and selective. The extraction of 148 initial concepts and their categorization into 37 subcategories and seven dimensions demonstrate accuracy and consistency in the data analysis process.

4. Findings

4.1 Qualitative Phase (Thematic Analysis)

In this section, the results related to thematic analysis and the review of domestic and foreign studies are presented. In thematic analysis, key themes were extracted, allowing researchers to identify behavioral patterns and factors influencing the self-regulation of traders. Additionally, the review of both domestic and international studies can help confirm or contradict the research findings with

previous results. In this context, examining prior articles and research can assist in identifying existing gaps in the scientific literature and pave the way for future research. Furthermore, this review can clarify the impacts of new technologies and analytical tools on trader behavior and market fluctuations. Overall, the results of the thematic analysis and the literature review can lead to the establishment of a robust theoretical framework for the research, enhancing the understanding of the dynamics of the cryptocurrency market and trader behavior.

Table 3. Main and subcategories identified in previous studies

Main Category	Subcategory	Resources
Economic and Market Factors	Price Volatility	Vignesh et al(2024), Johnson et al(2024), Benjamin et al(2023)
	Order Flow	Heimbach et al(2024)
	Market Inflows and Outflows	Ayana et al(2021)
	Total Current Inventory and Total Periodic Transactions	Ayana et al(2021)
	Hash Rate and Mining Difficulty	Johnson et al (2023)
Social and Cultural Factors	Social Environments and Social Networks	Johnson et al(2024), Benjamin et al(2023)
	Advertising and Social Influences	Johnson et al (2023)
	Social Emotions and Herd Behavior	Heimbach et al(2024); Khezri et al(2022)
Psychological Factors	Ability to Manage Emotions (Fear, Greed, Anxiety)	Ortega(2015)
	Emotion Regulation Techniques	Asheetu et al (2023)
	Awareness of Cognitive Biases	Asheetu et al (2023)
	Mental Health	Benjamin et al(2023)
Educational and Skill Factors	Training Based on Self-Regulation Skills	Ahmadi (2021)
	Continuous Learning and Adaptation	Asheetu et al (2023)
	Market Analysis Skills	Asheetu et al (2023)
	Risk Management Techniques	Asheetu et al (2023)
Individual and Personality Factors	Abilities and Personality Traits	Salari et al(2023)
	Rational Behavior and Avoidance of Emotional Behaviors	Dastouri et al (2019)
	Impulsive Decisions	Roland(2024)
Legal and Regulatory Factors	Lack of Recognition of Bitcoin by the Central Bank	Baghban et al(2023)
	Absence of Codified Law Regarding Bitcoin	Baghban et al(2023)
	Security Issues and Tax Evasion	Baghban et al(2023)
Technical and Technological Factors	Overtrading Phenomenon	Khezri et al(2022)
	News Phenomenon and Its Impact on the Market	Khezri et al(2022)
	Lack of Information	Khezri et al(2022)
Investment Factors	Individual and Institutional Investors	Zhunzhun et al (2023)
	Incentives and Motivations for Investment	Heimbach et al(2024)
Behavioral Factors	Bias and Positive Thinking Phenomenon	Khezri et al(2022)
	Patience Phenomenon and Emotional Behaviors	Khezri et al(2022)
	Trading Volume	Khezri et al(2022)
Macroeconomic Factors	Impact of Bitcoin on the Economy and Traditional Money Supply	Baghban et al(2023)
	Threat to the Real Economy	Baghban et al(2023)

Based on the above table, the main and sub-categories identified in previous studies encompass various factors. Economic and market factors play a significant role in shaping trading behaviors and strategies. Social and cultural factors influence traders' perceptions and interactions within the market.

Psychological factors are crucial in understanding traders' emotional reactions and decision-making processes. Educational and skill-related factors highlight the importance of knowledge and expertise in trading. Individual and personality factors affect traders' risk tolerance and behavioral tendencies. Legal and regulatory factors establish the framework within which traders operate. Technical and technological factors pertain to the tools and platforms used for trading. Investment factors focus on strategies and decisions related to asset allocation. Behavioral factors examine traders' patterns and habits. Finally, macroeconomic factors encompass broader economic conditions that can impact market dynamics. Overall, these classifications provide a relatively comprehensive understanding of the various influences on self-regulation and trading volume in the cryptocurrency market.

4.2 Qualitative Phase (Interview Text Analysis)

In the next stage, the research model was completed through interviews with experts. During this phase, the texts obtained from the interviews were coded. Open, axial, and selective coding are qualitative data analysis methods that assist researchers in identifying and organizing the concepts and patterns present in the data. In the open coding stage, the researcher examines the data and extracts initial concepts. For the topic of the research, this stage may involve identifying factors that influence traders' self-regulation in the cryptocurrency market, such as psychological behaviors, market knowledge, and trading strategies. These codes serve as the primary units of analysis and can help identify behavioral patterns and factors affecting trading volume fluctuations. In the axial coding stage, the relationships between the codes identified in the previous stage were examined, and efforts were made to identify the main patterns and central axes. For the research, this stage could include analyzing how traders' self-regulation impacts trading volume fluctuations and how this self-regulation can contribute to reducing or increasing volatility. Finally, in the selective coding stage, key and central concepts were identified and emphasized, which could be presented as main patterns in the research. This stage aids in creating a coherent theoretical framework that can lead to a better understanding of the dynamics of the cryptocurrency market and trader behavior.

Table 4. Relationship between concepts and categories

Color	Parent code	Code	Repetition of codes in interview texts
●		Causal factors	1
●		Contextual factors	1
●		Intervening factors	0
●		Core Category	0
●		Strategies	0
●		Consequences	0
●	Strategies	Setting Specific Goals	4
●	Strategies	Risk Management	3
●	Strategies	Regular Analysis and Evaluation	3
●	Strategies	Emotion Control	4
●	Strategies	Continuous Education and Learning	3
●	Strategies	Use of Algorithms and Analytical Tools	5
●	Strategies	Creating a Trading Plan	6
●	Consequences	Increasing Self-Confidence	3
●	Consequences	Reducing Emotional Fluctuations	5
●	Consequences	Improving Trading Performance	3
●	Consequences	Better Risk Management	2
●	Consequences	Consistency in Decision-Making	4

•	Consequences	Learning from Experiences	6
•	Consequences	Increasing Discipline	2
•	Central category	Self-Regulation for Traders	7
•	Intervening factors	Incorrect Analyses	4
•	Causal factors	Risk Management	8
•	Intervening factors	Sudden Market Changes	5
•	Contextual factors	Economic Environment	4
•	Contextual factors	Laws and Regulations	3
•	Contextual factors	Access to Information	4
•	Contextual factors	Technology and Infrastructure	6
•	Contextual factors	Social Support	6
•	Causal factors	Awareness of Cognitive Biases	4
•		Trading Volume Fluctuations	1
•	Contextual factors	Investment Culture	3
•	Contextual factors	Market Volatility	4
•	Contextual factors	Financial Education	3
•	Intervening factors	Emotions and Feelings	4
•	Intervening factors	Past Experiences	4
•	Intervening factors	Social Pressures	3
•	Intervening factors	Trading Strategies	5
•	Causal factors	Market Analysis	3
•	Causal factors	Experience and Education	3
•	Causal factors	Trading Psychology	4
•	Causal factors	Technology and Analytical Tools	2
•	Causal factors	Self-Monitoring	2
•	Causal factors	Goal Setting	1

As shown in the above table, the main and sub-components have been identified and classified, and the research model has been presented based on this classification and the results obtained from the thematic analysis. The identified model includes the following dimensions and components:

1)Among the causal factors influencing the self-regulation pattern of traders in cryptocurrency markets on trading volume fluctuations are market risk, trading psychology, awareness of cognitive biases, experience and education, market analysis, self-monitoring, technology and analytical tools, and goal setting.

2)Additionally, social support, technology and infrastructure, market volatility, access to information, economic environment, financial education, investment culture, and laws and regulations provide a specific context for implementing strategies, including creating a trading plan, using algorithms and analytical tools, controlling emotions, setting specific goals, continuous education and learning, regular analysis and evaluation, and risk management.

3)Trading strategies influenced by sudden market changes, past experiences, emotions and feelings, incorrect analyses, and social pressures can also serve as a general framework for executing actions and interactions.

4)Ultimately, the self-regulation of traders in cryptocurrency markets is affected by causal conditions, contextual conditions, intervening conditions, and actions and interactions, leading to outcomes such as access to new technologies, effective management, access to financial and technological resources, expansion of research and development areas, increased productivity, development of financial technologies, enhanced creativity and innovation, agility, system transparency, service diversity, improved services and security, joint investments, newer and faster services, creation of a collaborative ecosystem, improved customer experience, increased credibility, new market opportunities, reduced costs, and the establishment of a shared understanding of goals and needs.

Based on the identified dimensions and main and sub-components in the model, the theoretical model of the research can be presented as follows:

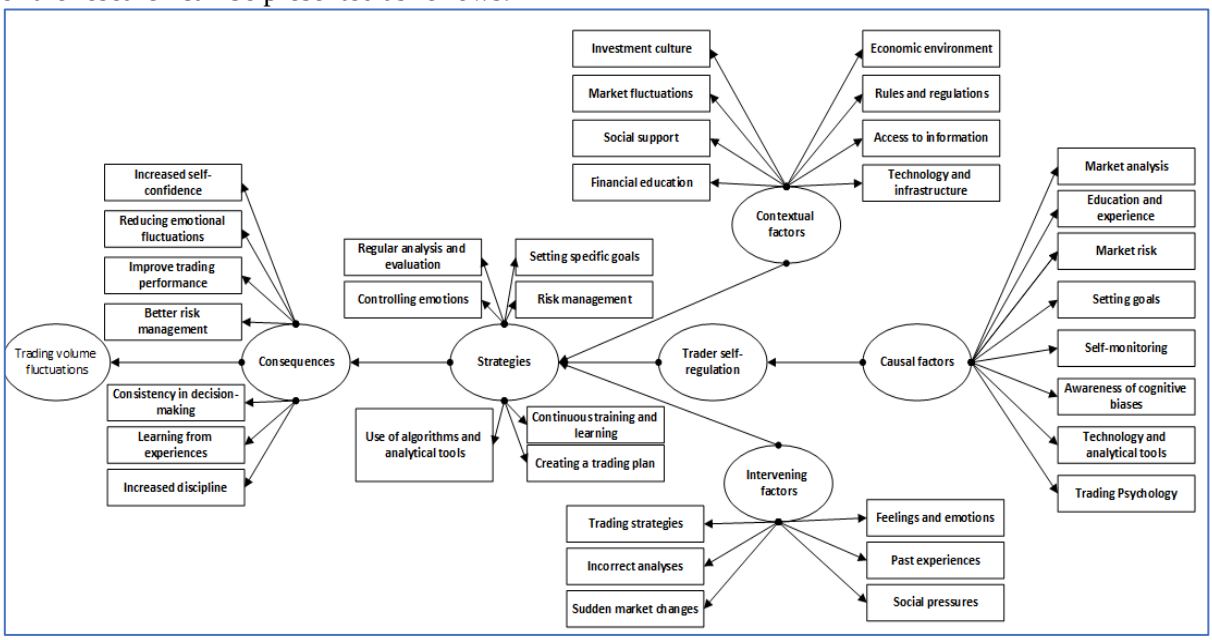

Figure 1. Conceptual research model

In justifying the various dimensions of the research model, it can be stated that self-regulation, as a key process in the behavior of cryptocurrency market traders, refers to their ability to control emotions, make rational decisions, and manage risk. This process is influenced by various factors that can be broadly divided into two categories: causal and contextual factors. Causal factors include market risk, trading psychology, awareness of cognitive biases, experience and education, market analysis, self-monitoring, technology and analytical tools, and goal setting. These factors directly impact traders' ability to self-regulate and help them make better decisions in volatile market conditions. Additionally, contextual conditions also play a significant role in traders' self-regulation. Social support, technology and infrastructure, market volatility, access to information, economic environment, financial education, investment culture, and laws and regulations all act as specific contexts that facilitate the implementation of effective strategies. These strategies include creating a trading plan, using algorithms and analytical tools, controlling emotions, setting specific goals, continuous education and learning, regular analysis and evaluation, and risk management. Thus, self-regulation is viewed as a dynamic and interactive process influenced by various factors.

Trading strategies also serve as general frameworks for executing traders' actions and interactions. Sudden market changes, past experiences, emotions and feelings, incorrect analyses, and social pressures can all affect traders' behavior and, consequently, impact trading volume fluctuations. Therefore, self-regulation not only aids in controlling emotions and making rational decisions but can also lead to reduced market volatility and improved overall performance. The consequences of traders' self-regulation include access to new technologies, effective management, access to financial and

technological resources, expansion of research and development areas, increased productivity, development of financial technologies, enhanced creativity and innovation, agility, system transparency, service diversity, improved services and security, joint investments, newer and faster services, creation of a collaborative ecosystem, improved customer experience, increased credibility, new market opportunities, reduced costs, and the establishment of a shared understanding of goals and needs. These consequences not only help improve individual traders' performance but also contribute to the overall development and sustainability of cryptocurrency markets. Thus, self-regulation is recognized as a key factor in the success and sustainability of cryptocurrency markets. The above results are related to several theories and models concerning traders' behavior and self-regulation in the cryptocurrency market. Below are some of these theories mentioned:

The theory of behavioral finance addresses the psychological and emotional impacts on financial decision-making. Factors such as trading psychology, awareness of cognitive biases, and emotions and feelings are examined within this theory.

The self-regulation theory refers to the self-regulatory processes and emotional control in financial decision-making. Components such as self-monitoring, setting specific goals, and controlling emotions are significant in this theory.

The social learning theory focuses on the effects of the social environment and social support on traders' behavior. Factors such as investment culture and social pressures are explored in this theory.

The risk management theory emphasizes the importance of risk management in financial decision-making. Components like risk management and market analysis are highlighted in this theory.

The complex systems theory examines the interactions and various actions in financial markets. Market volatility and sudden changes can also be analyzed within this framework.

The investment theory investigates the factors influencing investment decisions and trading strategies. Components such as financial education and the use of analytical tools are included in this theory.

Based on the results of the qualitative phase, the quantitative phase of the research has been considered next

4.3 Quantitative Phase of Research (Model Validation)

In this section, the model validation is conducted using the structural equation modeling approach with the Partial Least Squares (PLS) method. The goodness of fit of the measurement model is assessed through indicators such as factor loadings, Cronbach's alpha, Composite Reliability (CR), Average Variance Extracted (AVE), and discriminant validity (divergent validity).

Table (5) shows the factor loadings of the model's items.

Main category	Index	Factor Loading	t-Statistic	Significance Level
Core category	Self-Regulation for Traders	0.963	All factor loadings are greater than 1.96.	All significance levels are below 0.05.
Causal factors	Market Risk	0.963		
	Trading Psychology	0.970		
	Awareness of Cognitive Biases	0.968		
	Experience and Education	0.935		
	Market Analysis	0.964		
	Self-Monitoring	0.952		
	Technology and Analytical Tools	0.966		
	Goal Setting	0.954		
Contextual conditions	Social Support	0.950		
	Technology and Infrastructure	0.939		
	Market Volatility	0..957		
	Access to Information	0.865		
	Economic Environment	0.771		
	Financial Education	0.866		
	Investment Culture	0.931		
	Rules and Regulations	0.960		

Intervening conditions	Trading Strategies	0.871		
	Sudden Market Changes	0.935		
	Past Experiences	0.940		
	Emotions and Feelings	0.954		
	Incorrect Analyses	0.907		
	Social Pressures	0.963		
Strategies	Creating a Trading Plan	0.950		
	Using Algorithms and Analytical Tools	0.965		
	Controlling Emotions	0.935		
	Setting Specific Goals	0.924		
	Continuous Education and Learning	0.936		
	Regular Analysis and Evaluation	0.936		
	Risk Management	0.958		
Consequences	Learning from Experiences	0.911		
	Reducing Emotional Fluctuations	0.660		
	Stability in Decision-Making	0.946		
	Increasing Self-Confidence	0.947		
	Improving Trading Performance	0.932		
	Increasing Discipline	0.865		
	Better Risk Management	0.965		
	Trading Volume Fluctuations	0.893		

As shown in the table above, all factor loadings of the indicators are above 0.5 and are significant at the 95% confidence level (the significance level is below 0.05), with t-statistic values falling outside the range of ±1.96, indicating that the constructs are at an acceptable level in this regard. Furthermore, to avoid unnecessary elaboration, only the results of the conducted tests are presented:

Cronbach's Alpha and Composite Reliability: The coefficients of Cronbach's alpha and composite reliability of the constructs indicate the ratio of variance between each construct and its indicators to the total variance of the construct. A reliability coefficient above 0.7 is considered acceptable. The results of the reliability coefficients indicate that the obtained coefficients are above 0.7. Convergent Validity: In this study, the Average Variance Extracted (AVE) index was used to assess convergent validity. AVE indicates the correlation of a construct with its indicators. Fornell and Larcker (1981) introduced this criterion for measuring convergent validity and stated that the critical value for this measure is 0.5. This means that a value above 0.5 indicates acceptable convergent validity. The results from the assessment of the convergent validity of the model's constructs show that the AVE values for all constructs are above the threshold of 0.5, thus confirming the convergent validity of the model and the fit of the measurement models. Additionally, since the Smart PLS software uses the t-value to assess the significance of the coefficients, and this value is 1.96 for a 5% error rate, the significance is assessed by comparing the t-statistic values of the relationships with the aforementioned threshold. If the t-statistic value is greater than 1.96, the indicated relationship is considered significant. According to the research results, the path coefficients obtained in the figure are statistically significant.

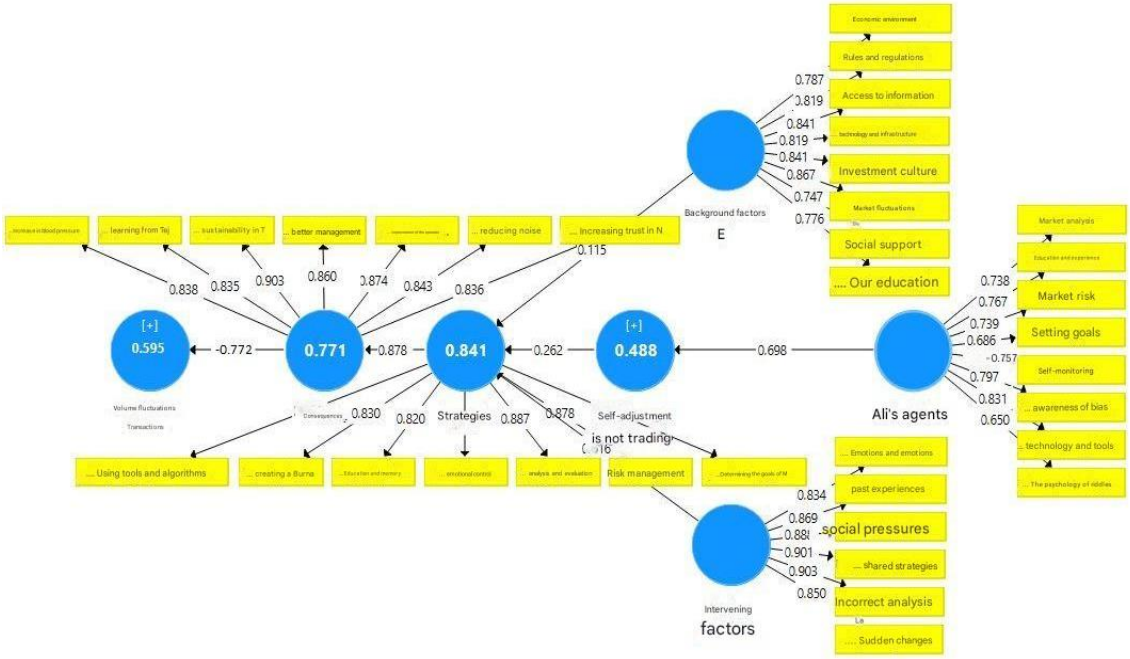

Figure 2: Path Coefficients of Research Variables

Based on the output from the software, the path coefficients and their significance results are presented in Table 6.

Table 6: Effect Coefficients of Variables and Their Significance

Path		Path coefficient	t-coefficient	Conclusion/Assumptions
From variable	to variable			
Causal conditions	Axial	0.698	14.556	Meaningful/Confirmed
Contextual conditions	Strategies	0.115	2.225	Meaningful/Confirmed
Intervening conditions	Strategies	0.616	7.476	Meaningful/Confirmed
Axial	Strategies	0.262	4.717	Meaningful/Confirmed
Strategies	Consequences	0.878	33.610	Meaningful/Confirmed
Self-regulatory consequences	Volume Fluctuations	-0.772	18.840	Meaningful/Confirmed

Based on the results obtained from the analysis of the path coefficients of the model, it can be stated that self-regulation and the implementation of research strategies have a set of consequences that, according to feedback from the quantitative sample, influence fluctuations in trading volume. The results indicate that this impact is negative and statistically significant. In other words, if the self-regulation of cryptocurrency market traders improves, the fluctuations in trading volume will decrease, leading to greater stability. To justify this result, it can be said that self-regulation helps traders control their emotions and avoid impulsive decision-making. This can lead to a reduction in sudden market fluctuations. Traders with better self-regulation can conduct logical analyses and make decisions based on up-to-date data and information. This can contribute to increased stability in trading volume. Self-regulation allows traders to implement more effective risk management strategies, which can reduce risks and fluctuations in trading volume. Additionally, traders who practice self-regulation are more likely to engage in learning and keeping their information current. This can enhance market awareness and improve trading decisions. Self-regulation can also help build confidence among traders. When traders feel they can manage themselves effectively, they are likely to be more active in the market, which can lead to an increase in trading volume.

5. Conclusion

In this research, an attempt was made to design a self-regulation model for cryptocurrency market traders as an analytical framework for understanding and managing fluctuations in trading volume in this market. This model is based on influential causal factors such as market risk, trading psychology, and awareness of cognitive biases. These factors directly impact traders' behavior and can lead to incorrect decision-making and severe fluctuations in trading volume. For instance, market risks can create a sense of uncertainty among traders, which may result in sudden changes in trading volume. Additionally, contextual and intervening conditions play a significant role in influencing traders' self-regulation. Social support, access to information, and technological infrastructure can assist traders in making better decisions and controlling their emotions. These conditions can act as facilitators that enable traders to implement their trading strategies more effectively and optimally leverage market fluctuations.

Trading strategies based on past experiences and thorough analyses can help reduce fluctuations in trading volume. For example, if traders can control their emotions and avoid incorrect analyses, they are likely to experience fewer fluctuations. These strategies should be continuously evaluated and updated to keep pace with market changes and prevent unwanted fluctuations.

The results of this model indicate that the self-regulation of traders can lead to positive outcomes such as increased productivity, the development of financial technologies, and improved customer experience. These outcomes not only help traders operate better in volatile markets but also contribute to the creation of a collaborative and transparent ecosystem in the market. In other words, this model can serve as a key tool for enhancing the overall performance of cryptocurrency markets.

Ultimately, the negative and significant impact of the strategies outlined in this model on trading volume fluctuations suggests that self-regulation can act as an effective mechanism for risk management and reducing volatility in cryptocurrency markets. Given the complexities of this market, paying attention to this model and implementing its strategies can help traders more effectively face the challenges present in the market and achieve better results. This model not only aids in improving individual traders' performance but can also lead to the establishment of a more stable and efficient market. Based on the identified strategies in the model, the following recommendations are proposed in line with the described strategies:

Strategy 1: Create a Trading Plan

Traders should have specific strategies for entering and exiting trades and document them.

Plan specific times of the day for trading and market analysis.

Define stop-loss and take-profit levels for each trade to manage risk.

Strategy 2: Use Algorithms and Analytical Tools

Utilize technical and fundamental analysis software to identify market patterns and trends.

Design algorithms that automatically generate buy and sell signals.

Analyze historical data to identify successful and unsuccessful patterns in past trades.

Strategy 3: Control Emotions

Use meditation techniques to reduce stress and enhance focus during trading.

Keep a journal to record emotions and reactions during trades to identify emotional patterns.

Learn breathing techniques to manage emotions during high-stress times.

Strategy 4: Set Specific Goals

Establish measurable goals for each time period, such as daily, weekly, and monthly.

Regularly review goals and adjust them as necessary.

Set specific, measurable, achievable, relevant, and time-bound (SMART) goals.

Strategy 5: Continuous Education and Learning

Enroll in online and in-person courses to learn new trading techniques.

Study reputable resources on market analysis and trading strategies.

Join trading groups and forums to exchange experiences and learn from each other.

Strategy 6: Regular Analysis and Evaluation

Review performance and identify strengths and weaknesses.

Create periodic reports on completed trades, including analysis of results and reasons for success or failure.

Seek feedback from other traders or advisors to improve strategies and performance.

Strategy 7: Risk Management

Invest in diverse assets to reduce overall risk.

Set stop-loss levels for each trade to prevent significant losses.

Assess the risks associated with each trade and determine the investment amount accordingly.

These recommendations can help traders enhance their performance in cryptocurrency markets by employing self-regulation strategies and reducing fluctuations in trading volume.

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