



The Institutionalization and Performative Properties of Financial Algorithms

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Abstract: This article explores the complex socio-economic implications of the influence of financial algorithmic systems upon the market landscape. The integration of these algorithms into industry has led to significant changes, and the computational processes they trigger shape the dynamics of today's market. To further advance financial algorithms, it is necessary to develop not only technological innovations but also new approaches and frameworks for studying them and determining their place within economic system. Three modes of financial algorithm development were analyzed for this purpose. The first mode involved dismantling traditional financial structures to establish a new financial and algorithm-driven order. The second mode focused on the performative functions of these algorithms, while the third explored the institutionalization of financial algorithms in the market. At the same time, there is a continuous comparison of traditional finance and algorithmic finance, considering their common features and differences, as well as analyzing the impact of financial algorithms on both financial and non-financial sectors. Evolutionary methods and institutional theory methods are used. The article concludes that the institutionalization of algorithms formalizes new artificial market structures, giving them a specific identity and legitimacy.

1 INTRODUCTION

The financial industry is a major user of algorithmic systems, playing a significant role in shaping demand for and determining the direction of algorithm development. The industry imposes specific functional requirements on algorithm developers, who must meet these demands to create effective solutions. Key concepts in financial algorithms include openness and inclusion of financial services, exclusion of human managers from customer service and transaction support processes, use of algorithms for trading and asset management, all designed to maximize computational efficiency and contribute to market optimization. As a result, the field of computational intelligence in finance is rapidly evolving towards sustainable development goals.

Modern algorithms, which include technologies such as machine learning, deep learning, and natural language processing, play a significant role in the development of the financial market. These

algorithms are embedded in various systems and affect a wide range of financial activities, including settlement, payment, credit services, and network user services such as recommendations, trading of financial assets, fraud detection, chatbots, and robo-advisors. In this study, financial algorithms are more than just a set of rules for analyzing data and making transactions. They are new players in economic and socio-technical systems, disrupting traditional financial markets and significantly influencing their future. These algorithms become equal participants in financial market relationships, challenging the dominance of traditional financial institutions.

Financial algorithmic systems are rapidly evolving and expanding, but they are still in their early stages of development and implementation. Over time, their benefits and potential risks are expected to become clearer. The rapid development of these systems and their increasing role in socio-economic processes has led to an increase in the number of publications on financial algorithmic systems. Researchers are trying to fill knowledge



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gaps, identify new areas for research, and develop financial algorithms that benefit society. Understanding their transformative role in the financial system is crucial.

2 THE CONCEPT OF CREATIVE DESTRUCTION

Algorithms have disrupted traditional business models and helped build new ones. First, they shifted the focus of entrepreneurial activity from people to automatic computing. Thus, the algorithms accelerated and switched many processes to the 7/24 mode, as well as increased the market efficiency and rationality of agents (Daraojimba, Abioye, Bakare, Mhlongo, Onunka, Daraojimba, 2023).

Shifting the entrepreneurial function towards data-driven decision-making has revolutionized finance (Balaji, 2025; Siddiqui, 2025). On the other hand, financiers started to place increased demands on algorithm developers, which impacted their development. Entrepreneurs began to rely on algorithms to analyze huge amounts of data in real time (Dhand, Singh, Le, 2025), which allows them to make more informed investment decisions and respond faster to market changes (Figure 1). In addition, the transition to high-frequency securities trading and algorithmic investment portfolio management has transformed the decision-making process into machine form.

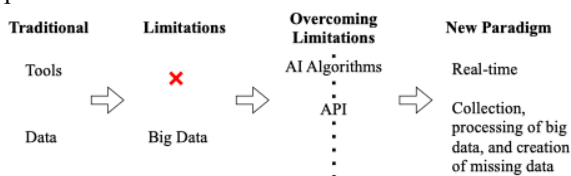


Figure 1: Transition from traditional to algorithm-based data processing. Authors' Compilation

The changes have led to a transition to a hybrid form of finance that combines traditional and algorithmic finance (Figure 2). In the last third of the last century, the financial sector began to dominate the real economy. Over the past decade, algorithmic finance started to replace traditional finance. Nowadays, algorithmic financial technology is spreading and replacing traditional financial services.

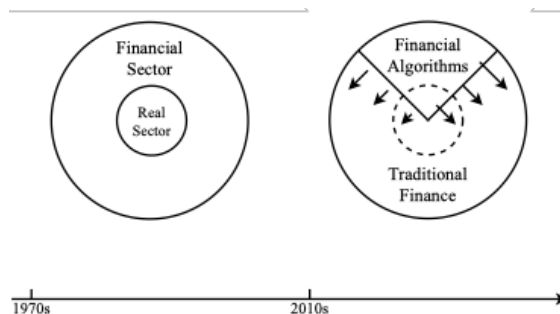


Figure 2: Algorithmic Transformation of the Financial Sector Source: Authors' Compilation.

The initial stages of integrating financial algorithms into non-financial online networks faced several challenges. These included issues related to legislative (Passador, Bravi, 2025; Khoury, Alshater, Joshipura, 2025) and technological compatibility (Rane, Choudhary Rane 2024), concerns about compliance with security and confidentiality standards, as well as ethical considerations (Malempati, 2025). Additionally, there was a need to overcome skepticism among users (Chen, Zhao, Xu, Nie, Zhang, 2025) and establish trust in new technologies (Grytsenko, 2025).

New systems often go beyond traditional financial regulatory frameworks, making them harder to regulate. Financial institutions must adhere to relevant regulations when integrating financial services into non-traditional platforms. Lack of standardized data exchange protocols and the need for each data provider to integrate with new systems pose obstacles.

There were concerns that the introduction of innovative technologies, such as financial algorithms, could divert resources from core tasks and potentially harm traditional customer relationships (Sudaryana, Wirjodirdjo, Windarto, 2024). However, these algorithms have proven successful in overcoming initial challenges and have become an integral part of the financial landscape.

These algorithms have mastered information analysis and marketing, leading to increased efficiency in operations, stronger customer relationships, and improved decision-making. As a result, they have transformed the financial ecosystem, impacting not only financial networks but also social and commercial systems. The introduction of financial algorithms has triggered a chain reaction affecting all levels of the ecosystem. They have influenced adjacent systems and facilitated their interaction and integration.

Financial algorithms, in addition to serving the users of the networks they are integrated with, are an

essential tool for inter-network communication (see Fig. 2).

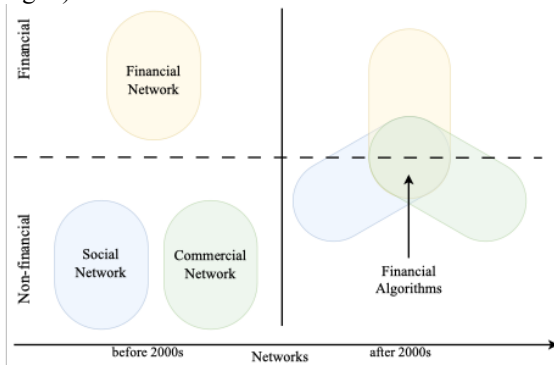


Figure 3: Illustration and Classification of Three Different Localization and Interaction Systems. Compiled by the authors.

The introduction of financial algorithms into non-financial networks enhances inter-network interactions and leads to network integration. Figure 3 illustrates the transition from the autonomous functioning of different types of networks to their integration. Competition for a larger market share drives the development of algorithmic finance (Figure 2). This is primarily achieved through reducing transaction costs and expanding the customer base. As financial and algorithmic processes become more widespread, computational procedures start to influence attitudes towards uncertainty and risk. Rationality becomes absolute, elevated to a mathematical value, affecting the effectiveness of decisions and their outcomes.

Thus, financial algorithms reconstruct the structure of economic management from within - they dismantle the old structure and build a new one within a specific market segment. As competition between traditional finance and innovative finance intensifies, the microstructure of the market evolves, creating opportunities for generating new value and additional revenue. By integrating with non-financial networks, financial algorithms act as a central organizing, managing, economic, and technological hub, determining the integration of networks and the allocation of value between them.

The general principle of operation for financial algorithmic systems integrated into online networks depends on the approach chosen. It can incorporate the methodology of efficient markets or behavioral finance. More recently, hybrid systems have been developed that adapt to various market conditions and incorporate analytical tools and techniques from different approaches. These modern algorithmic technologies are evolving in a mixed coordinate

system defined by the financialization of the economy. This system has been successful in adopting new technologies and incorporating them into the overall process of financial development of society.

3 THE PERFORMATIVE PURPOSE OF FINANCIAL ALGORITHMS

The term "algorithm" has quickly transitioned from being a professional term associated with programming and modeling to becoming a common term used by the public. It has gained significant attention, not only among professionals, but also among the public, as experts discuss its role in various financial processes. Algorithms play a crucial role in credit scoring, high-frequency trading, recommendation systems, portfolio management, and investment consulting. They contribute to the transformation of the financial landscape (Aggarwal, Sharma, Kaur, Lakhera, 2024) by actively participating in the creation of new business models and ecosystems (Nuhui, Aliu, 2025).

Regulators and politicians are attempting to integrate these systems into the framework of market oversight and information processing. The public is concerned about the increasing reliance on impersonal financial transactions. Public figures and cultural scholars acknowledge their impact on population behavior.

In the middle of the last decade, researchers noticed that algorithms were becoming significant objects of academic research, especially in relation to the formation of the digital public sphere (Vodenska, Becker, 2019). This increased attention to algorithms was part of a broader interest in the sociotechnical and socio-cultural analysis of tools and mechanisms in modern digital culture and its impact on social development.

Financial algorithms play a crucial role in new network architectures, rearranging and organizing connections between nodes. (Ananny, 2016) Understanding the functioning of these algorithms allows to better understand the direction of processes and build modern knowledge. This knowledge can then be used to develop effective ways to use high-tech platforms to solve social and economic problems online.

Financial algorithms with artificial intelligence often use large language models (LLMs), which allow them to process text context and simulate

human reactions while independently performing various tasks. In Russia, the GEN-T family of generative models is used, based on Qwen 2.5 models adapted to our country (T-Pro and T-Lite from T-Bank), which are used for chatbots and code writing automation.

Sberbank proposed the GigaChat model to automate communication with customers and create text content. Yandex has also developed YandexGPT models, including voice and text assistants like Alice, as well as Cotype from Mobile Telesystems (MTS), designed primarily for corporate clients.

The Russian market for LLM products is relatively small, amounting to 35 billion rubles or almost \$0.5 billion. However, it is projected that growth will continue to be significant, which will ensure the development of the country's financial algorithms.

The analysis of financial algorithms aims to understand how they influence market behavior and financial decisions, and how this affects market outcomes. This analysis helps to assess how effectively these algorithms perform their intended tasks, as well as to identify opportunities for their improvement and further development. Financial algorithms are performative in nature, as they could shape market trends and influence the financial behavior of users. They not only evaluate assets, but also shape their structure and price dynamics. In high-frequency trading, algorithms reflect the market and actively prepare it for the model they have developed. High-frequency trading algorithms and portfolio management tools trigger price movements.

Other examples of performativity include financial asset pricing and efficient financial models, which encourage people to make more rational decisions. As financial modeling evolves, adaptability to market fluctuations develops. The rapid development of behavioral and adaptive market technologies is linked to the creation and adoption of tools and techniques that correct and promote certain behaviors among customers. In this context, the power of algorithms is significant, as they not only serve to predict but also influence the outcome. Thus, the influence of financial algorithms becomes apparent.

The concept of performativity in financial algorithms differs from that of models in the natural sciences, which do not influence, for instance, gravity or entropy in thermodynamics or computer science. Financial algorithms, on the other hand, have the ability not only to monitor the market and its participants but also to manipulate them, thereby exercising their influence.

The first econometric models, which were the forerunners of modern financial algorithms, were models for pricing financial assets in option contracts. These models were later supplemented by derivative models that not only analyzed but also influenced the financial market on a structural level. Financial algorithms with deep learning elements can adapt to market changes and influence the market by introducing ready-made solutions, thereby changing it. Modern technologies allow us to identify hidden patterns and subtle trends in time series, which can be used to predict market behavior with greater accuracy. This increases the reliability of predictions and enhances the performance of models. As a result, algorithms not only study but also create an environment necessary for their effective operation.

In general, algorithms are starting to play a more significant role in society. As their impact on society grows, not only do their socio-economic functions change, but also their social purpose does (Sunstein, 2024). This is leading to the development of socio-technical and economic-technical relationships, which are determined by the creators of algorithmic systems. As a result, the roles of algorithms, their creators and those who manage these systems are fundamentally changing in public life. The human factor remains important, and it is likely that in the future a symbiosis between technology and human intelligence will determine the practical direction of algorithms and their socio-economic position in society.

Currently, the transition to institutionalization of algorithmic systems is becoming increasingly important for both science and practice. This is largely due to the performative nature of financial algorithms and their role in financial intermediation. The development of these algorithms towards institutionalized intermediary functions requires careful study and scientific investigation.

4 ALGORITHMIC INSTITUTIONALISM IN THE FINANCIAL SECTOR

Despite the large amount of literature and research on algorithmization and institutionalization in the financial sector, the conceptual connection between these two areas has not been a significant focus. In the 2020s, the idea of "algorithmic institutionalism" was introduced into academic discussion (Karabacak, 2025; Pant, Mishra, Mohan, 2024; Mendonça, Filgueiras, Almeida, 2023). It describes the

transformation of algorithms into high-tech institutions that resemble traditional institutions in their characteristics (see Figure 4). These algorithmic institutions have the ability not only to create, but also to implement solutions (Yuan, 2025). They operate according to pre-established rules and regulations (which may be independently created). As such, they represent the dynamics of power (informational, economic, and possibly political) in society and influence the behavior of network participants.

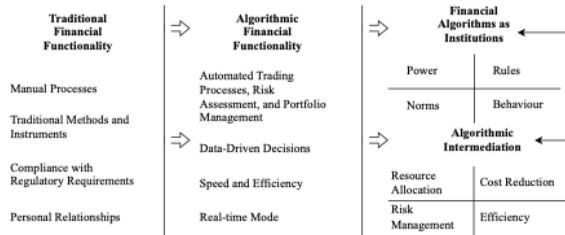


Figure 4: Algorithmic Functionality, Institutionalism, and Mediation. Compiled by the authors.

The integration of algorithmic systems into business practices requires rethinking some traditional approaches. From an institutional perspective, algorithms represent new entities that influence socio-economic outcomes. In this context, the algorithmization of the financial industry is a specific innovative solution not only to technological challenges but also to the challenges of improving market efficiency and achieving sustainable development goals.

The concept of integrating algorithms into financial services to improve their effectiveness is simple. It involves providing financial services in algorithmic form through non-financial networks, which allows for scaling up the supply (multiplying financial services and products within the network) and the demand (growing the customer base by attracting more users and increasing their ability to pay).

These processes can be illustrated by shifting the positions of the supply and demand curves on a graph. As a result, both supply and demand increase, moving to a higher position (see Figure 5). This makes financial institutions more efficient at working through social media and justifies the participation of new users due to increased efficiency.

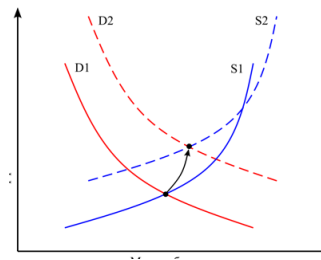


Figure 5: Supply and Demand Curves for Traditional and Algorithmic Financial Services. Source: Developed by the Authors.

A structural analysis of algorithmic institutionalism can help to better understand the socio-economic implications of algorithm development and their role in decision-making processes. This analysis can also help to see how algorithms have changed market behavior and their position among market participants.

According to a group of American researchers, there are several elements that serve as an analytical basis for this structural analysis. These include institutional construction, historical processes, rules and norms, power relations, games, and discursive dimensions (Almeida, Filgueiras, Mendonça, 2022). Each of these elements provides a unique perspective for understanding the impact of algorithms on society.

New institutional construction is taking place in the financial sector as part of the reform of traditional financial institutions. This process is happening within the framework of a balance between formal and informal institutions.

Among the general rules for the institutional construction of financial algorithms, there are two main principles: determinism of results due to the accumulation of management functions by financial algorithms and mass character, which implies the provision of results through the institutionalization of algorithms in various networks.

The strength of algorithms lies in their computational indisputable reasoning and uncompromising application in recommendations, consultations, calculations, and trading operations. Discursive measurement determines the sequence of events from the selection, analysis, and understanding of changes to the formation of concepts and the grouping of common properties and principles in the institutionalization of financial algorithms.

The evolutionary analysis of institutionalism allows to understand the processes of both order and complexity creation in the economy, as well as the evolutionary paths of various institutional

mechanisms and intermediaries. This approach provides a basis for analyzing economic change.

Evolutionary economics highlights the role of evolutionary processes in shaping economic behavior and institutions. Algorithmic institutionalism, on the other hand, applies computational concepts to comprehend these processes and explain the conditions for transitioning to algorithmic management.

Most often, researchers argue that mathematical objectivity is better than human judgment when it comes to managing the allocation of resources, determining prospects, setting priorities, and helps to reduce social inequality (Glas, 2006). Some researchers, however, reject this idea and believe that algorithms are not independent of human decisions (Yadav, 2015). They believe that algorithms should be closely monitored and regulated to ensure fairness and prevent discrimination (Min, Borch, 2022).

Experts are convinced that algorithms create orders based on strict mathematical calculations and irrevocable power rights, but they do not operate independently of human decision-making (Yadava, 2024). This is crucial for understanding the social and legal implications of algorithms in the financial sector (Almeida, Filgueiras, Mendonça, 2022).

5 CONCLUSION

The influence of algorithms on the market can be explained by their ability to shape the behavior of users and the dynamics of market transactions. Modern algorithmic systems are active participants in market activities, collecting and analyzing data, managing financial flows, and influencing other market players.

To understand the full impact of these algorithms, we must recognize their performative nature: they not only reflect reality but also actively shape it through their predictions and effects. Regulators must consider the impact of algorithms on market efficiency, as they influence decision-making processes, pricing mechanisms, and consumer behavior, leading to a transition towards market models that differ from traditional economic theories and management approaches.

The migration of a significant portion of the market to the digital space, coupled with the expansion of financial services through networks, has contributed to the development of feedback loops. These algorithms gather data about users and offer them personalized recommendations, making users susceptible to their influence. As a result, a new

equilibrium may emerge based on computational processes and the rationality of algorithmic actors. In today's financial markets, individual interests are shaped not only by human decisions but also by algorithmic systems. This has resulted in a dramatic shift in market dynamics and optimization strategies.

In this context, the behavior of agents in automated systems such as stock trading and investment portfolio management is calculated and controlled by complex algorithms. In addition, computational procedures are expanding their influence to encompass user behavior in areas such as settlement, credit, and insurance services. Theoretically, algorithmic solutions promise an idealized, efficient market characterized by rational behavior of agents. In the field of computing processes driven by algorithms, this aspect of the market seems to be moving towards a design that harmoniously fits into the concept of the "invisible hand" proposed by Adam Smith. However, both automated trading and credit-settlement services face obstacles, including market instability and unpredictable behavior of algorithms. Moreover, collusion between the participants has become a common problem.

The institutionalization of algorithms formalizes new entities and gives them a certain identity and legitimacy. Algorithmic institutions, in turn, have become the foundation for the development of intermediary activities and financial services. The mathematical and computational nature of algorithmic solutions in modern networks ensure not only the accuracy and speed of financial services, but also their responsiveness to user requests.

As a result, algorithmic systems facilitate the transition to the use of a fundamental resource that has not yet been fully explored by humans - time. They ensure the further integration of time into financial transactions, making it possible for humans to make more efficient use of this resource. The real-time operation of these systems, combined with their lightning-fast responses to market movements and user requests, as well as their ability to accurately forecast trends, indicate promising opportunities for a more complete utilization of time for development purposes.

Another significant development of algorithmic systems is the transition to more active use of the performative properties of finance on a new technological foundation. This is achieved not only through a more comprehensive and in-depth analysis of data and environmental knowledge for decision-making, but also through influencing economic

processes, market conditions, and network user behavior.

To study, understand, and most importantly, fully utilize financial algorithms in socio-economic regulation, there are three levels that need to be addressed. At the first level, a clear understanding and description of the underlying mechanisms behind the interaction between financial and social networks, as well as the role of financial algorithms in network, institutional, and intermediary development, is essential.

At the second level, the overall situation is assessed, and the risks and prospects of tumor development are evaluated. As a result, preparations are made for the conceptual design of new knowledge.

At the third level, conditions, and principles for monitoring the new system are developed, allowing not only to prevent the occurrence of undesirable events, but also to utilize the processes of institutionalization and mediation of financial algorithms to enhance the stability and reliability of the financial system. At this stage, the performative nature of finance will likely be further developed, and its active use maximized. This will contribute to the development of the algorithmic capabilities of finance and its application in the online environment.

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