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AI AS A MITIGATOR OF INFORMATION ASYMMETRY WITHIN PLATFORM STRATEGIARCHY LOGIC

Formulation of the problem. Information symmetry in society is an ideal situation, provide to minimize transaction costs. However, in the context of the Fourth Industrial Revolution, contradictory processes occur. While tools for reducing information asymmetry are increasingly used, the ever-growing volume of information, coupled with the means to distort it, actually exacerbates the problem. Indirect signs of deepening information asymmetry include disproportions in world trade. The rise of "post-truth" and "disinformation" is no coincidence and highlights the importance of research into information asymmetry. However, the development of artificial intelligence offers potential solutions for achieving greater information symmetry.

Literature review. Modern researchers concentrate their attention on specific issues related to information asymmetry. The issue of information asymmetry remains in the focus and is being studied from all over the world and concerns various aspects. For example, A. Omar and others "examines the relationship between information asymmetry and SOP (say-on-pay) abstention votes, highlighting the role of transparency and shareholders' decision-making in executive compensation matters." [1]. G. Ozparlak investigates gender sphere and overcome artificial barriers by women to reduction of asymmetric information [2, p. 227]. E. Khansalar and others have analyzed information asymmetry in capital market and came to the conclusion "that the variables of cash flow in proportion to accounting interest have more information content in explanation of capital market operation." [3, p. 258]. D. Fasihat and R. Iskandar are testing "relationship between the variables information asymmetry, earnings management, and Cost of Equity Capital" [4, p. 4643] and take result "to suppress profit management practices and reduce the Cost of Equity Capital value, companies can suppress information asymmetry by increasing the transparency of company information" [4, p. 4643].

Important research made N. Steigenberger, where he asks question "Why do resource holders not identify deceptive signals as deceptive?" [5, p. 9] and write "Deceptive signaling has been a problem for decades, and has been recently exacerbated by technological developments in machine learning and generative AI, which have made and continue to make deceptive signals both cheaper to produce and more difficult to detect" [5, p. 2]. But if there is looking to history, we can see that deceptive signaling take place at list thousands of years ago. Exemplify, Sun Tzu wrote "when able to attack, we must seem unable; when using our forces, we must seem inactive; when we are near, we must make the enemy believe we are far away; when far away, we must make him believe we are near" [6]. In terms of signaling theory Sun Tzu recommend to send deceptive signals. Also, it is necessary to pay attention that machine learning and generative AI create opportunity to decrease information [7]. Next N. Steigenberger discusses deceptive signalling in "four contexts: (1) young firms' attempts to acquire resources, (2) listed firms signaling to investors, (3) firms signaling to customers and (4) firms using deceptive signals to disguise their strategic intentions vis-à-vis competitors to gain a competitive edge and thus a financial advantage" [5, p. 6]. As we can see wide or general context, when deceptive signalling touch all aspects (such as image of future, models behavior etc.) stay out of focus.

As we can see object of researches have been a market, or even more direct – specific markets. Consequently, the understanding of information asymmetry as a universal phenomenon remains without due attention.

Purpose of research. Based on the literature review and existing gap in the previous researches, this

paper aims to describe role of AI, deployed on a platform of strategizing, functions as a third party to mitigate information asymmetry within the framework of signaling theory.

Presentation of main results. This study follows a structured logical progression. In the first stage, it examines the development of human society through the lens of mitigating information asymmetry. In the second stage, it investigates key instances where information asymmetry arose, highlighting its pervasive nature. In the third stage, it outlines fundamental strategies for reducing information asymmetry. In the fourth stage, it demonstrates how platform strategiarchy can be employed to reduce information asymmetry."

Development of society from the standpoint of information asymmetry

An examination of information asymmetry through the lens of historical progression, specifically via person-to-nature (P2N) and organization-to-nature (O2N) communication, yields a compelling insight of this process.

Upon entering the world, an infant possesses minimal, if any, knowledge. From the earliest moments of life, the infant endeavors to fill this cognitive void to effectively interact with the surrounding environment. Through the accumulation of knowledge, the infant strives to diminish the discrepancy between their perception of the world and objective reality. Given the ephemeral nature of individual human existence, this process is mirrored at the societal level, facilitated by the capacity to preserve and transmit knowledge across generations.

In the era of primitive communal society, the divergence between the actual world order and societal perceptions was maximal, bridged by anthropomorphic totems. Subsequently, during the period of nascent slave-owning societies, the attempt to reduce this cognitive gap led to a transition from totems to a pantheon of deities and early philosophy, whose interactions aimed to construct a coherent worldview. The feudal epoch witnessed the ascendancy of monotheism. The capitalist era marked a shift towards the dominance of a scientific worldview, which, according to contemporary understanding, most accurately represents reality.

"Consider the question, "Why does a stone fall?" This query would elicit fundamentally different responses in distinct historical periods. A member of a primitive communal society might attribute the phenomenon to the belief in inherent spirits. A representative of a slave-owning or feudal society might ascribe it to divine will. Only individuals from the industrial era, and more specifically, the era of the scientific and technological revolution coinciding with the Enlightenment, would understand the influence of gravitational force. This understanding is a product of that time period. A similar observation can be made with the question, "Why does the sun shine?". Individuals from the first three epochs would not provide an accurate explanation. Only those with a modern scientific understanding can explain the process of thermonuclear fusion of hydrogen into helium."

Thus, the entire trajectory of human development can be conceptualized as an endeavor to mitigate the information asymmetry between humanity and nature. A discerning reader might note that the term "information asymmetry" was initially applied to dyadic contractual relationships. However, this distinction is inconsequential, as humans are inherently engaged in an interaction with their environment, which is contingent upon their comprehension of it. Consequently, nature may deviate from human expectations during interaction (e.g., in resource extraction or space exploration), which is a direct manifestation of information asymmetry.

Basic cases of the emergence of information asymmetry

According to the Nobel Prize in Economics documents from 2001, the laureates demonstrated that the phenomenon of information asymmetry can be understood by augmenting economic theory with the realistic assumption that one side of a market possesses superior information [8, p. 1]. However, we can examine this phenomenon significantly more widely, not limited to market participants. We can explore this phenomenon beyond market interactions. For example, we can examine the relationships between interstate relations, individual-state interactions, state-state interactions or human-environment interactions.

It is widely recognized that information asymmetry plays a pivotal role in the establishment of contractual relationships, such as seller-buyer relationships [9]. However, a broader perspective can be adopted by delineating four primary categories of actors: (1) persons (individuals); (2) organizations (enterprises, public associations, states, international organizations, classes, legal entities); (3) nature (the environment); (4) artificial intelligence (AI). Nature's apparent lack of volition may seem incongruous within this grouping. However, it does not preclude interactions with the first two categories, as extensively explored in game theory (games against nature). The inclusion of AI is somewhat anticipatory. Nevertheless, given its developmental strides in recent years, its consideration is pertinent for both present and future discourse. With the proliferation of the Internet of Things, AI can be posited as a potential interface between the technosphere and the biosphere (humanity).

This yields ten potential contractual scenarios: (1) person-person (P2P), (2) person-organization (P2O), (3) person-nature (P2N), (4) person-AI (P2AI), (5) organization-organization (O2O), (6) organization-nature (O2N), (7) organization-AI (O2AI), (8) nature-nature (N2N), (9) nature-AI (N2AI), and (10) AI-AI (AI2AI).

The combinations (1), (2), and (5) have received the most scholarly attention, while (7)-(10) remains the least explored. A brief overview of each scenario follows.

1. Person-person (P2P). When two individuals (P1 and P2) interact, such as in a seller-buyer relationship (or in non-economic contexts like spousal relations or cooperative hunting), each possesses distinct knowledge of interaction protocols and anticipated outcomes. Every interaction constitutes an implicit or explicit contract, governed by established or tacit rules, and dependent on the volume of information (hereinafter VI) of each party. This interaction presents two primary scenarios: (A) VI (P1) > VI(P2) or VI(P2) > VI(P1), and (B) VI(P1) ≈ VI(P2). Ultimately, information asymmetry enables the party with superior information to shape the future of the less informed party. Mitigation of this asymmetry (for case VI(P1) > VI(P2)) and its consequences can be achieved through two general ways. Firstly, augmentation of P2's information (knowledge) or reduction of P1's information (as a form of informational ostracism). Secondly, provision of compensation by P1.

The former is challenging, as P2 initially lacks awareness of their knowledge deficit, and subsequent awareness may be of limited practical utility. However, AI or societal mechanisms can provide advisory support. The latter necessitates the involvement of a higher-level actor, such as a society or state.

2. Person-Organization (P2O). In interactions between persons and organizations, the latter typically possesses a greater informational advantage regarding the subject matter and anticipated consequences. So that (VI(O)>VI(P)). A standard strategy for mitigating information asymmetry is the engagement of a third party. For instance, in person-bank interactions, the individual (1) may seek legal or financial counsel or (2) participate in deposit insurance schemes. These approaches, analogous to risk management, differ fundamentally: one attempts to equalize information asymmetry through external expertise, while the other minimizes risks stemming from this asymmetry.

3. Person-Nature (P2N). This communication is discussed in the previous section. In this case VI(P) < VI(N).

4. Person-AI (P2AI). The interaction between AI and humans has become ubiquitous with the advent of large language models (LLMs). The disparity in knowledge between individuals and AI, trained on vast digitized datasets, is substantial. This interaction is reciprocal: humans contribute new data to AI, while AI imparts knowledge to humans. Given AI's simultaneous interactions with numerous individuals, its knowledge accrues at a faster rate than one person. Theoretically, extensive delegation of cognitive tasks to AI could lead to human cognitive atrophy, then potentially AI will be degrading through interactions with cognitively diminished individuals. However, this risk is mitigated by the adaptability of AI algorithms. The critical issue remains the development of AI quasi-consciousness, without which AI remains a tool (in arms of individuals or organizations) for imposing specific future scenarios for others individuals or organizations. In any case VI(P) < VI(AI).

5. Organization-Organization (O2O). Interactions between organizations (first of all a big ones) typically exhibit lower information asymmetry than P2O, due to dedicated legal departments and access to professional experts. So that VI(O1) ≈ VI(O2), if organization sizes are same. And in general, VI (O1) > VI(O2), if size company O1 is more than size company O2.

6. Organization-Nature (O2N). This communication has similar features as case P2N. So that VI(O) < VI(N).

7. Organization-AI (O2AI). Organizations possess less information than AI (VI(O)<VI(AI)), but, in current conditions, AI is developed and owned by specific organizations, implying AI's alignment with these entities' interests.

8. Nature-Nature (N2N). Although natural components do not possess the ability to enter into contractual arrangements, communication is a continuous phenomenon within ecological systems. Human actions demonstrably affecte the exchange of information between these components, leading to modifications informational asymmetry between them.

9. AI-Nature (AI2N). Nature, in a universal sense, is an inexhaustible source of AI training data, so its knowledge surpasses that of AI and VI(N) > VI(AI).

10. AI-AI (AI2AI). The further development of various AIs will also determine competition between them, which will also depend on the level of information asymmetry. The question of the need to mitigate information asymmetry for case VI(AI1) > VI(AI2) remains open.

These communications are categorized into: (1) peer-level (P2P, O2O, AI2AI) and (2) hierarchical (all others). Hierarchical actors typically possess varying information volumes (VI), leading to the following inequalities:

$$VI(N) > VI(AI) > VI(O) > VI(P).$$

These inequalities are justified as follows: VI(O) > VI(P) because individuals are constituents of organizations; VI(AI) > VI(O) because AI is trained on multi-organizational data; and VI(N) > VI(AI) because AI learns from a subset of natural data.

All actors have opportunity to utilize information for gain, which assessments as expected results (hereinafter ER).

Therefore, for persons, if VI(P1) > VI(P2), then P(ER(P1)) > P(ER(P2)), i. e., P1's vision of the future is more likely to prevail. This principle, if universalized, predicts societal stratification into informed "subjects" (with big VI) and uninformed "objects" (with small VI), highlighting current knowledge (information) as a determinant of the future.

Basic strategies to reduce or mitigate information asymmetry

As shown in the previous section, there are two main ways to counteract information asymmetry: reducing either the causes or the consequences.

The first way involves providing the less informed party with the necessary amount of additional information. The second way involves providing compensatory mechanisms for the party that suffers losses due to lack of information.

Thus, we can propose 4 options for interaction between the two parties (Table 1).

As both parties seek to achieve greater information parity regarding the transaction's details. It promotes to formation a more efficient market. AI can contribute to increased efficiency in the information gathering process for both parties.

Table 1

Intersection of strategies to reduce information asymmetry in the interaction of two parties

Party A	Party B	
	Strategy #1 Increasing the volume of information about the subject of the transaction (contract, communication)	Strategy #2 Reducing the risks (consequences) caused by information asymmetries
Strategy #1 Increasing the volume of information about the subject of the transaction (contract, communication)	Both parties obtain additional data regarding the transaction (including using AI)	The formation of an effective compensatory mechanism on the part of B devalues the increase in volume of information on the part of A
Strategy #2 Reducing the risks (consequences) caused by information asymmetries	The formation of an effective compensatory mechanism on the part of A devalues the increase in volume of information on the part of B	Mutual agreement to implement compensatory mechanisms guaranteed by a third party (often the state)

Source: created by the author.

When one of the parties tries to increase the volume of information about the subject of the transaction, and the other party forms an effective compensatory mechanism, the latter gains an advantage. And this makes it economically unfeasible for first party to increase the volume of information.

When both parties aim to reduce risk (the consequences of asymmetry), the compensatory mechanism is naturally introduced. Only a third party can be a guarantor of the fulfillment of obligations.

Platform strategiarchy: a tool for third-party reduction of information asymmetry

Drawing from signal theory, researchers have observed that 'third parties can assume a signal validation role' [5, p. 12]. For instance, a prominent endorser, acting as a third party, can signal on behalf of a resource seeker [10], such as when venture capital investors endorse entrepreneurs [11].

Building upon the ten previously identified communication types, we now examine the third party's role. This entity can serve either as an information source for the less informed party or as a guarantor of compensatory mechanisms for it, redistributing benefits to ensure fairness (Table 2).

Within the framework of P2P, P2O, P2N, P2AI, O2O, and O2N interaction models, the role of third-party mediation, undertaken by individuals, organizations, or artificial intelligence, is observed. Such mediation can be directed towards the diminution of pre-existing information asymmetry or the amelioration of its resultant effects. Individuals, in this role, primarily function as providers of supplementary information to less informed parties. It is important to note that the natural world does not qualify as a third party in these interaction models.

In O2AI and N2N interactions, organizations or AI may serve as third-party mediators.

In N2AI and AI2AI interactions, only AI can act as a third party.

The capacity of artificial intelligence to provide informational consultancy and guarantee contractual fulfillment through the instrumentality of smart-contracts is observed.

The potential for using AI as a third party can be realized within the logic of acting of platform for coordinating strategies [12-13], that provide basis for platform strategiarchy [7, p. 61]. Strategiarchy is a social system in which all persons and organizations have an actual public strategy. Platform strategiarchy is a strategiarchy implemented on a digital platform. From the perspective of signaling theory, a strategy communicates important information to the counterparty about the desired future state.

Table 2

Subjects that can act as a third party to reduce information asymmetry

One party	Second party			
	Person	Organization	Nature	AI
Person	Third party 1. Person (IV*; G**). 2. Organization (IV; G). 3. AI (IV; G)	Third party 1. Person (IV). 2. Organization (IV; G). 3. AI (IV; G)	Third party 1. Person (IV). 2. Organization (IV; G). 3. AI (IV; G)	Third party 1. Person (IV). 2. Organization (IV; G). 3. AI (IV; G)
Organization	Third party Analogously to case person-organization	Third party 1. Person (IV). 2. Organization (IV; G). 3. AI (IV; G)	Third party 1. Person (IV). 2. Organization (IV; G). 3. AI (IV; G)	Third party 1. Organization (IV; G). 2. AI (IV; G)
Nature	Third party Analogously to case person-nature	Third party Analogously to case organization-nature	Third party 1. Organization (IV; G). 2. AI (IV; G)	Third party 1. AI (IV; G)
AI	Third party Analogously to case person-AI	Third party Analogously to case organization-AI	Third party Analogously to case nature-AI	Third party 1. AI (IV; G)

* IV – provides additional VI to the less informed party

** G – guarantees a fair redistribution of benefits obtained as a result of the transaction in favor of the less informed party.

Source: created by the author.

AI deployed on a digital platform of strategizing [12-13] can organize and compare the public strategies of individuals and organizations with their actions, the content of the contracts they plan to conclude or are currently executing. Thus, AI will ensure effective moderation of both the conclusion of smart contracts and their execution. Platform strategiarchy's economic basis may rely on participant contributions, governmental funding, or international grants, including those from the UN.

Conclusions.

1. The entire history of human development can be viewed from the standpoint of the desire to overcome information asymmetry. This takes the significance of the category "information asymmetry" to a new level, demonstrating its universal nature. Thus, information asymmetry is a universal category that is an integral characteristic of the development of nature and society, as well as all possible types of communications between key actors: individuals, organizations, nature and AI.

2. The four primary categories of actors (persons, organizations, nature, AI) give rise to 10 different types of interaction, which are divided into two groups (peer-level and hierarchical). Actors have different amounts of information, which describes information asymmetry. In turn, information asymmetry generates economic inequality.

3. The negative effects of information asymmetry can be reduced in two strategic approaches: either by providing additional information to the less informed party, or by redistributing the economic benefits received by the more informed party in favor of the less informed party.

4. Both of these strategic approaches can be implemented within the framework of the logic of platform strategiarchy using artificial intelligence. This assumes that all actors have formalized public strategies that are taken into account when concluding and implementing smart contracts. This approach can be considered as a further development of the provisions of the signaling theory (by M Spence), where public strategies play role of reliable signals, which determines the scientific novelty of the research results.

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Вишневський О. Штучний інтелект як агент пом'якшення інформаційної асиметрії за логікою платформної стратегіархії

Інформаційна симетрія в суспільстві є ідеальною ситуацією, що забезпечує мінімізацію транзакційних витрат. Проте в контексті Четвертої промислової революції відбуваються суперечливі процеси. У той час як інструменти для зменшення інформаційної асиметрії використовуються все частіше, постійно зростаючий обсяг інформації разом із засобами її спотворення фактично загострює проблему. Однак розвиток штучного інтелекту пропонує потенційні рішення для досягнення більшої інформаційної симетрії.

Стаття має на меті описати роль штучного інтелекту, розгорнутого на платформі стратегії, функціонує як третя сторона для пом'якшення інформаційної асиметрії в рамках теорії сигналізації.

Всю історію розвитку людства можна розглядати з позицій прагнення подолати інформаційну асиметрію. Це виводить значущість категорії «асиметрія інформації» на новий рівень, демонструючи її універсальний характер. Інформаційна

асиметрія є універсальною категорією, яка є невід'ємною характеристикою розвитку природи та суспільства, а також усіх можливих типів комунікацій між ключовими акторами: індивідами, організаціями, природою та ШІ.

Чотири основні категорії акторів (людини, організації, природа, штучний інтелект) створюють 10 різних типів взаємодії, які поділяються на дві групи (однорівневі та ієрархічні). Актори мають різну кількість інформації, що описує інформаційну асиметрію. У свою чергу, інформаційна асиметрія породжує економічну нерівність.

Негативні наслідки інформаційної асиметрії можна зменшити за допомогою двох стратегічних підходів: або шляхом надання додаткової інформації менш поінформованій стороні, або шляхом перерозподілу економічних благ, отриманих більш поінформованою стороною, на користь менш поінформованої сторони.

Обидва ці стратегічні підходи можуть бути реалізовані в рамках логіки платформної стратегіархії з використанням штучного інтелекту. Це передбачає, що всі суб'єкти мають формалізовані публічні стратегії, які враховуються при укладанні та реалізації смарт-контрактів. Такий підхід можна розглядати як подальший розвиток положень сигнальної теорії (М. Спенса), де публічні стратегії відіграють роль надійних сигналів.

Ключові слова: економічна теорія, асиметрія інформації, ШІ, економічні сигнали, теорія сигналів, стратегіархія, платформна стратегіархія.

Vyshnevskyi O. AI as a Mitigator of Information Asymmetry within Platform Strategiarchy Logic

This paper aims to describe role of AI, deployed on a platform of strategizing, functions as a third party to mitigate information asymmetry within the framework of signaling theory.

The entire history of human development can be viewed from the standpoint of the desire to overcome information asymmetry. This takes the significance of the category "information asymmetry" to a new level, demonstrating its universal nature. Thus, information asymmetry is a universal category that is an integral characteristic of the development of nature and society, as well as all possible types of communications between key actors: individuals, organizations, nature and AI.

The four primary categories of actors (persons, organizations, nature, AI) give rise to 10 different types of interaction, which are divided into two groups (peer-level and hierarchical). Actors have different amounts of information, which describes information asymmetry. In turn, information asymmetry generates economic inequality.

The negative effects of information asymmetry can be reduced in two strategic approaches: either by providing additional information to the less informed party, or by redistributing the economic benefits received by the more informed party in favor of the less informed party.

Both of these strategic approaches can be implemented within the framework of the logic of platform strategiarchy using artificial intelligence. This assumes that all actors have formalized public strategies that are taken into account when concluding and implementing smart contracts. This approach can be considered as a further development of the provisions of the signaling theory (by M Spence), where public strategies play role of reliable signals.

Keywords: economic theory, information asymmetry, AI, economics signaling, signaling theory, strategiarchy, platform strategiarchy.

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