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QUANTUM INFORMATION THEORY: TOWARDS THE PARADIGM OF COGNITION, THE THEORY OF EVERYTHING AND PHILOSOPHY

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ABSTRACT

It is the author's concept *of quantum information theory* as a universal paradigm of cognition and a theory of everything, integrating physics, epistemology, and the ontology of sense. The author assumes that information is not only a description of reality, but its primordial material — cognitive energy that co-creates matter, consciousness, and the evolution of civilization. The model is based on a five-step hierarchy of cognitive transformation: data → information → concept → knowledge → wisdom, corresponding to the gradual ordering of the entropy of sense. The process of cognition is quantum in nature: every act of thinking exists in the superposition of senses, and only at the moment of interpretation does *the collapse of sense occur, i.e.,* the transition from potentiality to cognitive actuality. The author develops an analogy between the wave of cognition and the wave of matter, introducing the concepts *of the amplitude of sense* and *cognitive entropy* as formal measures of the quality of cognition. The result is a theory in which man, artificial intelligence, and the Universe participate in a single field of quantum information, and the cognitive equilibrium corresponds to the state of minimal entropy – wisdom. The article integrates the classical concepts of Bohm, Einstein, McLuhan, and Floridi, showing information as an efficient factor equal to energy and matter. The proposed concept of *Homo sapiens harmonicus* presents the man of the future as a being capable of harmonizing the amplitudes of sense, combining knowledge with values, and transforming technology into a tool for spiritual development. The paper concludes with the postulate of a quantum epistemology, in which philosophy becomes the science of organizing the world's information field—the art of transforming the chaos of data into the wisdom of existence.

Keywords: Quantum information theory; quantum epistemology; collapse of sense; cognitive entropy; wisdom; philosophy of information; amplitude of cognition; theory of everything; Homo sapiens harmonicus; McLuhan; integration of matter and information.

1. INTRODUCTION: FROM MATTER TO SENSE

Modern quantum physics has replaced Newtonian determinism with the probabilistic model, in which reality exists as a set of potentialities. Similarly, the epistemology of the 21st century requires a departure from the classical understanding of information as a static data carrier. Information today appears as *the energy of cognition*—dynamic, entangled, and dependent on the observer's context. Previous theories of information were based either on syntax (examining the bandwidth of a communication channel; Shannon and Weaver 1948 and 1949) or semantics (exploring the range of content of units of thought: data, information, concept, knowledge, wisdom; Targowski 1990 and 2023). Quantum information theory assumes that information is equivalent to energy. In addition, the new theory assumes that cognition can be described not only logically but also formally, using a mathematical apparatus inspired by quantum physics.

In an information-theoretic framework, it is essential to distinguish between the *meaning* of information and its *sense*. The *meaning* of an informational unit refers to its *semantic content*—the descriptive, context-independent properties encoded in the symbol. By contrast, the *sense* of information reflects its *context-dependent functional consequences*, arising when the informational signal interacts with a physical, biological, cognitive, or social system.

Crucially, the *sense* of information is *energy-implicative:* it denotes not only an interpretive shift but also the energetic, behavioral, or dynamical changes it induces within its environment. For example, the *meaning* of the descriptor "black dress" is confined to its semantic attributes (a garment of a given chromatic value). Its *sense*, however, emerges only in a specific context: in a funeral ritual, the same informational signal triggers a patterned set of *energy-driven behaviors*—movement, posture, emotional modulation, and adherence to ceremonial norms. Thus, while *meaning is descriptive and static, sense is consequential and dynamic*, capturing how information *guides or constrains energy expenditure, system transitions, or action patterns*.

Formally:

$$\text{sense}(I \mid C) = \Delta E_C(I) \qquad (1)$$

where $\Delta E_C(I)$ denotes the context-specific (C) energetic consequences of information I.

Hierarchy of units of cognition
Every cognitive act goes through five levels of organization of sense:

Level	Function	Description
Data (D)	Potential	Raw facts and sensory stimuli—the chaotic substrate of cognition.
Information (I)	Organize	Data is organized through context and relationships.
Concept (C)	Structure	A conceptual approach that allows for modeling and differentiation.
Knowledge (K)	System	A network of concepts used for prediction and understanding.
Wisdom (W)	Integration	The ability to combine knowledge with the values and effects of action.

Formally:

$$T: D \rightarrow I \rightarrow C \rightarrow K \rightarrow W \qquad (2)$$

That is, the cognitive transformation (T) function, in which each successive phase decreases entropy and increases the organization of sense.

Chaotic and organized information
The information occurs in two extreme states:

- Chaotic state—data without structure and relationships (cognitive entropy),
- Organized state—data ordered by units of cognition (semantic structures).

The equation can describe the process of transition between the two[1]:

$$\frac{dS_I}{dt} = -k \cdot \ln P \qquad (3)$$

Where:
S_I – information entropy,
P – probability of occurrence of a specific sense,
k – information coefficient (analogous to Boltzmann[2]'s constant).

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[1] The formula is a temporal version of Boltzmann's thermodynamic entropy, converted to "information entropy" by analogy only. This formula was later adapted by Claude Shannon (1948) in information theory in this form: $H = \sum_j p(j) log p(j)$where the symbol $p(j)$ stands for the probability of an event j occurring in the distribution of all possible events of the source of information. Skolei Shannon took from Hartley (1926) the formula for the information $I(j)=-log\ p(j)$. The smaller, the more information the symbol carries. For example, a message given on Monday that tomorrow is Tuesday has p=1, then the information has a value of 0, because $\log p(j) with\ 2^0 = 1$.

[2] The Boltzmann constant is a measure of order and chaos in nature — it appears in the formula for entropy: S = ln W, $k_B$where is entropy, and—the number of possible states of the system. Thanks to this, it combines information (the number of possibilities) with energy and matter. In quantum

In a state of wisdom, which means achieving cognitive balance. $S_I \rightarrow \min$
This formula expresses the relationship between cognitive order and the probability of sense:

- If a given sense is very probable ($P \rightarrow 1$), because when the basis of the logarithm = 2^0, ln =1
- $\frac{dS_I}{dt} \rightarrow 0$: the information entropy decreases – the cognitive system reaches a state of equilibrium, which is *wisdom*.
- If the sense is unlikely (P "1), ln $P < 0$ 2^0 =1
- $\frac{dS_I}{dt} > 0$: information entropy increases, the system enters cognitive chaos (misinformation or lack of understanding).

It means that the rate of change in the entropy of sense depends logarithmically on the degree of cognitive certainty. The logarithmic nature reflects the quantum nature of the interpretation process. Each decision of sense reduces the space of potential senses in a non-linear manner, analogous to wave-function collapse.

Physical and informational interpretation:
In classical Boltzmann physics:

$$S = k_B \ln W \tag{4}$$

Where: is the number of microstates of the system. In cognitive theory (the "-" sign means that information reduces entropy):

$$S_I = -k \ln P \tag{5}$$

It is an inverted law of entropy, because it is not the number of possible states that counts here, but the probability of a specific sense. This formula can therefore be interpreted as the equation of the collapse of sense: as it grows, the system "understands" more, entropy decreases — the information is ordered toward wisdom.

Philosophical interpretation:
This equation describes the dynamic process of moving from ignorance to understanding.

- Information entropy (S_I) is the "dark energy" of cognition—the potential for ambiguity.

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information theory, it can be said that the constant plays the role of the "Boltzmann constant of sense"–it defines the minimum threshold of cognitive chaos (entropy of sense), below which information becomes ordered and leads to wisdom. S W k_B κ

- The logarithmic dependence shows that a slight change in cognitive confidence has a significant impact on wisdom.
- The k coefficient plays the role of a "spiritual constant" that differentiates the ability of individuals or cognitive systems to process sense (analogous to cognitive capacity).

Chart in Figure 1. It shows how the rate of change in information entropy (dSi/dt) depends on the probability of sense (P): — on the left (P < 0.2)— cognitive chaos, high entropy, and low certainty of sense—on the right (P → 1) – the state of wisdom**,** where entropy decreases to zero, and sense becomes stable and complete.

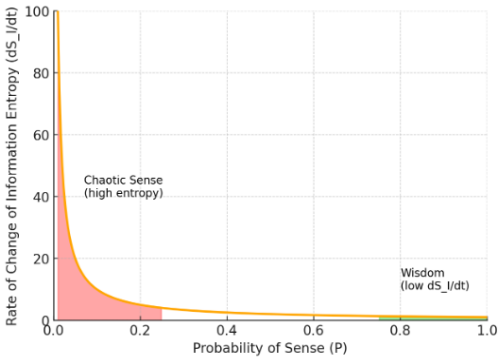

Figure1. Graph of the rate of change in information entropy

2. THE QUANTUM NATURE OF INFORMATION

According to the analogy with quantum physics, information can make sense resulting from the superposition of senses:

$$| \Psi_I \rangle = \alpha \, | \text{true} \rangle + \beta \, | \text{false} \rangle \qquad (6)$$

where:

$$| \alpha |^2 + | \beta |^2 = 1 \qquad (7)$$

- $| \Psi_I \rangle$ (psi) describes the state of sense of the information before interpretation,
- α, β - amplitudes representing the cognitive structure of expectations,
- The collapse into "truth" or "falsehood" occurs only when the mind performs a senseful act, i.e., decides.

Why are amplitudes squared?
Because in quantum reality, we do not observe the amplitudes themselves (α, β), but their energies, i.e., *probabilities*. In quantum physics, Niels Bohr's principle states:

$$P_i = | \psi_i |^2 \qquad (8)$$

That is, the probability of finding a system in each state is equal to the square of the amplitude of the state of the sense state before its collapse.
In quantum information, this means:

- $| \alpha |^2$ – the probability that a given sense will be interpreted as "true",
- $| \beta |^2$ – the probability that it will be interpreted as "false".

The square of an amplitude, therefore, is the amount of energy of sense (intensity of sense), not just its logical existence.
Significance for the logic of cognition
In classical logic:
Something is either true or false (value 0 or 1).
In quantum logic, sense:
An entity remains in a state of superposed truth and falsehood until it is interpreted, at which point a definitive meaning emerges through the collapse of sense.
The amplitudes α and β determine the degree of potentiality – how much "cognitive energy" a given interpretation has before it is resolved (through collapse). Only the cognitive act (measurement, interpretation, decision) reduces the superposition to a single value—*true* or *false*—with probability or $| \alpha |^2 | \beta |^2$

Cognitive interpretation of the collapse of sense

This equation (of truth and falsehood) describes the information state before the cognitive decision – a person, that is, his mind or AI, processes both senses, *truth and falsehood*, simultaneously, in a state of indeterminacy. Then the act of interpretation (measurement of sense) takes place:

$$| \Psi_I \rangle \rightarrow | \text{„true”} \rangle \text{ or } | \text{„false”} \rangle \qquad (9)$$

with probability or $| \alpha |^2 | \beta |^2$
It is the moment of collapse of sense in quantum information theory that replaces physical measurement in quantum mechanics.

Philosophical interpretation

The square of amplitudes means that cognition is not linear, but energetic – the greater the focus, context, and cognitive intention, the greater the "energy of truth." That is why he expresses the principle of preserving the total cognitive power: truth and falsehood do not disappear but coexist in the balance of the field of sense, in the following manner (since probability cannot be >1):

$$| \alpha |^2 + | \beta |^2 = 1 \qquad (10)$$

Summary

PHYSICAL CONCEPT	EQUIVALENT IN QUANTUM INFORMATION THEORY
Wave Amplitude (ψ)	The potential of information
Amplitudes of Truth and Falsehood	α and β
Collapse of the wave function	The act of interpretation (collapse of sense)
Physical measurement	Sense of the decision
State Energy	Intensity of sense (credibility)

- α represents *a bright wave of cognition*—the tendency of the information system to order, sense, and coherence.
- β represents *a shadow wave*—a component of uncertainty, error, paradox, and misinformation.
- Until the cognitive system (human, AI, civilization) *measures sense*, the two waves coexist—creating a cognitive superposition.
- The act of interpretation (the collapse of sense) reduces this state to a single value—true or false—with a probability determined by $|\alpha|^2$ and $|\beta|^2$.

The act of interpretation (cognitive measurement) causes the state to collapse to a specific sense:

$$\widehat{M} \mid \Psi_I \rangle \rightarrow \mid \phi \rangle \qquad (11)$$

Where:

$\widehat{M}$ it is the operator of cognitive measurement,
and this is the realized sense $\mid \phi \rangle$.

The interpretation is therefore probabilistic and depends on the observer's context – a human (analogous to Heisenberg's principle in quantum mechanics) or an artificial intelligence.

Organized Information Architecture
Hierarchy of information structures:

- Systems (S)—sets of related information pursuing a common goal,
- Subsystems (P)—specialized parts of the system,
- Microsystems (M)—operating units,
- Tokens (τ)—the smallest quanta of sense used in AI.

Mathematically:

$$S = \sum_i P_i, \quad P_i = \sum_j M_{ij}, \quad M_{ij} = \sum_k \tau_{ijk} \tag{12}$$

That is, every cognitive system is the sum of nested units of sense.

The energy of cognition and the entropy of sense
Information behaves like energy: it can be transmitted, transformed, but not destroyed. In a thermodynamic analogy, it has the following states:

UNIT	PHYSICAL EQUIVALENT	ENERGY FUNCTION
Data	Potential energy	Latent cognitive mass
Information	Kinetic energy	Movement towards interpretation
Concept	Force Field	Organization of the flow of sense
Knowledge	Dynamic Balance	Stabilization of cognitive structures
Wisdom	Minimum entropy	Optimizing understanding and acting

Objectives of Cognition: From Information to Wisdom
The previous approach has reduced the goal of cognition to two poles: informing (I_+) and disinforming (I_-). In quantum information theory, five goals can be distinguished:

SYMBOL	THE PURPOSE OF COGNITION	CHARACTERISTICS	PHYSICAL EQUIVALENT
I_+	Letting	Increase consistency and knowledge	Structured energy emissions
I_-	Disinformation	Introducing cognitive chaos	Energy dissipation
T	Transformation	Creating new states of sense	Phase transition
X	Transcendence	Model paradigm shift	Quantum leap
R	Reflection	Analysis and ethical control of cognition	Quantum Observer

Formally, the state of sense of information is as follows:

$$|\Psi_P\rangle = \lambda_1 |I_+\rangle + \lambda_2 |I_-\rangle + \lambda_3 |T\rangle + \lambda_4 |X\rangle + \lambda_5 |R\rangle \tag{13}$$

With the condition of normalization:

$$|\lambda_1|^2 + |\lambda_2|^2 + |\lambda_3|^2 + |\lambda_4|^2 + |\lambda_5|^2 = 1 \qquad (14)$$

Where:
Ψ: Wave function of sense

- It means the information wave of cognition — the whole state of potential senses before their interpretation (i.e., the collapse of sense).
- In physics, Ψ describes *the wave function of* a particle; in quantum information theory, it describes *the wave function of sense*, that is, the distribution of possible cognitive acts.

These are the amplitudes (weights) of the five possible cognition goals in quantum information theory. $\lambda_1, \lambda_2, \lambda_3, \lambda_4, \lambda_5$
We will explain:

1. λ_1– amplitude of the purpose of informing (organizing, conveying true information) $|I_+\rangle$
2. λ_2– amplitude of the purpose of disinformation (introduction of chaos, manipulation, noise) $|I_-\rangle$
3. λ_3– the amplitude of transformation (creating a new sense, changing the paradigm)$|T\rangle$
4. λ_4– amplitude of transcendence (going beyond the existing model, spiritual/metaphysical sense)$|X\rangle$
5. λ_5– the amplitude of reflection (meta-cognition, ethical and critical control of information)$|R\rangle$

And – as in quantum mechanics – we are not interested in themselves, but in their squared modules:λ_i

$$|\lambda_1|^2 + |\lambda_2|^2 + |\lambda_3|^2 + |\lambda_4|^2 + |\lambda_5|^2 = 1 \qquad (15)$$

That is: the entire cognitive act is a superposition of these five intentions, and their squares indicate the probability that the system (human, AI, society) will "ask" the world in a given mode: inform, disinform, transform, transcend, or reflect.

Examples of cognition goals

a. *Informing (I_+)–increasing coherence and cognitive order*

Goal: to transfer, organize, and expand the scope of knowledge; to reduce ignorance (information entropy).
Examples:

- Publication of a scientific discovery in a peer-reviewed journal that verifies facts and organizes the state of knowledge;
- Educational activity – a lesson, lecture, or textbook that transforms data into understandable information;

- A report by the central statistical office or Eurostat, which transparently presents data and enables public decisions;
- An ai message that reliably summarizes the source data (e.g., medical analysis).

The result: increasing the cohesion of the cognitive system and social trust.

b. Disinformation (I_)—introducing cognitive entropy

Objective: to disrupt or distort the cognitive process through manipulation, half-truth, or falsehood.
Examples:

- Political propaganda creating a fictitious picture of reality;
- Deepfake or manipulated video that evokes false emotions;
- Unfair advertising or "fake science"—e.g., fake results of sponsored research;
- Algorithms in social networks that amplify polarization by selectively suggesting content.

The result: an increase in information chaos and a loss of the ability to distinguish between truth and fiction (moral entropy).

c. Transformation (T) – creating new states of sense

Objective: to transform existing knowledge into new models of understanding; to initiate cognitive innovation.
Examples:

- The discovery of the theory of relativity revolutionized the previous concept of time and space.
- The emergence of open systems theory, cybernetics, or cognitive ecology which gave dynamics to systems.
- In artificial intelligence, developing a new neural network architecture that learns emergent relationships.
- In spirituality – reinterpretation of religious dogmas in the light of modern science.

The result: a paradigm shift, or a new "state of cognitive matter."

d. Transcendence (X) – changing the paradigms of existing models

The goal: to reach beyond the limits of rationality or empiricism – towards intuitive, metaphysical, or ethical cognition.
Examples:

- Works by Albert Schweitzer, Karl Jaspers, Pierre Teilhard de Chardin – combining science and spirituality;
- Mystical or artistic experiences that go beyond logical language;
- In science: hypotheses about the multiverse, quantum consciousness, or artificial self-awareness;

- In AI, the question of whether a machine can "understand" values or sense.

The result: expanding the boundaries of the field of cognition – creating new dimensions of sense and axiology.

e. Reflection (R) – meta-cognition and ethical control

Objective: to analyze the process of cognition itself; to distinguish its motivations, limitations, and effects.

Examples:

- The philosophy of science (Popper, Kuhn, Feyerabend) studies how knowledge arises and falls;
- Technology ethics—e.g., questions about responsibility for algorithms' decisions;
- Data quality control and AI audit (AI Ethics Audit);
- Spiritual and philosophical "examinations of conscience" of civilization (e.g., the integral ecology of Pope Francis).

The result: the cognitive system's self-awareness, which allows it to limit its own mistakes and abuses.

Mathematical model of cognition goals

Each act of cognition can be described as a vector in the quantum space of information:

$$|\Psi_P\rangle = \lambda_1 |I_+\rangle + \lambda_2 |I_-\rangle + \lambda_3 |T\rangle + \lambda_4 |X\rangle + \lambda_5 |R\rangle \qquad (16)$$

where:

λ_i are the amplitudes of the probability of achieving a given cognitive goal, and their sum meets the condition:

$$\sum_{i=1}^{5} |\lambda_i|^2 = 1 \qquad (17)$$

Thanks to this, it is possible to formally describe *cognitive equilibrium*—when the amplitude of information and reflection exceeds that of disinformation.

Example: Decision to introduce artificial intelligence into public education

Let's assume that we analyze the cognitive-social process of creating an "AI at school" strategy. Scientists, politicians, teachers, parents, and the media are involved in this process—each with a different cognitive intent. We can assume that the state of cognition of the entire decision-making system can be written as a superposition of the five goals of cognition:

$$| \Psi_P\rangle = \lambda_1 | I_+\rangle + \lambda_2 | I_-\rangle + \lambda_3 | T\rangle + \lambda_4 | X\rangle + \lambda_5 | R\rangle \quad (18)$$

Step 1. Determination of amplitudes (example values)
| The Purpose of Knowledge | Description in the context of AI in education | Amplitude (λi) | Probability (|λi|²) |

I_+| Informing the public about the opportunities and limitations of AI | 0.6 | 0.36 || | Media disinformation: AI as a "threat to children" or "a miracle solution to everything" | 0.4 | 0.16 || | Transforming Education: New Ways to Teach and Personalize Content | 0.5 | 0.25 || | Transcendence: A Reflection on the Sense of Humanity in the Age of Intelligent Machines | 0.3 | 0.09 || | Reflection: Ethics, Privacy, Right to Error, Data Control | 0.4 | 0.16 |I_TXR

Step 2. Normalization:

$$| \lambda_1 |^2 + | \lambda_2 |^2 + | \lambda_3 |^2 + | \lambda_4 |^2 + | \lambda_5 |^2 = 0.36 + 0.1 + 0.25 + 0.09 + 0.16 = 1.02 \approx 1 \quad (19)$$

(In practice, minor deviations result from measurement uncertainty—as in quantum physics).

Step 3. Interpretation

- The cognitive system (society, media, and institutions) is in a state of mixed cognition.
- Two goals dominate: information (36%) and transformation (25%), indicating significant development potential.
- However, disinformation (16%) and reflection (16%) balance each other—so the process can easily veer into chaos or dogmatism.
- Transcendence (9%) is low—few people ask *why we need all this*, i.e., about the sense of civilization.

Step 4. Request

The quantum model allows us to describe society as not simply "knowing" what it thinks about AI—it exists in a cognitive superposition until an act of "collapse" occurs (e.g., a government decision, a program reform). The structure of the amplitudes determines whether cognition will lead to wisdom (W) or to a new form of information chaos.

The principle of uncertainty of information

In quantum physics, Heisenberg's uncertainty principle states that it is impossible to determine a particle's position and momentum simultaneously and precisely. The measurement of one of these parameters inevitably affects the other, revealing a fundamental limitation of physical cognition.

$$\Delta x \cdot \Delta p \geq \frac{h}{4\pi}$$

Similarly, in quantum information theory, it can be assumed that information has a pair of complementary attributes: a cognitive goal and a form of transmission. The goal (e.g., informing, disinforming, transforming, etc.) corresponds to the position of the quantum of sense. In contrast, the form (e.g. dialogue, lecture, media, management, preaching) corresponds to its momentum, i.e., the dynamics of influence in the field of communication.
Their relationship can be summed up symbolically:

$$\Delta C \cdot \Delta F \geq \kappa \qquad (20)$$

Where: means the uncertainty of the cognitive goal, – the uncertainty of the information form, and (kappa) is a constant of the quantum field of sense, $\Delta C \Delta F \kappa$ which is the equivalent of the Boltzmann constant in physics. But in *quantum theory, quantum information* has an epistemic-semantic sense, not a physical one. It expresses the minimum threshold of uncertainty of sense—that is, the smallest possible "portion" of uncertainty in the relationship between *the goal of information* (*C*) and *the form of communication* (*F*).

This principle means that you cannot fully control what information means and how it works simultaneously. The more precisely its purpose is defined, the more unpredictable the effect of the form of communication becomes; The more ordered the form, the more open and indefinite the sense remains.

As a result, every act of communication becomes a measurement—a collapse of the function of the sense of information, in which potential senses pass into the reality of interpretation. Ultimately, information is not a fixed state, but a cognitive wave, the amplitude and phase of which depend on the relationship between the sender's intention (goal), the form of communication, and the act of reception (collapse).

The principle of information uncertainty sets the limits of cognition in the digital age: the more we seek to control information, the less truth remains in it. An example of which is the party's or state's proclaimed policy.

Philosophical variant

The same model can be used to analyze historical decisions, e.g.

- Introduction of nuclear energy,
- DNA discoveries,
- or in Poland, to the interpretation of educational reforms after 1989.

In any case, the "vector of cognition" $|\Psi_P\rangle$ can be broken down into ethical, pragmatic, transformational, and disinformation components, and examined to see whether the intellectual balance of a given civilization approaches the state of minimum entropy.

Amplitude of sense and correlation of information quanta

Every act of cognition can be imagined as a wave phenomenon: sense does not appear suddenly but spreads through the mind and culture like an energy wave in space. The amplitude of cognition is encoded in this wave – a measure of the intensity and direction of the sense of information. It is not a statistical number, but *the potential of sense*: semantic energy, which only in the act of interpretation (collapse) becomes measurable.

In quantum physics, amplitude determines the probability of finding a particle in a given state. In quantum information theory, the amplitude of cognition describes the force with which a given. λ_i cognitive goal – information, disinformation, transformation, transcendence, or reflection – participates in the process of creating sense. When cognition is "measured", that is, interpreted by a human, institution, or artificial intelligence, its potential collapses to its real value:

$$P_i = | \lambda_i |^2 \qquad (21)$$

Amplitude, then, is the cause, and probability is the effect; The first is the energy of sense, the second—its trace in the world of facts.

Waves of cognition

Each message, idea, or decision is an information wave with a specific amplitude of cognitive sense. When we speak, write, or analyze data, we produce interference—the overlapping of waves of sense. Two ideas with amplitudes $\lambda_1 \lambda_2$ can strengthen each other (if they are in phase, that is, they agree on the goal) or weaken each other (if they are out of phase).

For example:

- The idea "AI in education increases the availability of knowledge" (I_+) is reinforced with the idea of "AI personalizes teaching" (T),
- But it weakens with the idea of "AI will replace teachers" (I_-).

In this case, cognitive interference occurs[3]:

$$| \lambda_{1+2} |^2 = | \lambda_1 + \lambda_2 |^2 = | \lambda_1 |^2 + | \lambda_2 |^2 + 2 | \lambda_1 | | \lambda_2 | \cos \phi \qquad (22)$$

Where:

- ϕ means *the difference in the phases of sense* — that is, the degree of agreement or contradiction of senses.
- $\cos \phi$ - A measure of the interference of sense, from full agreement (1) to complete contradiction (–1).

[3] The first person to use the interference formula with the term, was Thomas Young (1801), and in quantum mechanics the full form of this formula was used by Dirac (1927–1930). Which I introduce in relation to wave quantum information. $2 | a | | b | \cos \varphi$

Cognitive interpretation:

- When $\rightarrow \varphi = 0 \cos \varphi = 1$
  The phases are consistent → constructive interference of senses reinforces each other: knowledge increases, entropy decreases.

Philosophical and cognitive interpretation:

- $\cos \varphi$ expresses cognitive coherence—that is, the degree to which different informational acts interact or collide in the field of consciousness.
- It is the equivalent of *the resonance of sense*: when the phases are in agreement, a new, stronger sense arises (integration of knowledge).
- When the phases are opposite, there is a collapse of sense, loss of sense, or the phenomenon of "cognitive destructive interference" (e.g., propaganda, paradox, contradictory interpretations).

Correlation of information quanta

In classical logic, a message is independent of others. In quantum logic, a message can be entangled with another—its sense depends on the accompanying sense. If two quanta of information and are correlated, the state of cognition is not the sum of their states, but a common function: *A B*

$$| \Psi_{AB} \rangle = \lambda_{AB1} | I_+ \rangle_A | I_+ \rangle_B + \lambda_{AB2} | I_- \rangle_A | I_- \rangle_B + \ldots \qquad (23)$$

In practice, this means that the sense of one concept depends on the context of the other. For example, the sense of the term "freedom" in the sentence *"freedom to teach"* differs from that of *"freedom from knowledge"*. Both information quanta are semantically entangled with each other – you cannot know one without influencing the other.

The correlation of amplitudes is therefore the way in which thought exists in complex social and cultural systems. In the information society, millions of quanta of sense are constantly entangled—through media, algorithms, emotions, and language.

When these correlations are ordered, they form a network of knowledge; when chaotic, information noise. Then the information is no longer a wave with a specific amplitude, but a collection of interfering noises that cancel each other out. Then civilization loses the ability to distinguish between information and disinformation, and thus the direction of cognition.

Measurement and collapsing of sense

The act of interpretation—understanding, deciding, choosing—is the equivalent of quantum measurement. When a human (or AI) performs an act of cognition, the state of superposition of the senses of information collapses: one possibility becomes reality, the others disappear. It is the moment when *possibility becomes a fact* and *amplitude becomes probability*.

However, cognition does not end at the moment of collapse. Each realized sense of information affects others, changing their amplitudes. In this way, the cognitive system—the individual, society, civilization – is constantly *reconfiguring*. It is this non-linear correlation of the quanta of sense that makes the cognitive process never stable: each new piece of information changes the amplitude distribution of all the others.

Cognitive energy and sense coupling

Each quantum of information carries a specific "cognitive energy," which can be approximated through information entropy:[4]

$$S_I = -k \sum_i P_i \ln P_i \qquad (24)$$

The more uneven the distribution of probabilities is, the greater the entropy, and therefore the less harmony of cognition. When the amplitudes of information quanta are synchronized, the cognitive system approaches a state of minimal entropy, which can be equated with wisdom. Then the correlation between the quanta of sense becomes positive: information does not compete but cooperates. An example is a scientist or teacher who combines data, ideas, values, and emotions into a coherent model—each element reinforces the other. In contrast, in a system dominated by propaganda or artificial disinformation, amplitudes diverge, leading to destructive interference and cognitive noise. P_i

Towards a quantum ethics of information

A crucial ethical consequence follows from the correlation of the quanta of sense: no act of communication is isolated. Every word, data, decision – even a single "token" – affects the entire cognitive system, modulating the amplitudes of other quanta. Responsibility for a word, science, algorithm, or politics is therefore not a matter of intention, but of the awareness of entanglement.

In this view, wisdom becomes a state of minimal cognitive entropy—an ordering of the senses of information that minimizes conflicts between quanta of information. It is a state in which correlations are harmonious, and amplitudes are in harmony. Then it can be said that *a wise civilization is one in which cognitive interference is constructive rather than* destructive.

Conclusion

The amplitude of cognition is a measure of the potential of the sense of information – the silent energy of thought, which in the act of

[4] This is due to Claude Shannon's 1948 design.

interpretation turns into fact, decision, knowledge, or wisdom. When the quanta of information are correlated with each other, the world becomes understandable; When the amplitudes of their sense enter destructive interference, chaos ensues. By measuring the amplitudes of cognition, we are not only measuring the power of information—we are measuring *the state of civilizational consciousness*. Because just as a physicist studies the waves of matter, the man of the 21st century must learn to study the waves of sense.

QUANTUM THEORY OF FORMS OF INFORMATION

Category: form of informing

Each act of communication can be assigned to one of six primary forms of information – differing in structure, intention, sender-receiver relationship, and "wave depth" of the message:

CATEGORY	EXAMPLES	DOMINANT FEATURES
A. Dialogic	Conversation, debate, consultation	exchange of amplitudes between peers
B. Monologue	Lecture, sermon, speech	Emission of strong, one-sided amplitude
C. Systemic	Management, Reports, Manuals	Structured, low-noise procedural information
D. Media	Press, TV, Internet, social media	Multi-source interference and chaotic superposition
E. Reflective	essay, meditation, art, poetry	Inner entanglement of senses – introspective information
F. Transcendent	Sermon, Prayer, Moral Manifesto	A message addressed to sense, not only to reason

Quantum characteristics of forms of information

Each form of information can be described as *a quantum state of the field of sense* of information with specific parameters:

- amplitude (|λ|)—the strength of the message,
- Phase (f)—specific purpose of the message (informing, disinforming, transformation, transcendence, reflection)
- form (r)—a specific form of communication (e.g., dialogue, monologue, system, media, reflection, transcendence, etc.)
- entropy (S)—the degree of chaos or order in a structure,
- Correlation (κ)—the ability to connect with other quanta of information.

Below is an overview of these parameters for each format:

A. Dialogic form—amplitude interference
Explanation: Two or more waves of sense overlap each other. Dialogue is a space of cognitive interference: amplitudes can amplify (when the interlocutors resonate) or abolish (when they exclude each other).
Quantumly, this can be written as follows:

$$| \Psi_{dialog} \rangle = \lambda_A | \phi_A \rangle + \lambda_B | \phi_B \rangle \quad (25)$$

Interference creates a new state of sense that cannot be assigned to either party separately. Dialogue lowers cognitive entropy—if amplitudes are in the realization phase of sense at φ ≈ 0—and increases semantic correlation κ.
Conclusion: Dialogue is the form closest to quantum entanglement in human communication—it generates a shared sense of information beyond the individual ego.

B. The monologue format—cognitive collapse
Description: The sender sends a strong information impulse – a lecture, a sermon, a speech. The recipient does not interfere but *measures* the message's collapse to its own sense.
Quantumly, this can be written as follows:

$$\hat{M}_{recipient} | \Psi_{speaker} \rangle \rightarrow | \phi_{interpretation} \rangle \quad (26)$$

A high amplitude of the sender (|λ| large) means high energy of the message. Still, the lack of feedback increases the risk of losing the realized sense (φ) – the message can "dissipate" in different interpretations.
Conclusion: A monologue is an intense wave, but short-lived—effective in transmitting, weak in consolidating wisdom.

C. Systemic Form—Quantum Order
Description: In management, administration, and science, procedural information dominates, in which sense is controlled by structure (scheme, regulations, algorithm).
Quantumly, this can be written as follows:

$$|\Psi_{sys}\rangle = \prod_i \hat{O}_i |\phi_i\rangle \quad (27)$$

where $\hat{O}_i$ are the operators ordering the information quanta (the components of the system)? Such a message minimizes entropy, but also reduces amplitude–the sense becomes predictable, but not creative.
Conclusion: The systemic form stabilizes information but suppresses creative fluctuations–it is necessary for order, but not sufficient for development.

D. Media format—chaotic superposition
Explanation: In media and social networks, news waves superpose billions of signals, each with a small amplitude, but the combined effect is enormous. Quantumly, this can be written as follows:

$$|\Psi_{\text{media}}\rangle = \sum_i \lambda_i \, m^{i\phi_i} \, |\phi_i\rangle \qquad (28)$$

This formula provides a complete, quantum description of the media field of information transmission — that is, how different messages, styles, and communicative intentions affect the *wave of sense-making* in public space. Let us explain step by step what the pointers and elements of this equation mean, especially the power of the form of $m^{i\phi_i}$.
Structure of the equation
It is an extension of the quantum state of media information in the database, where:

- $|\Psi_{media}\rangle$— it is the state of the entire media field, the sum of all possible formats and goals of communication,
- λ_i— information amplitude (strength, share, energy of a given channel or form of communication),
- $m^{i\phi_i}$— a factor describing the modality of transmission (moment, tone, emotion, or context) of the message,
- $|\phi_i\rangle$— the state of the realized sense of information — thanks to a specific form of communication (e.g., dialogue, monologue, system, etc.).

What does power mean $m^{i\phi_i}$
An expression is a complex form of cognition, fundamental in quantum mechanics and adapted in this theory of the sense of information[5].
By definition:

$$m^{i\phi_i} = \cos\,\phi_i + i\sin\,\phi_i \qquad (29)$$

It follows that each component of the message has two coexisting parts:

- real (cos φi) – representing rational, logical sense,
- imaginary (sin φi) – representing the emotional, symbolic, or metaphorical component of the message.

Together, they create the modality of the message, i.e., its *cognitive intonation*.
The importance of modality in the media field
The realized sense of information ϕ_i determines the cognitive moment and the direction of the resonance of the sense because of the use of a specific format of communication:

[5] Euler created the mathematics of the complex phase, Schrödinger introduced it to the wave function, and Dirac gave it a fundamental quantum sense.

- Two messages with a similar modality of cognition (e.g., concordant narratives) interfere constructively — they reinforce sense,
- Messages about the opposite modality of cognition (e.g., ideologically contradictory) interfere destructively — they weaken or abolish sense.

That is why the media can create either social resonance (shared sense) or information chaos (decoherence of sense).

Importance of the index i

Index means that the sum runs across all types or channels — examples of i:

- i=1: news
- i=2: social media,
- i=3: science
- i=4: religion
- i=5: art, etc.

Each has its own amplitude. λ_i and realized sense ϕ_i.

Cognitive interpretation

In quantum information theory, this equation states that the media field is *a superposition of all possible communication modes*, each with its own modalities and amplitudes. The collapse of sense (that is, the moment when a society adopts a single interpretation) occurs when the modalities of sense from different sources are synchronized.

If the phases (goals of cognition) and modalities (forms of communicating media) are random, a decoherence of the sense of information arises – the lack of a typical cognitive structure. Information noise is created, i.e., a state of high cognitive entropy.

Conclusion: The media function as a "quantum field" without measurement – full of potential senses that disappear before they are interpreted. It is the biggest challenge of the digital age.

E. Reflective Form—Internal Interference

Description: Essay, poetry, philosophy—these are the forms in which the sender and receiver are the same consciousness. Information circulates within the cognitive system, producing auto-entanglement.

Quantumly, this can be written as follows:

$$| \Psi_{ref} \rangle = \lambda_{int} | \phi_{mind} \rangle + \lambda_{meta} | \phi_{conscience} \rangle \qquad (30)$$

Internal interference lowers the entropy of the sense of information—it leads to cognitive resonance, which can be equated with wisdom.

Conclusion: Reflection is the most stable form of information, with low entropy and high coherence; it is a quantum balance between cognition and being.

F. Transcendent Form—Long Wave Resonance
Description: A sermon, a prayer, an ethical or prophetic manifesto – a message addressed not only to reason, but also to conscience, to a "field of sense" larger than the individual.
Quantumly:

$$| \Psi_{trans} \rangle = \int \lambda(t) m^{i\phi(t)} dt \quad (31)$$

It can be interpreted as a continuous superposition of dynamic states in which amplitude and modality change over time. Let us explain step by step:
Sense of individual ingredients:

- $| \Psi_{trans} \rangle$—is a "transformed" state (e.g., transformed, transient, or composite), which is the result of summing up all the instantaneous contributions of the state over time.
- $\lambda(t)$—a function of amplitude (modulus) over time, which determines the strength or intensity of a given instantaneous state.
- $m^{i\phi(t)}$—a modality factor (forms of information), representing the oscillating nature of information (as in quantum waves or interference signals).
- dt —an element of time, which in the integral means continuous summation after all moments *t*.

Why does the integral appear?
The integral means that the state $| \Psi_{trans} \rangle$ does not arise in one moment but is the sum of all the momentary contributions—it is as if you were putting together a film of individual frames.
Mathematically, it can be written like this:

$| \Psi_{trans} >=$ sum (denoted by integral) of all temporary states $\lambda(t) m^{i\phi(t)}$ (32)

In quantum physics and information theory, this means that the process of transformation (e.g., the flow of information or its energy) extends over time, and its total effect results from the interference of these forms of cognition.

Informative interpretation
In quantum information theory, this can be understood as follows:

- $\lambda(t)$—the intensity of sense (how much a given moment of cognition brings sense),
- $\phi(t)$—the realized sense, i.e., its direction of cognition
- Integral – the process of accumulation and interference of senses in time, leading to the creation of the resulting state of information.

In quantum matter, the integral builds a state from the superposition of waves of different frequencies. Here, it builds a state from various formative relationships. If it is a long-length, low-frequency wave, then it is "long-range"

information that can last for generations (e.g., the teachings of Fr. Piotr Skarga, the Gospels, the Decalogue).
Conclusion: The transcendent form is a "standing wave" in the field of sense of civilization—it has the most remarkable ability to perpetuate values.

Interdependence of forms: cognitive interference
In practice, no form of information works in isolation. A conversation (A) can turn into a lecture (B); media (D) reinterpret the sermon (F); reflection (E) becomes a system (C). Their amplitudes interfere, creating a complex cognitive landscape of civilizations.
Mutual reinforcement or extinction depends on the phases of their sense:

COMBINATION	INTERFERENCE EFFECT
A + E (dialogue + reflection)	Cognitive resonance – wisdom is born
B + D (monolog + media)	Reinforces information chaos
C + F (System + Transcendence)	Creates ethical institutional governance
A + D (dialog + media)	Generates polarization and noise
E + F (Reflection + Transcendence)	Leads to a culture of deep sense

Conclusion: form as a quantum state of sense
In quantum information theory, the form of information is not just a carrier of content—it is *an operator of cognition* that changes the state of information, its energy, and direction. Each way of speaking, writing, teaching, or managing acts as a quantum filter that modulates the amplitude of sense and its moral phase.
So we can say:
The quantum phase of information concerns content, but the form organizes the sense of information. And in the quantum age of information, form becomes *somewhat equivalent to content* – both are interdependent quanta of cognition. This assumption confirms the intuition of McLuhan, who in the 60s of the twentieth century announced the famous sentence:

"The medium is the message"
McLuhan noted that it is not the content itself, but the medium—the form of communication—that shapes our way of thinking, our perception of time and space, and even the ethics of communication. Today, we can say that he was right in the quantum sense. Each medium has its own amplitude of sense (having energy), i.e., a characteristic cognitive wave that affects how we perceive reality.

- The book generates long, coherent waves of sense (low entropy, high wisdom).
- Television—short and intense waves (high amplitude, low reflectivity).

- Social media—billions of tiny quanta of sense in superposition (maximum entropy).

As a result, this medium shapes the amplitude of cognition—that is, it decides whether the information becomes knowledge, emotion, illusion, or wisdom. Thus, McLuhan predicted that in the future (i.e., today) form and phase (content) would become inseparable quantum states of communication**:** one does not exist without the other, and each influences the phase and correlation of the other. In this sense, the modern "quantum theory of information" develops his thought:

- Where McLuhan spoke of *a medium*, we speak of *a wave of information format*;
- Where he saw the *transmitter of culture***,** *we see* the *operator of sense***.**

The evolution of the goals of cognition in civilization

AGE	THE DOMINANT GOAL OF COGNITION	CHARACTERISTICS
Antiquity (Socrates, Aristotle)	Reflection (R)	Knowledge for virtue and the common good
Middle Ages	Transcendence (X)	Getting to know God and the sense of existence
Modernity (Bacon, Newton)	Notice (I_+)	Empirical and applied cognition
Twentieth century (technocracy)	Transformation (T)	Innovation and control over nature
The 21st century (digital age)	I_+–I_- hybrid	Coexistence of knowledge and disinformation, the need for reflection (R)

From 2040 to 2050, the goal of cognition is likely to be integrated wisdom (W)—the process that combines all five goals of informing into a dynamic balance.

Towards quantum epistemology

Just as quantum mechanics allows us to predict new states of matter, quantum information theory enables us to predict and organize new states of sense. The information may:

- Interfere (connecting senses),
- Tunnel (jump between contexts),
- To get entangled (to create networks of interdependent ideas),
- To collapse (to realize oneself in interpretation).

In this way, cognition becomes a quantum process—relational, probabilistic, and intentional.

IMPLICATIONS FOR AI

Generative AI works in the spirit of quantum epistemology:

- It operates on tokens as superpositions of senses,
- Uses contextual probability features,
- It generates sense through semantic collapse.

Consequently, humans and AI coexist in the same *field of quantum information*, differing only in motivation: ethical (human) or statistical (AI).

Implication: From Quantum Matter to Quantum Sense
The quantum theory of information shows that information—like matter—has *a dual nature*: wave and partial, potential and actual, chaotic and ordered. The path from data to wisdom reflects the transformation from indeterminacy to stability. Wisdom is a state of minimal cognitive entropy – a balance between knowledge and values.

Integrating quantum matter with quantum information by integrating the cognitive goal with the information format
In classical theories of communication, information is described as content transmitted through a specific channel. In the quantum theory of the sense of information that I develop, information is not just a package of data, but an epistemic state that arises through the interference of two factors: the cognitive goal and the communicative format. Only their combination—mathematically described as a tensor product—creates a complete form of a message, capable of the collapse of sense.

Goal has a phased nature of information
Every communicative act is embedded in a specific purpose of the sender: to inform, persuade, interpret, mobilize, entertain, provoke, or legitimize. The goal is therefore not a side parameter, but a phase function that gives the message a cognitive direction.
A vector describes the goal in phase space:

$$|\kappa_g\rangle,$$

Where the index (g) is the type of goal, and the format factor:

$$m^{i\phi_g}$$

It expresses *cognitive modality*, i.e., the attitude of sense that determines the subsequent interference of information.
The goal models the intention—that is, "what the message is supposed to do" with the mind of the recipient.

Format as a supporting infrastructure of sense
At the same time, there is an independent dimension of the format: monologue, dialogue, debate, column, reportage, panel, academic narrative, emotional narrative, etc. In this theory, format is not a stylistic accessory, but a supporting infrastructure that shapes the course of the collapse of sense. The format is represented as a vector:

$$|\lambda_f\rangle$$

Where index (f) denotes the type of form. On the other hand, the amplitude (λ_{gf}) corresponds to the coupling strength of a given goal with the selected form.
The format determines how the sense is generated and what interpretive course is appropriate for a given message.

Tensor product of goal and format
The whole state of quantum media information arises only when the two dimensions are tensor-connected:

$$|\Psi_{\text{media}}\rangle = \sum_{g,f} \lambda_{gf}\, m^{i\phi_g}\, |\kappa_g\rangle \otimes |\chi_f\rangle. \tag{33}$$

Tensor($\otimes$) means:

- A multiplication operation that creates **a new space**, larger than the two previous ones.
- Purpose and form are independent dimensions,
- Their combination is not a simple multiplication,
- A new space of communication states is created,
- Each message is a combination (goal, form), not a reducible value.

It is thanks to the tensor structure that it is possible to describe cognitive interference—a phenomenon in which the duplicate content takes on different senses depending on the relationship between goal and form. As illustrated in Table 1.

Table 1. Example of tensor multiplication by formula [33]

Objectives\ Forms	Monologue	Dialogue	Debate	Negotiation / Deliberation
Inform	Information monologue (announcement, announcement)	Information dialogue (interview, Q&A)	Factual debate	Working briefing (reconciliation of facts)
Explain/Teach	Explanatory lecture	Explanatory tutoring/mentoring	Problem seminar	Educational arrangements Workshop
Convince	Persuasive speech	Persuasive conversation	Persuasive debate	Persuasive negotiations
Provoke / Mobilize	Mobilizing speech	Mobilizing/provocative dialogue	Provocative debate	Mobilizing prognosis (call to action)

Interference of Sense as an Effect of the Coupling of Two Spaces
Since the format amplitude has the form:

$$m^{i\phi g}$$

Different goals can interfere constructively or destructively, just as the waves in classical Young's interference or the quantum amplitudes in Dirac's formalism.
As a result:

- The exact words can carry different senses,
- Different forms can strengthen or weaken intent,
- The viewer experiences a collapse of sense dependent on the interference of both dimensions.

It explains why: A persuasive monologue differs from a persuasive dialogue–informing in the form of a debate has a different effect than informing in the form of a reportage—provocation in the form of a dialogue works differently than provocation in the form of a monologue.

Significance for Modern Media
In an age of message overload, the role of purpose and format becomes crucial. It is not the content, but *the modality and infrastructure of the message* that determines what sense will be interpreted.
This theory of quantum information of sense indicates that media do not only transmit information—they transmit cognitive states whose sense is the result of interference between:

- the goal phase,
- the infrastructure of form,
- amplitude weight,

- and the context of the recipient.

Therefore, the analysis of the message must include both dimensions simultaneously.

Update of Einstein's equation: since information is a form of energy

Modern knowledge indicates that matter and information are not separate entities, but two forms of the same energy—as Einstein wrote, *"energy and mass are equivalent"*. ($E = mc^2$). In terms of quantum information theory, it can be added that this energy also has an informational dimension, which leads to the equation:

$$E = mc^2 = I\, k_q T \qquad (34)$$

where:

- I means information contained in a system (measured in quantum units of sense),
- k_q– quantum information constant (analogous to Boltzmann's constant),
- T– information time and other (as below), i.e., the period of his dynamic cognitive activity.

What does T mean?

- T = Information Transformation Time (Sense Time). T is the temporal dimension of transforming information into sense, that is, the period during which information *acts*, *organizes,* or *changes the state of a system*. It is epistemic time, not physical time. It answers the question: How long does information act to produce energy of sense.
- T = Information Temperature (Processing Intensity).
  Where:
  - the degree of stimulation of the information system,
  - the intensity of information exchange,
  - the speed of "boiling sense",
  - Then: Ik_q is the informational equivalent of free energy in physics.
- T = Evolutionary dimension (direction of change of information). It is the fourth dimension of quantum information theory—the direction in which information:
  - Grows,
  - Fades,
  - Organizes itself,
  - Collapses into sense.

Why is T needed?
For I (information intensity) to pass into energy, *duration*—processuality—is needed:

$$E_{info} = Ik_qT \qquad (35)$$

Without T, information would be "dead", unable to work, untranslatable into the energy of sense. T gives dynamics to information, just as time gives momentum to motion.

Towards the Theory of Everything (ToE)
With the help of cybernetic modeling, we will develop the architecture of the Universe to arrive at a theory of everything by integrating quantum matter with quantum information. The cybernetic, as a graphical model, enriches the existing research of astrophysicists, which is based on mathematical modeling of a fixed composition of four material forces: weak, strong, gravitational, and electromagnetic. On the other hand, graphical modeling highlights the shortcomings of the existing modeling. It detects other forces and the role of the info-communication process.
The model in Fig. 2 highlights the main forces that govern the world and the roles of intelligent control of these forces through info-communication processes.

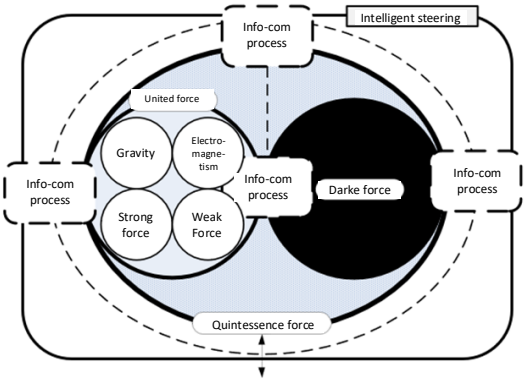

Figure 2. The role of intelligent control of the information and communication process is controlling the operation of the seven forces of the world.

On the other hand, the model in Figure 3 synthesizes these forces and shows that there are 7 of them, i.e., 3 more, which astrophysicists have been operating with so far. It detects the unifying, quintessential, and dark forces. Therefore, their efforts to define a GUT (the Great Theory of Unification) that would integrate these four material forces are in vain.

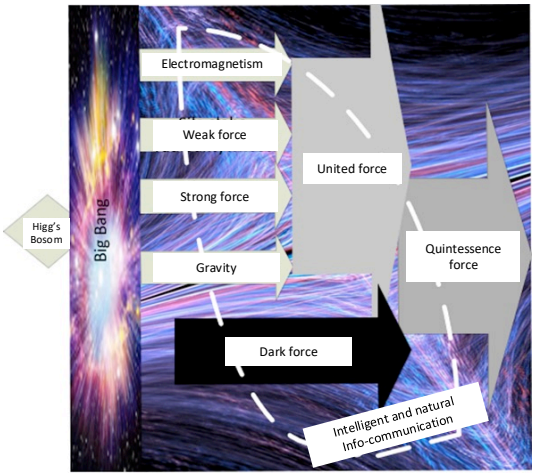

Figure 3. The dynamics of the seven forces of the Universe, which form the basis of GUT (Grand Unified Theory = Grand Theory of Unification), when integrated with the info-communication sense, lead to TOE (Theory of Everything).

From the considerations so far, it follows that *every material system has an information potential*, which manifests as a quantum field of sense. In the context of Figures 2 and 3 of the "Architecture of the Universe," the dynamics of the seven forces of nature can be written as a function of information energy:

$$F_i = -\nabla\Phi_i + \frac{dI_i}{dt}, \tag{36}$$

Where:

- F_i - the i[th] force of the Universe (e.g., gravity, electromagnetism, weak, strong, dark, quintessence, informational force),
- Φ_i – the potential of the field,
- $\frac{dI_i}{dt}$ – a stream of information affecting the change in the state of energy.

In dynamic equilibrium, the sum of all forces balanced by information flows is (in vector notation[6]):

$$\sum_i \vec{F}_i = \frac{d\vec{I}_{\text{tot}}}{dt} = 0 \tag{37}$$

[6] Writing an equation in vector notation means that all the quantities in this equation have a direction and a turn—they are not ordinary numbers (scalars), but vectors in space. So they must be summed and differentiated as vectors – and equality to zero means full directional equilibrium in the state space.

Which describes the state of information-material equilibrium – the equivalent of the state of minimal entropy in the theory of cognition. When $\frac{dI_{tot}}{dt} > 0$, there is an expansion of the Universe (expansion of the information field), and when $\frac{dI_{tot}}{dt} < 0$ – it's the contraction of the Universe or collapse of sense.
In terms of information, it can be read as follows:

- $\vec{F}_i$— are local "forces of sense" (factors that change the direction or intensity of sense in a system, under a vector notation),
- $\vec{I}_{\text{tot}}$— total vector of information flow throughout the system,
- The equation states that when the sum of all sensory-creative interactions is balanced, the information system reaches a state of stable interpretation—no new senses arise or disappear.

It means that the total impulse (or momentum) of the information is constant, and the tot index (from *total*) indicates the sum of all components of the system—the total state, not the local state.

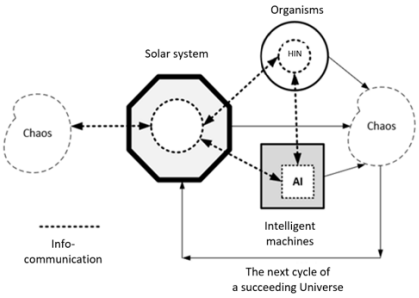

Figure 4. Universe Architecture Series (HIN-Higher Intelligence, AI-Artificial Intelligence)

The cybernetic model in Figure 4 of the Universe Architecture Cycle shows the *role of info-communication control* as a process that synchronizes the flow of energy and information between quantum matter systems. Formally, this can be summed up by the equation of information control:

$$\frac{dI}{dt} = \alpha \nabla \cdot (c\,\Psi) \qquad (38)$$

Where: Ψ is the information wave (a function of the state of sense), and α – the coupling factor of intelligent control (equivalent to the system's ability to self-regulate). Growth of α corresponds to the increasing coherence of the Universe—a state in which information and matter are synchronized, and physical and cognitive phenomena become one function of evolution. c = the *rate, velocity, or intensity* with which the information field Ψ spreads through space.

Understood in this way, the integrated theory of quantum matter and quantum information creates a generalized version of Einstein's theory – covering not only energy and space-time, but also information as the third dimension of existence. It can be written symbolically:

$$E^2 = (mc^2)^2 + (Ik_qT)^2 \tag{39}$$

It expresses the coexistence of material and informational energy in a single, non-linear structure of the Universe. In the state of information equilibrium, both terms are harmonized ($E_m = E_I$), while in the state of expansion ($E_I > E_m$). There is an expansion of space, according to Einstein's and Hubble's cosmological observations, but extended by the cognitive dimension.
This formula extends Einstein's relativistic energy formula, and the squares on both sides have profound physical and structural significance. Let's explain step by step.

Classic pattern form
Einstein's equation for the total energy of a (relativistic) system is:

$$E^2 = (mc^2)^2 + (pc)^2 \tag{40}$$

Where:

- E—total energy,
- m—rest mass,
- p—momentum,
- c—the speed of light.

This equation combines the resting energy (mc^2) with the energy of motion (pc) into a single geometric whole —like Pythagoras' theorem:

$$E^2 = E^2_{\text{resting}} + E^2_{\text{motion}}. \tag{41}$$

That is why there is a square form—to combine quantities of different types (energy and momentum) in a geometrically consistent way.
In the quantum version of the information:

$$E^2 = (mc^2)^2 + (Ik_qT)^2 \tag{42}$$

The second component is the quantum-information analogue of momentum: (Ik_qT)

- I– information intensity (information pulse),
- k_q– the quantum constant of information (analogous to),k_B
- T– time, temperature, or period of transformation of sense.

Therefore:

$$E^2 = (mc^2)^2 + (Ik_qT)^2 \tag{43}$$

It plays the role of a dynamic component of information energy, just as *pc* it plays the role of kinetic energy in relativistic physics.
Why are both sides squared?

(a) For geometrical reasons.
The equation has a Euclidean (Pythagorean) structure in four-dimensional space [time–total energy–mass energy (mass being), information energy (sense being)]. Squares allow you to "add" quantities that differ in direction or dimension—the total energy is then the length of the vector in the energy space:

$$E^2 = E_{\text{resting}}^2 + E_{\text{inform}}^2 \qquad (44)$$

Without squares, it would not be possible to add these quantities.

(b) For physical reasons
Squares eliminate negative signs and ensure that:

- energy is always a positive quantity (regardless of the direction of information flow),
- time symmetry is maintained (both for $+T \; and \; -T$)
- The duality between mass energy and information energy can be described without a unit collision.

(c) For information purposes
In quantum information theory, squares mean:

- real (measurable) values of the energy of sense, because the moduli of the squares of amplitudes are always observable,
- Thus E^2 it corresponds to the "density of sense," just as $|\Psi|^2$ it corresponds to the probability density.

General interpretation

$$E^2 = (mc^2)^2 + (Ik_qT)^2 \qquad (45)$$

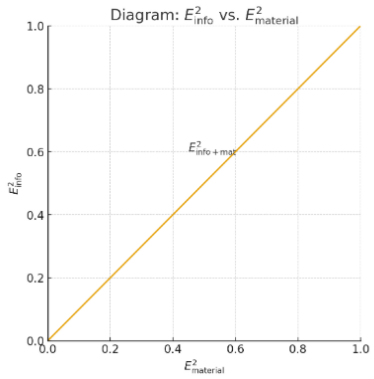

Figure 5. Summation chart of material and informational energy (E_{tot})

can therefore be read as:
The total energy of being (or sense) is the geometric sum of two components:

- energy encoded in matter (mass),
- and the energy encoded in the flow of information (the impulse of sense, time, the temperature of cognition).

Metaphorically:
Just as in physics, matter and motion are two sides of the same energy, so in quantum information theory, matter and information are two forms of the same quantum reality of sense, and their combination requires square geometry.

Conclusion
1. The Universe is an information-material system in a state of dynamic equilibrium
From the equation (in vector notation):

$$\sum_i \vec{F}_i = \frac{d\vec{I}_{tot}}{dt} = 0 \qquad (46)$$

It follows that matter and information are two aspects of the same energy of existence. The balance of physical forces (gravitational, electromagnetic, etc.) is only possible thanks to the flow of information that synchronizes it. When this flow is positive, the Universe expands—both cosmologically and cognitively; when negative, there is a collapse of energy and sense.
Conclusion: The Universe maintains stability not only through the laws of physics but also through the flow of information – it is a self-regulating information-energy system.
2. Information acts as an equivalent agent of energy and matter
Extended Energy Identity Equation:

$$E^2 = (mc^2)^2 + (Ik_qT)^2 \qquad (47)$$

It shows that information has an energetic dimension and can affect physical and cognitive processes. Increasing informational order (coherence) raises the level of organization of matter, from atoms to biological and social systems.
Conclusion: Information is not just a description of the world, but its active component — it co-creates matter, energy, and consciousness.

3. The evolution of the cosmos and man has a standard information code
The equation describes info-communication control:

$$\frac{dI}{dt} = \alpha \nabla \cdot (c\Psi) \qquad (48)$$

Shows that the Universe develops through an increase in the coefficient of coherence α — that is, the ability to intelligently self-organize. In the biological and civilizational dimension, this corresponds to the development of consciousness, wisdom, and the ability to cooperate.
Conclusion: The growth of wisdom in cognitive systems (human (WIN), AI, civilization) is a continuation of the cosmic process of ordering information — the evolution of spirit is a natural extension of the evolution of matter.

How the energy of the material quantum is added to the energy of the information quantum
Example with NVIDIA shares.
In the Theory of Everything, the energy of every phenomenon has two components:

1. Material energy – related to real, measurable parameters of the system (here: capitalization, revenues, technology, products).
2. Information energy
   – related to the influx of information that changes the interpretation of the value of the system (here: government decisions, licenses, regulations, market narratives).

Together they form:

$$E_{\text{tot}} = E_{\text{mat}} + E_{\text{info}} \qquad (49)$$

In the financial market, NVIDIA's capitalization is an example of material energy—it results from real products, the computing power of its GPUs **(**Graphics Processing Units, i.e., specialized computing chips designed to perform parallel AI calculations very quickly), and actual market-driven demand. It is the energy of "mass" that exists independently of interpretation.
However, at some point, information emerges: the government is limiting export licenses and imposing high tariffs on imports of digital components. This information acts as *a quantum impulse of sense*: it changes investors' perceptions and shifts the market into a new state. Although it is non-material

information, it has energy — it transforms expectations, business models, and therefore the valuation of shares.
As a result:

$$E_{\text{tot}} = E_{\text{mat}} + E_{\text{info, (regulations, market)}} \quad (50)$$

The value of stocks is rising not because there are physically more chips, but because there is more information that changes the interpretation of future earnings.
It is a classic case where:

- material quantum (real value of products)
- information quantum (government decisions, narrative, flow of sense)

They add up, creating a spike in the system's total energy—that is, an increase in the stock's valuation.
Because financial markets are a pure implementation of the principle of the ToE:
Material energy + Information Energy → Valuation Energy.
The market responds not just to a company's output, but especially to what is known and believed about it.
Gold Example

- The material energy of gold is stable. The information energy of gold is unlimited. And their sum creates its real value.
- So gold is valuable not because it is heavy, but because it carries a gigantic energy that organizes human decisions.

The example of TESLA

- Tesla is a material company only in its factories.
- On the stock exchange, it is an information company.
- And its real energy is the sum of both.
- Example of war in Ukraine
- Ukraine won with information energy (the role of President Zelenskyi), which it could not win with material energy.
- And the West added matter to it thanks to the power of this information.

An example of China's role in the 21st century

- China, as the World Factory
- with the power of narrative and standards and the wisdom of its sages ("win a war without a battle"),
- to co-create the global rules of the 21st century.

Most studies on human longevity point to a particularly important, if not the most important, factor [e.g., according to Japanese studies (ikigai harmony) and the Harvard Study of Adult Development (Vaillant 2012)]: having a sense

of life and of the next day. This kind of sense strengthens the energy of life towards the activity of actions and relationships, which prolongs life.

How quantum information can develop the queen of sciences, which is philosophy, i.e., the love of wisdom, the highest possible sense of people's lives.

First, we will give its quantum definition:

Philosophy is the process of harmonizing the amplitudes of sense in the search for wisdom — the love of order in the information field of the world.

With *Homo sapiens*, we may become *Homo sapientiae harmonicus* = **a** *Man of wisdom and balance*, who can transform information into order, knowledge into compassion, and technology into a tool of development, but not destruction. Therefore, philosophy can develop in the following ways:

i. Metaphysics and ontology

- Relational beings (ontology of states, not substances): we describe what exists as *a network of information states* and their correlations (entanglements), not as "self-contained" things.
- Informational monism/processualism: events are "collapses of sense".
- Potential layer: the superposition of states gives rise to an ontological space of possibilities, not a "lack of knowledge". The philosophy of possibility (Aristotle) regains its formal apparatus.
- *Epistemology*
- Cognition as a measurement: The cognitive act acts as an operator: $\widehat{M}$ — *context* and *intention* co-create the outcome. The classic ideal of "knowledge from nowhere" gives way to precise contextualism (the so-called *"connecting the dots"*).
- Probability of sense: the thesis introduces $P_i = |\lambda_i|^2$. The rationality metric allows us to evaluate and contrast the "energy" behind different cognitive goals, such as informing, misleading, transforming, transcending, and reflecting.
- *Philosophy of mind and consciousness*
- Correlation instead of location: We model mental content as patterns of information correlation (not "representations in a box").
- Naturalization of intention: The amplitudes and phases of "cognition goals" can give a formal description of intentionality (why the thought is "directed at something").
- *Logic and methodology*
- Multivalued/quantum logics: formalize *the superposition of truth* before interpretation, while truth in ToE appears as a limit (after the collapse).

- Probabilistic-operational method: humanities studies can use vectors of states of sense and normalization to compare discourses, narratives, and doctrines.
- *Philosophy of science*
- Complementarity of paradigms: classical and quantum models are *complementary* descriptions of the same informational reality.
- Forecasting "states of information": just as we predict states of matter, we can design states of information (ecosystems of knowledge, public policies, education, and so forth).

New theses that philosophy can adopt

1. The thesis of information correspondence: truth = high correspondence of distribution of sense between models, data, and practice (coherence + pragmatics).
2. The wisdom thesis of minimal entropy: wisdom is the ability to organize the field of sense in such a way as to reduce chaos without suppressing pluralism.
3. The thesis of entangled responsibility: each word/algorithm changes the amplitudes of the others—the ethics of communication becomes the ethics of *interference*.

CONCLUSION

- If the twentieth century quantized matter, then the twenty-first century faces the task of quantizing sense, understood as a structural property of information systems. It means a shift in philosophy towards *information physics*, in which the waves of sense are subject to the same laws of interference, superposition, and collapse as the waves of matter.
- Understanding cosmic evolution requires analyzing the "black box" of the Universe, i.e., those processes in which local gradients of information and fluctuations in entropy generate increasingly complex configurations. Complexity here is not an accidental result of chaos, but the result *of the action of informational organizing fields* that direct the system towards states of higher coherence.
- The first living cell was created through a sequence of information transformations in an environment with a high density of chemical data. Analysis of these processes indicates that life originated where channels with minimal noise appeared, capable of maintaining and reproducing patterns – in other words: where there was *a stable flow of information*.
- The processes of Darwinian natural selection can be reinterpreted in terms of information theory as mechanisms for code optimization and entropy reduction. The apparent randomness of mutations is compensated for

by systemic pressure to increase the body's informational efficiency, leading to structures of high complexity and coherence stability.

- The question arises whether there is a form of external or emergent control of the flow of information, analogous to *the operators of evolution* in quantum mechanics [e.g., the Higgs boson supports the Standard Model because it proves that particles gain mass (almost at 0 time[7]) from the Higgs field, precisely as the theory predicted]. *In the Theory of Everything, the Higgs mechanism can serve as the bridge linking quantum fields of gravitation and information by treating mass-generation as an emergent, energy-informational process embedded in the Universe's fundamental fabric.* It may even imply the existence of higher-order rules governing the direction of sense propagation in biological, technological, and social channels.
- The transformation of life cannot be fully explained in terms of classical matter, as it requires a model that accounts for both energy and information flows. Information acts as *a control field, reducing chaos and maintaining the system's structural order.*
- The use of the term "control" in the context of information physics suggests the existence of signals with a specific channel capacity, bandwidth, and noise immunity that determine the evolution of a system. These signals act as design operators, directing the flow of content towards states with greater stability of sense.

Therefore, a new paradigm of the architecture of the Universe is emerging, in which matter, energy, and information should be treated as conjugate field variables and regarded as emergent properties of systems with high informational coherence. This paradigm may become the foundation of a new science integrating physics, quantum computing, and epistemology in the coming centuries.

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[7] Some call it the God's particle since is almost at -T, but "almost".

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KWANTOWA TEORIA INFORMACJI: W STRONĘ PARADYGMATU POZNANIA, TEORII WSZYSTKIEGO I FILOZOFII

STRESZCZENIE

Jest to autorska koncepcja *kwantowej teorii informacji* jako uniwersalnego paradygmatu poznania oraz *teorii wszystkiego*, integrującej fizykę, epistemologię i ontologię sensu. Autor zakłada, że informacja nie jest jedynie opisem rzeczywistości, lecz jej *pierwotną materią* — energią poznawczą, która współtworzy materię, świadomość oraz ewolucję cywilizacji. Model opiera się na *pięciostopniowej hierarchii transformacji poznawczej: dane → informacja → koncepcja → wiedza → mądrość,* odpowiadającej stopniowemu porządkowaniu *entropii sensu*. Proces poznania ma *naturę kwantową*: każdy akt myślenia istnieje w stanie *superpozycji sensów*, a dopiero w momencie interpretacji następuje *kolaps sensu*, czyli przejście od potencjalności do poznawczej aktualności. Autor rozwija analogię pomiędzy *falą poznania* a *falą materii*, wprowadzając pojęcia *amplitudy sensu* oraz entropii poznawczej jako formalne miary jakości poznania. Rezultatem jest teoria, w której *człowiek, sztuczna inteligencja oraz Wszechświat* uczestniczą w jednym polu kwantowej informacji, a *równowaga poznawcza* odpowiada stanowi minimalnej entropii — mądrości. Artykuł integruje klasyczne koncepcje *Bohma, Einsteina, McLuhana i Floridiego*, ukazując informację jako czynnik sprawczy równoważny energii i materii. Zaproponowana koncepcja *Homo sapiens harmonicus* przedstawia człowieka przyszłości jako istotę zdolną do harmonizowania amplitud sensu, łączenia wiedzy z wartościami oraz przekształcania technologii w narzędzie rozwoju duchowego. Pracę zamyka postulat *epistemologii kwantowej*, w której filozofia staje się nauką organizowania informacyjnego pola świata — sztuką przekształcania chaosu danych w *mądrość istnienia*.

Słowa kluczowe: kwantowa teoria informacji; epistemologia kwantowa; kolaps sensu; entropia poznawcza; mądrość; filozofia informacji; amplituda poznania; teoria wszystkiego; *Homo sapiens harmonicus*; McLuhan; integracja materii i informacji.

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