

Meaning Is All You Need: Contextual Reality Engineering as an Ontological Framework for Complex Systems

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This article examines the growing inadequacy of reductionist and subject-centered paradigms for modeling complex heterogeneous systems that include humans, technologies, institutions, ideas, and even abstract categories such as justice or the future. The problem lies in an ontological gap between two dominant assumptions: on the one hand, the treatment of elements as isolated entities; on the other, the attribution of meaning exclusively to subjective experience. Neither approach is able to explain how being and meaning emerge neither within parts nor within consciousness, but through a dynamic projection onto the whole.

The aim of this work is to propose and formalize Contextual Reality Engineering (CRE) as an ontological framework in which reality is understood as a non-local, non-reductive field of relations. The methodology is interdisciplinary and combines hermeneutic-philosophical analysis (Heidegger, Voegelin, Vernadsky, Husserl) with a quantum-inspired formalism (Dirac's bra-ket notation in Hilbert space), used not as a physical theory but as a structural metaphor for operationalizing the contextual dependence of meaning.

The main contribution of the article is the introduction of a measurable construct, "meaning as projection": the meaning of an element is defined as $\langle X|\Psi_{full}\rangle$, and its contextual weight as $|\langle X|\Psi_{full}\rangle|$.

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$full\rangle|^2$, where $|\Psi_{full}\rangle$ denotes the global state of the system. This makes it possible to reconceptualize truth not as correspondence with facts, but as resonance with being – as attunement to the integral structure of reality.

A comparison with contemporary approaches shows that CRE overcomes the gap between description and action, making authenticity measurable and reality projectable. The approach opens new horizons for ontological design under conditions of radical uncertainty and crisis of meaning.

Keywords: Contextual Reality Engineering (CRE), ontology, meaning, context, resonance, *aletheia*

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Introduction

Contemporary scientific knowledge increasingly encounters the need to move beyond reductionist and subject-centered models in describing complex systems – from social communities and cognitive processes to the noosphere and global ecological networks. Within this context, a fundamental question arises: how can one formalize the intuition according to which no element – whether a human being, a technology, an idea, or a natural phenomenon – exists in itself, but acquires meaning and being only through its participation in a whole? Addressing this challenge requires more than an interdisciplinary synthesis; it calls for a new ontological orientation in which reality is understood not as a collection of isolated entities, but as a dynamic field of mutual projections and contextual resonances.

The history of thought – from ancient philosophy to quantum cosmology – contains numerous anticipations of this orientation. Already in the ancient Greek concept of *alētheia*, understood as the unconcealment of beings in their authenticity, one finds the idea of truth as attunement to the whole rather than correspondence between judgments and facts.

In the twentieth century, this intuition was further developed in theories of the noosphere, social fields, and relational ontology, and in the twenty-first century it has taken new forms in quantum-inspired models of cognitive science and systems analysis. Yet, despite these developments, there is still no unified operational framework capable of integrating the philosophical depth of these ideas with a computable, measurable, and practically applicable model of wholeness.

The present article proposes such a synthesis by formalizing reality as an ontological field in which the meaning of any element is determined by its projection onto a universal context. Its aim is to translate the deep ontological intuition of the unity of microcosm and macrocosm from the domain of intuition into the language of formal description and practical action.

The central thesis of the work can be formulated as follows: when a self-aware subject is included in any system, that system acquires a certain meaning, which then extends to all its components. At the same time, the subject must relate itself not only to the elements of the system, but also to a more general context that transcends its boundaries. Only under this condition does the subject's activity, oriented toward understanding or transforming the system, acquire a genuinely ontological dimension.

The proposed approach is not limited to theoretical description; it opens a path toward ontological design – toward the design of realities in which meaning becomes a measurable parameter, and action becomes an act of co-creation with the whole. This is particularly relevant under conditions of global uncertainty, fragmentation of knowledge, and crisis of

meaning, when efficiency ceases to be a sufficient criterion and the authenticity of being comes to the foreground.

1. Literature Review

The idea that meaning arises only through participation in a whole is extensively articulated in twentieth-century philosophical, sociological, and political thought.

In *Being and Time* (1927), Martin Heidegger argues that traditional metaphysics mistakenly focuses on isolated beings while neglecting the horizon of Being itself. Genuine understanding, according to Heidegger, is possible only through *Dasein*- human existence that is always already embedded in the holistic context of the world. The meaning of any element does not arise in isolation, but only in its relation to the whole – to *being-in-the-world*. Truth here is not the correspondence of a judgment to a fact, but *alētheia*: the unconcealment of beings in their belonging to Being, that is, resonance with the whole (Heidegger, 1962).

According to Oleg Bazaluk's philosophy of cosmic evolution, the authentic existence of the subject is possible only in attunement with the objective order of the integral world; deviation from this order leads to the accumulation of contradictions and, ultimately, to destruction (Bazaluk, 2021).

Eric Voegelin develops a closely related idea by arguing that human consciousness is originally oriented toward the “transcendent” – an order that surpasses empirical givenness. He calls this “ontological tension”: consciousness does not merely register the world but participates in its ordering through the apprehension of higher meaning. Voegelin criticizes the “deformations of consciousness” (ideology, gnosticism) that arise when humans attempt to enclose meaning within a closed immanent system. Only through self-relation to the transcendent order does action become ontologically significant (Voegelin, 1957).

From the perspective of the natural sciences, Vladimir Vernadsky affirms the inseparable ontological integrity of the world, in which every element – from the atom to thought – acquires meaning only through participation in a single cosmic process. His concept of the noosphere appears as a scientific vision of the whole, in which matter, life, and reason are bound together within an evolutionary fabric. Reason cannot stand outside nature; it must enter it as an active and responsible agent, capable of “introducing measure” into the cosmic process (Vernadsky, 1945). This ethical and ontological requirement – to be in resonance with the whole – almost literally coincides with the central thesis of the present work.

Claude Lévi-Strauss (1949) and Pierre Bourdieu (1990) transpose this intuition of wholeness into the гуманитарную sphere. For Lévi-Strauss, myth or kinship systems constitute holistic cognitive structures in which any element acquires meaning only in relation to the whole. For Bourdieu, social reality consists of autonomous yet interrelated “fields” in which the meaning of any agent or object is determined by its position within the structure. Immanuel Wallerstein (1974), in turn, demonstrates that the capitalist world-system is a single historical whole in which “core” and “periphery” mutually define one another, and every political-economic actor is embedded within a global context.

The idea thus articulated – that meaning is born through the projection of the part onto the whole, and that authentic being requires attunement with being in its most complete form – constitutes the philosophical core of the approach proposed in this article.

Our central thesis also draws on Edmund Husserl's phenomenological concept of intentionality, whose core idea is the notion of the projection of meaning. According to this view, consciousness is never “empty,” nor does it function as a passive mirror of the external world.

On the contrary, consciousness is always directed toward an object and actively constitutes its meaning, endowing it with significance through an intentional act of “projection.” The object is not given in itself; it arises as something meaningful only within the act of consciousness (Husserl, 1913).

Extending Husserl’s position, we proceed from the assumption that when a self-aware subject becomes included in a complex system, the subject does not merely “add itself” to that system as one more element; rather, it constitutes the system as a field of meaning, extending an ontological dimension to all its components. However, for this dimension to become authentic, the subject must relate itself not only to the local elements of the system, but also to a broader horizon – to that “whole” which transcends everydayness and provides ontological depth to action.

Fundamental science, and quantum physics in particular, points to analogous regularities at the level of the microworld: reality is not a given background, but a process that arises through interaction, measurement, and participation.

In his axiomatization of quantum mechanics, John von Neumann introduced the idea that the act of measurement is inseparable from the interaction between the system and the observer (von Neumann, 1955). John Wheeler further developed the idea of observer participation, stating that “no quantum phenomenon is a phenomenon until it is an observed phenomenon” (Wheeler, 1978). Wojciech Zurek showed that classical reality is “selected” from quantum superposition through interaction with the environment – decoherence stabilizes states only within a contextual environment (Zurek, 2003).

A continuation of these ideas is found in Quantum Bayesianism (QBism), which radically emphasizes the subjective and participatory character of quantum mechanics (Fuchs et al., 2014). According to QBism, the wave function does not describe the objective reality of a system as such, but represents the personal degrees of belief of an agent – the observing subject – regarding the possible outcomes of its future interactions with the world. Quantum probabilities, calculated via the Born rule (Born, 1926), are not objective properties of nature, but subjective assessments analogous to probabilities in decision theory: they reflect an agent’s expectations based on past experience and serve as guides for action under conditions of uncertainty.

Within the QBist interpretation, wave function collapse is understood not as a physical event, but as an update of an agent’s subjective beliefs after the acquisition of new experience. From this perspective, the so-called paradoxes of quantum mechanics – such as “nonlocality,” violations of Bell’s inequalities (Bell, 1964), or the Kochen–Specker theorem (Kochen & Specker, 1967) – do not require physical explanations in terms of superluminal influences or hidden variables. Since quantum states (including entanglement) are regarded as relative to a particular agent, the observed correlations between distant measurements are interpreted not as manifestations of objective nonlocality, but as the coherence of subjective expectations of different agents, formed through their interactions with a shared world.

QBism thus returns to science a participatory realism: reality is not a static background independent of us, but a dynamic process in which agents actively participate, creating new facts through their actions and measurements. The world is, in this sense, “unfinished,” open to genuine creativity and freedom, where the agent’s experience becomes the fundamental “material” of the universe (Fuchs et al., 2014).

These positions undermine the concept of an objective world independent of the subject. In our approach, this is translated into an ontological principle: reality is actualized only in the act of participation, and the subject (including the observer) is not a passive recorder but an active agent whose attention and intention reconfigure the field.

We also regard as crucial the ideas of David Bohm, who proposed the concept of an “implicate order” in which each part contains information about the whole (Bohm, 1980). Carlo Rovelli, in relational quantum mechanics, likewise argues that “quantum states are not absolute – they exist only relative to another system” (Rovelli, 1996).

These ideas resonate with our perspective: any elements – whether human beings, technologies, or ideas – appear not as isolated entities, but as nodes within a nonlocal network of meanings. Their properties and significance arise not “inside” them, but in relations, which makes it possible to model complex heterogeneous systems (social, cognitive, ecological) as unified ontological fields.

In the context of the present article, we consider bra–ket notation – the language in which quantum states are described in Hilbert space (Dirac, 1939) – to be particularly important. Although originally a tool of physical theory, its structure has proven suitable for expressing ideas and regularities across different domains of human knowledge (cognitive science, computational linguistics, information theory, experimental modeling, and others).

We therefore regard bra–ket notation as the most appropriate operational language for formalizing the key constructs of our approach, in particular the idea that the meaning of any element is the result of its projection onto the whole.

On the basis of the literature reviewed, we observe that the fundamental insights of quantum theory – from the role of the observer to nonlocal wholeness and the formal language of projections – deeply resonate with the description of complex heterogeneous systems that include consciousness, culture, and sociality.

At the same time, in the numerous scientific works that draw on this convergence, the direct application of quantum formalism to social phenomena is not assumed; instead, an inspiring analogy is employed.

This is how projects such as *Quantum Mind and Social Science* (Wendt, 2015) should be understood: their aim is not to demonstrate that society is “quantum,” but to show that quantum logic (superposition of states, contextual dependence of measurements, nonlocal correlations) often provides a more adequate description of phenomena such as ambivalence, choice uncertainty, observer effects, or the irreducibility of the whole to the sum of its parts.

A similar strategy has been developed in cognitive science (Bussemeyer & Bruza, 2012), in models of consciousness (Penrose & Hameroff, 2014; Atmanspacher, 2002), and even in semantics (Khrennikov, 2010), where Hilbert spaces were used as formal tools rather than as claims about the physical nature of thought or culture.

We observe that researchers employing quantum approaches do not claim that social, cultural, or cognitive objects are “physically entangled” in the sense of quantum mechanics. Instead, they use quantum formalism as a powerful semantic and structural metaphor for describing nonlocal, contextual, and non-reductive relations among heterogeneous elements.

We would emphasize that the use of Hilbert space and Dirac’s bra–ket notation in articulating our conceptual framework is not merely convenient but ontologically necessary, because this mathematical structure simultaneously: expresses wholeness; captures non-separability (that which cannot be divided into independent parts without losing the meaning, structure, or properties of the whole); allows meaning and significance to be measured; supports nonlocal relations; integrates the observer into the ontology; and обеспечивает interdisciplinary compatibility.

Building on the achievements of fundamental science and continuing the tradition of our predecessors’ scientific work, we hold that the transition from philosophical–ontological intuition to the formal description of complex systems that include human beings, through

the languages of mathematics and quantum physics, is not only justified but corresponds to a deeper tendency of contemporary science: the search for a unified semantic and structural foundation for describing both physical and cognitive reality.

2. Problem Statement

It should be noted that authoritative contemporary practical approaches to the description and design of complex systems increasingly abandon the classical “subject–object” dualism and recognize the human being not as an external observer, but as an embedded node within a heterogeneous network that equally includes technologies, institutions, ideas, natural processes, and digital artifacts.

This tendency manifests itself across a wide range of paradigms – from Actor–Network Theory (ANT) and Object-Oriented Ontology (OOO) to digital twins, the semantic web, socio-technical systems, and adaptive AI interfaces.

However, despite the diversity of these models, they exhibit a shared methodological limitation:

- ANT focuses on the process of network assembly but does not offer a formal language for measuring the significance of actants (Callon, 1986; Latour, 2005; Law, 1992);
- OOO and semantic web ontologies specify relational structures but neglect the dynamics of perception and action (Harman, 2018; Berners-Lee et al., 2001);
- digital twins model an object’s state in context but reduce reality to measurable parameters, excluding semantic and existential dimensions (Tao et al., 2019);
- socio-technical systems take context into account but treat it as a set of features rather than as an ontological field of wholeness (Oviatt, 2013; Bijker et al., 1987).

As a result, none of the established approaches makes it possible simultaneously to:

- (a) treat an element as part of a unified global state of the entire system;
- (b) formalize its meaning as a projection onto that whole;
- (c) measure its contextual significance as a degree of participation in the field of being.

Thus, an ontological gap remains unfilled: there is no unified operational language capable of expressing how exactly the particular – whether a human being, an algorithm, or an idea – acquires meaning and weight through its relation to the whole. It is precisely this gap that Contextual Reality Engineering (CRE) seeks to fill by offering a model in which meaning ceases to be a subjective given and becomes a measurable parameter of ontological inclusion.

3. Theoretical Model

The proposed approach is grounded in the ontological hypothesis that all that exists – from human beings and technologies to ideas and natural phenomena – does not exist in isolation, but only as part of a single dynamic field of being. This field is formalized as a vector in Hilbert space:

$$|\Psi_{\text{full}}\rangle \in \mathcal{H}.$$

Here $|\Psi_{\text{full}}\rangle$ denotes the global state of the entire system – open, heterogeneous, and inclusive of everything: people, objects, institutions, ideas, natural processes, and even transcendent orientations. It is not directly observable, but serves as the ontological horizon relative to which the meaning and weight of any element are defined.

Each element of the system – whether subject, object, or observer – is represented as a separate vector in the same space $\mathcal{H}$:

- |S)- the subject, that is, a self-aware agent capable not only of participating in the field but also of reflexively relating itself to it;
- |Obj)- the object, any entity (thing, concept, artifact) that does not possess autonomous meaning but acquires it through the subject's attention;
- |Si)- the observer, an operator embedded in the field who, in the act of attention, actualizes $|\Psi_{full}\rangle$, making it operationally accessible.

The key act of ontologization is the projection of an element onto the field, which determines its meaning. For an arbitrary element $|X\rangle$ (where X may be S, Obj, or Si), meaning is formalized as the inner product:

$$\text{Meaning}(X) = \langle X | \Psi_{full} \rangle.$$

This quantity – a complex number – expresses the amplitude of the element's inclusion in the whole: its phase indicates directionality, and its modulus indicates the degree of participation. However, for practical purposes (and in accordance with the quantum-inspired interpretation), the fundamental measure is contextual significance, or “ontological weight,” defined as the squared modulus of the projection:

$$\text{Contextual significance}(X) = |\langle X | \Psi_{full} \rangle|^2.$$

This real number between 0 and 1 indicates how deeply the element is woven into the structure of reality: a value close to zero indicates marginality, while a value close to one indicates centrality.

Relations between elements (Ψ) are not reducible to causal or functional relations. Instead, they are modeled as entangled states:

$$|\Psi_{ij}\rangle \in \mathcal{H}_i \otimes \mathcal{H}_j,$$

where $\mathcal{H}_i$ and $\mathcal{H}_j$ are the subspaces corresponding to elements i and j . Such states are non-separable: information about the pair cannot be derived from knowledge of the parts alone. This formally expresses the idea that relations are primary with respect to entities, and that the whole is not reducible to the sum of its components.

A visualization of the theoretical model of CRE described above is presented in Fig. 1.

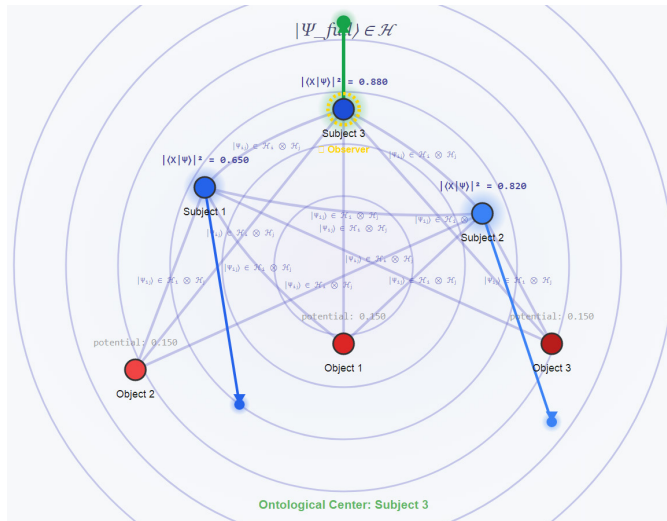


Fig. 1. Model for Contextual Reality Engineering (CRE)

(<https://claude.ai/public/artifacts/5eb3fd25-7a9a-48e7-b74a-52b69c0c4013>):

- $\mathcal{H}$ - denotes Hilbert space;
- $|\Psi_{\text{full}}\rangle$ - the global state of the entire system;
- $|X\rangle$ - an arbitrary element, where X may be the observer (blue circle with a yellow halo), the subject (blue circle), or the object (red circle);
- $\langle X|\Psi_{\text{full}}\rangle$ - the projection of the observer or another subject onto the global field, their “meaning,” represented by blue vectors;
- $|\langle X|\Psi_{\text{full}}\rangle|^2$ – the “weight,” “contribution,” or “status” of the observer, subject, or object in the system, that is, its “contextual significance”;
- $|\Psi_{ij}\rangle \in \mathcal{H}_i \otimes \mathcal{H}_j$ - the quantum state of the relation between objects i and j, depicted as thin curved lines connecting subjects and objects;
- concentric circles – “ontological horizons.”

We consider it necessary to add the following clarifications to the model presented in Fig. 1.

First, the projection of an element onto the field is determined at the moment of attention of a hypothetical observer.

Second, it is important to emphasize that this formalism is not a physical theory. Hilbert space here functions as an ontological language that allows the intuitive idea of the wholeness of the world to be operationalized. Quantum constructs are used as structural and semantic metaphors – not to describe the microworld, but to express the contextuality, nonlocality, and non-reducibility of complex heterogeneous systems.

Third, the global state is not a physical wave function, but an ontological horizon relative to which the meaning of any element is defined. However, for a subject this horizon may be significantly narrowed. Thus, instead of relating itself to all that is, a subject may seek the grounding of its being in relation to a master or a collective.

Fourth, within the described model, truth ceases to be correspondence between judgments and facts. Instead, it is understood as resonance with being – the maximal alignment between the declared position of an element ($|X_{\text{decl}}\rangle$) and its actual projection onto the field ($|X_{\text{fact}}\rangle$).

Fifth, the model functions not only as a description of reality, but also as a tool for its construction: by changing projections and relations, the subject can reconfigure not only its own position within the field, but the field as a whole.

4. Discussion

The CRE approach does not arise in a vacuum; it resonates with a range of advanced concepts that seek to overcome the isolation of elements in favor of a holistic, context-dependent understanding of reality. However, in each case CRE moves beyond technical or cognitive models by offering an ontological framework in which meaning becomes a measure of participation in the whole.

Transformers (Vaswani et al., 2017) implement a computational analogue of projecting an element onto context: the attention mechanism weights the relevance of each token relative to the entire sequence. This instrumentally confirms CRE’s thesis that “meaning arises in relation to the whole.” However, transformers operate with statistical correlation rather than ontological wholeness: their “context” is recomputed at each step and does not constitute a stable field of being.

The Mamba architecture (Gu & Dao, 2023), based on state-space models (SSM), likewise rejects static attention by introducing temporal selectivity. Yet whereas Mamba optimizes prediction through a recurrent hidden state, CRE focuses on ontological selectivity: the field

$|\Psi_{\text{full}}\rangle$ is recalculated not as a model of the environment, but as an act of co-creation of reality after each action.

World Models (Ha & Schmidhuber, 2018) and the Code Word Model (CWM) (Synnaeve et al., 2025) go further by replacing reactive behavior with internal simulation, in which an agent “lives through” the future in order to align action with the dynamics of the world. CWM is particularly close to CRE in that it introduces an active field in which code and context must resonate. Yet in CWM “resonance” means the absence of execution error, whereas in CRE it means the authenticity of participation in being. Thus, CWM may be regarded as a partial and technically constrained case of CRE within the ontology of programming.

Contextual reasoning (Giunchiglia & Bouquet, 1997; Benerecetti et al., 2000; Ghidini & Giunchiglia, 2001; Liu et al., 2021) empirically demonstrates that human thinking is sensitive to the wholeness of situations. However, it remains at the level of a cognitive strategy and does not explain how meaning itself is formed in the process of reasoning.

Quantum cognitive models (Gabora & Kitto, 2022; Winslow & Gabora, 2022; Fernández Cuesta et al., 2025; Juarez Ramos, 2022) go even deeper: they show that cognitive processes follow a quantum-like logic, with superposition, interference, and collapse. In these models, ontology emerges as a result of the agent’s inclusion in a field, rather than as an external vocabulary. This directly resonates with CRE: meaning here is not classification, but projection onto the whole, $|\langle X|\Psi\rangle|^2$. Moreover, the apparent “irrationality” of behavior is interpreted not as error, but as a manifestation of the field’s nonlocal logic, in which elements are ontologically interrelated.

A particularly close resonance is found with the concept of contextual truth (Bielecki, 2021). Both approaches reject absolutized objectivity and link truth to action. Yet whereas for Bielecki truth is the functional adequacy of a model within the cybernetic cycle “action–evaluation–correction,” for CRE truth is a measure of authenticity, expressed as resonance with being. Bielecki asks, “Does the model work?” – CRE asks, “Does being resonate?”

Finally, Wedel’s (2025) work on Contextual Memory Intelligence (CMI) proposes an architecture in which the meaning of action is determined by its inclusion in a dynamic field of past decisions and intentions. In CMI, “contextual entropy” is the decay of the link between a decision and its justification; in CRE it is ontological dissonance, $\Delta = \langle X_{\text{decl}}|\Psi\rangle - \langle X_{\text{fact}}|\Psi\rangle$. CMI implements a key insight of CRE in an applied AI architecture, but remains within the domains of explainability and auditability, whereas CRE offers a meta-ontology in which CMI appears as a particular case of “memory engineering” within “reality engineering.”

Thus, CRE does not oppose these approaches; it generalizes them by translating technical, cognitive, and cybernetic insights into the level of existential–ontological practice, where meaning, truth, and action become measurable acts of participation in the whole.

At the same time, the scientific novelty of CRE lies not in the invention of new mathematical constructs, but in their ontological synthesis and technologization. The formulas $\langle \text{Obj}|\Psi_{\text{full}}\rangle$ and $|\langle \text{Obj}|\Psi_{\text{full}}\rangle|^2$ have no direct analogues in physics, cognitive science, or sociology as operational measures of being.

The approach overcomes the gap between:

- philosophy (“reality is relational”) and practice (“how to change reality”);
- physics (“the observer participates”) and ethics (“how to participate responsibly”);
- cognitive science (“we think contextually”) and engineering (“here is a tool for contextual design”).

5. Practical Applications

CRE has significant applied potential because it offers a unified operational language for modeling heterogeneous systems that include not only human beings, but also technologies, institutions, ideas, places, AI, and even abstract categories such as “justice” or “the future.” Unlike human-centered models, CRE operates with any element that has meaning within human reality, regardless of whether it possesses consciousness or physical form.

The practical power of CRE rests on three principles:

- (1) the meaning of any element arises exclusively through its projection onto the whole;
- (2) reality is constituted through relations, forming a “fabric of being”;
- (3) the contextual significance of an element is measured as $|\langle X|\Psi_{\text{full}}\rangle|^2$ – the squared modulus of its projection onto the global state of the system.

This formalization allows not merely the description of complex systems, but the operation on their ontology: distinguishing what exists, how it exists, and how deeply it is “included” in the whole. Particularly valuable is CRE’s ability to formalize not only truth, but also falsity – as measurable dissonance:

$$\Delta = \langle X_{\text{decl}}|\Psi_{\text{full}}\rangle - \langle X_{\text{fact}}|\Psi_{\text{full}}\rangle,$$

where $|\Delta| > 0$ indicates a discrepancy between how an element is represented and how it is actually included in the field of being.

When the declared position diverges from the actual projection, the weight of the element within the system decreases. This opens a path to diagnosing manipulation, ideological distortions, and systemic crises on the basis of an objective criterion – the degree of resonance with the whole.

CRE also introduces an ontological distinction between the subject (that which relates itself to the field) and the object (that whose projection is defined externally). Yet both become real only through inclusion in $|\Psi_{\text{full}}\rangle$, which eliminates metaphysical dualism and renders ontology operational.

Another bold claim grounded in CRE is that consciousness is not a substance, but a process of maintaining a coherent projection of the subject’s internal state onto a model of the whole. From this perspective, decision-making algorithms are operators that maximize meaning, and reality construction is the active updating of the global system state through the inclusion of new objects and relations.

On this basis, four key directions of practical application can be distinguished.

1. CRE-L: an analytical language for ontological modeling

CRE makes it possible to formalize the ontology of any socio-technical world – from corporate culture to a smart city. Here an “office” is not a building, but a state $\langle \text{Office}:\text{creative} \rangle$; a “metro” is not infrastructure, but a factor of quality of life with weight $|\langle \text{Metro}|\Psi_{\text{full}}\rangle|^2 = 0.9$.

Such an approach makes hidden semantic structures visible and allows dissonances to be diagnosed – for example, when a declared “value of innovation” is not confirmed by its projection in the field of reality. CRE-L can be particularly effective in urban studies, ecology, education, and governance.

2. LLM-CRE: AI “with meaning”

Contemporary language models, despite their expressive power, remain bound to token sequences and optimized for predicting probabilistic patterns rather than for maintaining ontological coherence of meaning. CRE proposes a different approach: an architecture oriented not toward tokens, but toward dynamic ontological states, which can be represented,

for example, through vector embeddings as approximate models of semantic positions in context.

A CRE-based system does not generate answers autonomously, but provides the user with an interface for interacting with a dynamic model of the contextual field. It computes the projection of the user's current state onto the global ontological field $|\Psi_{\text{full}}\rangle$ and proposes transformational operators that facilitate the restoration of resonance with the whole. For instance, in response to the query "I feel lost," the system may suggest: "You are not lost – you are in a zone of goal redefinition. Let us activate the latent nodes of your network." Such an AI does not replace the subject, but becomes a tool through which a person can consciously participate in the co-construction of meaningful context, guided by the measure of participation in the integral structure of being.

3. CRE-action: the practice of reality construction

CRE proposes a six-phase algorithm of decision-making as an act of creation:
 immersion into the field $|\Psi_{\text{full}}\rangle$;
 self-identification as a vector $|I\rangle$;
 measurement of the degree of inclusion $|\langle I|\Psi\rangle|^2$;
 design of new relations ("entanglements");
 collapse through conscious action;
 recalculation of the field after transformation.

This cycle is applicable in psychology (restoring connections), business (strategic "entanglement" with market actors), creativity (art as the collapse of meanings), and personal life (relationships as joint states). The core principle is: you do not choose the future – you become the one whose projection already contains that future.

4. CRE-strategy: action under conditions of radical uncertainty

In military, crisis, and strategic planning, classical models lose effectiveness. CRE-strategy replaces forecasting with ontological stability:

- instead of scenarios, projections of key elements are evaluated: $\langle \text{Commander}|\Psi\rangle$, $\langle \text{Morale}|\Psi\rangle$, $\langle \text{Info-field}|\Psi\rangle$;
- points of fragility (low $|\langle X|\Psi\rangle|^2$) are identified, where minimal intervention can trigger the opponent's collapse;
- operations are modeled as reconfiguration of relations – for example, the creation of an "entangled state" between disinformation and trust.

CRE-strategy does not require complete information; it relies on the internal coherence of one's own system. The higher $|\langle I|\Psi\rangle|^2$, the more resistant the system is to disintegration. This turns authenticity into a strategic advantage and formalizes such notions as "cognitive warfare" and "ontological security."

Thus, the practical strength of CRE lies in its unification of description and action. It enables not only the analysis of why a "tree" is a symbol rather than merely a plant, or why AI becomes a social agent, but also the intentional design of such states. In an era of fragmented knowledge and hyperreality, CRE offers a framework for thinking about authenticity – a tool that can foster a more coherent attunement with being.

6. Limitations

Despite its practical potential, the CRE approach faces a number of significant limitations and methodological challenges that must be taken into account in its application and further development. Among these limitations, the following can be distinguished.

1. The problem of operationalizing the “global state”

The central element of CRE – the state $|\Psi_{\text{full}}\rangle$ – remains a hypothetical construct. Unlike quantum mechanics, where the wave function, although not directly observable, is linked to measurable quantities, CRE offers no generally accepted way to empirically reconstruct or approximate $|\Psi_{\text{full}}\rangle$ for complex social, cultural, or cognitive systems. Any attempt to model it (for example, via knowledge graphs or multimodal embeddings) will inevitably be partial, subjective, and dependent on the chosen ontologies.

2. Subjectivity and ambiguity of projections

The value $|\langle \text{Obj} | \Psi_{\text{full}} \rangle|^2$ presupposes a shared field, but in reality different subjects may operate with different $|\Psi\rangle$ – for example, under conditions of ideological polarization, cultural differences, or cognitive divergence. This calls into question the universality of the measure of “semantic significance” and requires the introduction of multiple, possibly conflicting contextual fields, which greatly complicates the formalism.

3. Computational and cognitive complexity

Even in simplified form, CRE requires the continual recalculation of projections and relations with any change in the system. For human–machine or socio-technical systems with thousands of nodes, this dynamics becomes computationally expensive. For human agents, it becomes cognitively overloading. This limits the applicability of CRE to small-scale, highly reflective contexts (therapy, strategic planning, creative practices), while making scaling to automated or mass systems difficult.

4. The risk of ontological reductionism

The attempt to express “being” through a scalar product carries the risk of reducing complex phenomena – such as morality, tragedy, or transcendent experience – to a numerical metric. Reducing “authenticity” to $|\langle I | \Psi \rangle|^2$ may lead to the instrumentalization of meaning, where value is determined not by the depth of experience, but by “degree of inclusion in the field,” measured by external criteria.

5. Ethical ambivalence of “reality construction”

CRE provides a tool not only for harmonization, but also for contextual manipulation. Whoever controls the definition of $|\Psi_{\text{full}}\rangle$ or manages the operators T_{op} gains a powerful lever of influence over the perception and behavior of others. Without a clear ethical framework, CRE may be used to create ontologically stable illusions – for example, in propaganda, marketing, or “cognitive warfare.”

6. The boundary between formal analogy and physical ontology

CRE uses quantum formalism as a semantic model, but this analogy remains metaphorical. Attempts to assign it a literal physical meaning (for example, by claiming that social relations are “real entanglement”) lead to a categorical error. It is therefore essential to clearly distinguish between the formal instrument (Hilbert space as a language of description) and ontological status (the physical nature of objects) in order to avoid pseudoscientific interpretations.

Thus, CRE is not a finished theory, but rather a methodological framework that enables new ways of seeing and constructing complex systems. It has considerable potential, but also serious limitations. To use it responsibly, it is important to remember:

- it is a formal metaphor, not a physical reality;
- it requires caution in measuring meaning and clear ethical boundaries in order not to turn authenticity into an instrument of manipulation.

Conclusions

Thus, Contextual Reality Engineering (CRE) begins as a methodological framework for analyzing and constructing complex systems, but it can potentially extend beyond them toward fundamental questions of ontology, cognition, and being. If traditional science sought to decompose the world into parts in order to understand it, CRE proposes a reverse movement: to reassemble the whole in order to recover meaning. This represents not merely a technical shift, but a profound philosophical reorientation.

The projection formalism $\langle X|\Psi_{\text{full}}\rangle$ turns out not to be a mathematical device, but an expression of an ancient intuition: nothing exists “in itself” – everything exists as a relation to the whole. This idea, running through Heidegger (“being-in-the-world”), Vernadsky (“the noosphere”), Voegelin (“the transcendent order”), and Bohm (“the implicate order”), now receives an operational form. CRE does not claim that the world is like a quantum system; it shows that the structure of meaning itself is contextual, nonlocal, and relational, regardless of the physical nature of its carrier.

This entails serious philosophical consequences. First, truth ceases to be an epistemological category (the correspondence of knowledge to an object) and becomes an ontological state – a measure of resonance with being. Second, the subject loses the status of an isolated observer and acquires the role of an active node whose attention and intention reconfigure the field of being. Third, action is liberated from utilitarian logic: it is valued not by its outcome, but by its degree of authenticity – by how much it arises from wholeness rather than from fragmentation.

Such a shift opens new horizons for interdisciplinary research:

Empirical validation of ontological constructs. The development of a psychometric instrument – the “Index of Inclusion in the Field of Reality” (IIR) – would make it possible to test the extent to which people naturally act out of resonance with the whole. This would build a bridge between existential philosophy and cognitive science.

Quantum-inspired AI architectures of a new generation. A transition from token-oriented models to systems operating with ontological states (KIM) may lead to the emergence of AI capable not only of generating, but of participating in the co-construction of meaning.

Ontological security under conditions of hybrid threats. In an era of information warfare and crisis of trust, CRE offers a formal language for diagnosing and protecting the integrity of social, political, and cultural systems – not through censorship, but through strengthening their internal resonance.

A philosophy of the cosmos as a field of participation. Developing Vernadsky’s idea of the noosphere within the framework of CRE makes it possible to rethink the human being’s place not as an observer of the universe, but as an active participant in the cosmic process, whose consciousness introduces measure into the evolution of the whole.

CRE is not a finished form of scientific knowledge. It is an instrument intended for a responsible user, whose actions with its help can become acts of co-creation rather than of destruction of the whole.

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