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CONCEPTUAL PROPERTIES OF ISLAMIC ECONOMIC MODELING: COMPLEXITY, NONLINEARITY, AND ENDOGENEITY IN EPISTEMOLOGICAL PERSPECTIVES

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ABSTRACT

This paper introduces a new perspective of economic reasoning and analysis pertaining to situations of complexity combined with nonlinearity and endogenous relations among interacting, integrating, and evolutionary entities. The entities comprise multi-variables representing different embedded systems encompassing economy, society, science, and ethics. In the emergent model of endogenous inter-causal relationships between such entities, the ontological perspective assumes the nature of evaluating inter-causal intra-. It involves systemic relations utilizing formalism belonging to the functional ontology of mathematical forms (Gruber, 1993) instead of invoking metaphysical ontological speculation. The functional ontological approach to structure and formalism leads to a new framework of economic reasoning in the presence of embedded systems that continuously participate and complement, as opposed to being subjected to the central postulate of the marginal rate of substitution and exogenous treatment of knowledge in mainstream economics. The continuous interaction, integration, and evolutionary (IIE) learning phenomenon in such inter-causal systems establishes ethical endogeneity. Thus, the philosophical background of economic reasoning is a functional epistemological formalism of the interactive, integrative, and evolutionary systems. Such systems are characterized by IIE-learning processes induced by the episteme of unity of knowledge.

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INTRODUCTION

Islamic economic theories have not fully developed to explain the broader social processes and events involved. The technique of True Islamic Economics should involve formulating and analytically studying complex systems with significant interdependencies between many disciplines, processes, systems, and entities. Islamic Economic models of social realities are distinguished by the intricate system dynamics and the variables that reflect the intricacy of the embedded subsystems. However, Islamic Economic modeling has been

developed in a limited and specialized manner, disregarding social realism. Mathematics and statistics are commonly employed in Islamic economic modeling without considering the broader perspective of social, cultural, and complex decision-making processes (Beed & Kane, 1991). These factors should collectively define the social and economic interaction for the broader complementary viewpoint. The lack of a systematic approach to academic progress in Islamic Economics has hindered the research and advancement of the topic, making it difficult to make credible predictions about real-world events (Soros, 1998).

Nevertheless, the study of embedded systems concerning different subsystems of the human body reveals a methodological universality in the system modeling and results produced within this broader framework. When interdisciplinary subsystems expand, the resulting models are predicted to converge into a single modeling approach since they can achieve more significant dimensional analysis. Boland (1990) contends that a theory possessing a greater degree of falsifiability can supplant a theory with a lesser degree of falsifiability. This process results in broadening the universality domains of emergent theories, surpassing the limitations of previous theories.

LITERATURE REVIEW

The future of Islamic socio-scientific modeling

The concept of convergence towards a universal and singular theory across all scientific disciplines involves the development of a comprehensive and exclusive model capable of addressing the fundamental principles of scientific discourse in a broad sense, as Barrow (1991) proposed. This model also extends to the specific applications of general-system modeling. This research course investigates the specific issues and difficulties exclusive to different academic disciplines. Formalism aims to achieve a universal and singular theory that can address the fundamental nature of scientific argumentation across all disciplines. This endeavor involves developing a comprehensive model that can applied to general scientific inquiries and specific instances of general-system modeling. This research course involves the investigation of specific obstacles and difficulties that are exclusive to different academic disciplines.

However, the emerging study is deeply rooted in the universality of interacting systems. However, all of them can be investigated using the same paradigm of socio-scientific examination. Therefore, we use "socio-scientific" to describe the comprehensive and interconnected perspective that combines science and society. Islamic Economics is a social science.

Furthermore, the Islamic modeling enterprise encompasses a unified epistemology to address a wide range of concerns, situations, entities, and disciplines, emphasizing the universality and uniqueness of such a model. The Islamic socio-scientific 'everything' theory combines a unique understanding of the social sciences and the natural sciences, creating a unified intellectual pursuit. Implementing the distinctive and all-encompassing model is grounded in the epistemology of the interconnectedness of knowledge. The goal is to investigate the interactions and behavior of interconnected systems by establishing a clear connection and explanation of concepts and their outcomes. Because of their unclear or uncertain nature, these objects symbolize relationships that are not in a straight line or predictable pattern.

The expansion of the modeling enterprise allows for the exploration of the embedded

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Islamic social-political economy, which involves studying the interconnected subsystems and their organic unity and process orientation. The theory that corresponds to a process-oriented, extensively systemic analysis, such as Islamic social-political economics, results in a distinct study of political economy compared to the conventional one. The traditional understanding of political economy has evolved beyond its exclusive emphasis on examining the complex and unequal power interactions among different economic and societal actors pertaining to the ownership, production, and distribution of wealth and resources (George, 1897). The discipline of Islamic social and political economy is distinct. Islamic social-political economy is a comprehensive study of the interconnected subsystems inside the human order, known as the world system. The underlying forces that drive the interactions between these systems exhibit conflict. The dynamics described as interaction, integration, and organic relational unification are absent (Sztompka, 1991).

When conflicts arise, reconciling the diverse knowledge systems becomes a moral and ethical endeavor to rebuild unity. It involves addressing the positivistic character of conflicts and divergence. The presence of nonlinearity in embedded system modeling is characterized by the interaction of components, resulting in the integration and dynamic evolution of internal and external systems. It is driven by the learning process, which is influenced by the unity of knowledge. These qualities govern the entire modeled system to ensure predictability and controllability. The subsystems now function as a cohesive whole, forming a system ensemble. This unity has analytical implications based on the Islamic epistemic worldview of the interconnected social system.

The concept of evolution in this context refers to the historical development of a system or ensemble. It represents a reconstructed possibility of sustainability, influenced by the Islamic epistemological understanding of the interconnectedness and oneness of systems. The significant interconnectedness of relationships can be attributed to the widespread interdependencies between the variables and the actions of the embedded subsystems. The idea of pervasive complementarities in integrating economic, social, and other elements refers to how agents, agencies, and their different variables interact and engage within and across systems (Choudhury, 2007).

RESEARCH METHOD

Objective

This work presents a new line of research focused on the interaction, integration, and evolutionary dynamics influenced by the Qur'anic episteme of unity of knowledge. This episteme encompasses the interconnections between economy, science, and society. The Islamic understanding of these interconnected relationships is rooted in the concept of a unified body of knowledge. It discusses the concept of interconnectedness between different disciplines regarding various challenges and problems represented by specific system variables. Here, deductive reasoning transitions into inductive analytics. Inductive reasoning resurfaces as the deductive continuation of learning that spans the interconnected processes of biological unity in knowledge to ensure predictability and controllability in emergent processes, and it is necessary to adopt a governing worldview that emphasizes the unity of knowledge in nonlinear and complex learning dynamics.

Explanation

The intrinsic systemically unified technique refers to the expression of two types of participative organic unity of being and becoming, as described by Prigogine (1980). There are the internal dynamics of interaction within subsystems. It leads to the process of integration, which involves convergence. The process of interaction, which results in integration and consensus, ultimately leads to evolutionary equilibrium.

Therefore, the dynamics of the IIE process emerge. The IIE dynamics emerge and dissolve, undergoing recursive reformation within and across disciplines and systems as part of the holistic approach to exploring the studied problems. All of these qualities collectively constitute the dynamics inside the system. Furthermore, by modeling continuous mathematical functionals, the interacting and integrative processes undergo evolution and transition into new phases of evolutionary learning inside and between systems (Whitehead, 1978).

Emergent processes that occur between systems and involve learning are known as evolutionary learning processes. The resultant cohesive stages within any educational process are thus made universal and retain their distinctiveness in the interconnected socio-scientific matters through the dynamic interactions that promote integration and, consequently, evolution. These dynamics persist consistently during learning and repetition of similar cause-and-effect relationships. The Qur'anic verse (Qur'an 36:36) highlights the interconnectedness of dynamic processes, such as pairing different elements in the cosmos. It emphasizes the creator's ability to bring together various pairs, including those obtained from the earth, living beings, and even from unknown sources.

The profound comprehension of interconnected subsystems leads to a profound grasp of cause and effect, which drives outcomes and transformations. Knowledge is epistemic and pertains to the system-ensemble notion (Hubner, 1985). The degree to which it contributes to creating organic unity in embedded systems is evaluated utilizing positivistic analysis methods. The estimated findings suggest the necessity of developing normative futures instead of socially undesired projected ones. Time has a distinct and unique function in evolutionary learning dynamics inside embedded subsystems. Time does not directly induce alteration or reconstruction. Its sole function is to document occurrences and assessments accurately. In the IIE-process approach, the socio-scientific system undergoes evolution through internally generated knowledge flows that persist and continue in the IIE-learning processes over time. Events, by definition, are the coming together of information and experiences in a particular place and time.

The outcomes of events, as assessed through economic evaluations, become evident in knowledge, place, and time (Choudhury, 2009). All events within this framework of learning dynamics are intrinsically probabilistic, involving the same pattern of circular causality among interrelated systems. Therefore, substantial and advantageous relationships exist between the variables that represent distinct subsystems. Knowledge flows are generated by the ontological premise that all variables are unified. This occurrence is a prime example of monotheistic unity, also referred to as Tawhid. Thus, they persist within the interrelated links among subsystems via the mechanisms of IIE-evolutionary learning.

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RESULT AND DISCUSSION

A brief review of the literature in the thematic field of embedded system modeling

In this concise part (see Choudhury & Hossain, 2007 for a comprehensive analysis), we highlight a quest for a formal approach similar to IIE modeling. The emergent nonlinear models produce disturbances due to their multidisciplinary nature and the intrinsically complicated aggregation that arises (Bertuglia & Vaio, 2005). The implications of the nature of nonlinear modeling that arise from system embedding extend beyond the works of Chichilnisky (1990), Gelfand (1961), Kupka & Peixoto (1993), and Debreu (1990). Smale (1990) pioneered the intricate aggregation of topological cells into higher-dimensional manifolds. Producing tensor variations of the coefficients of manifold functionals, which involves multilinear economic interactions, is known as 'foliation.' Ultimately, the analysis of ethically reconstructed systems can be applied to complex events inside interactive subsystems.

Therefore, using ideal surfaces with convexity and the assumptions of perfectly competitive markets, along with the steady-state equilibrium and the 'objective' assumption of optimization, do not define the limits of mathematical applications in Islamic economic theory. The linearity of mathematical equations in econometrics results from assuming parametric constants or patterns of probabilistic changes in estimated coefficients. The calculated coefficients are assigned hypothetical Bayesian probability distributions at most.

Nonlinear transforms

The monotonically increasing positive mappings within repetitive, interactive, integrative, and evolutionary (IIE) processes within and between systems maintain the same type of IIE learning processes for assessing wellbeing, including their circular causal mappings. However, it is not always the case that they converge to the identity mapping. In other words, acquiring knowledge does not result in direct connections. The functional linkages (mappings) between the variables maintain a persistent nonlinearity through the induction of knowledge-flows and {θ}-values.

The evolutionary learning model given above possesses mathematical features and formalism that are purely nonlinear. The emerging IIE model of learning, which applies universally and uniquely to all difficulties and problems inside and across systems, is based on the participative organism of unity of knowledge as the episteme. It implies that the diversity of disciplines may be examined using the same evolutionary learning framework, which allows for understanding the dynamic behavior in all areas of knowledge despite the differences in the specific issues faced by various systems. The outcome is distinct and universally applicable due to its simple mathematical essence, encompassing all aspects of evolutionary learning systems.

The methodological originality is attributed to its global aspect, which involves participative complementarities between variables, topological transformations, and the representation of underlying agencies through variables and relations. This Islamic socio-scientific finding contradicts the assumption of limited resources, the trade-off in allocating resources, and the rate at which one alternative is substituted for another in mainstream economic theory. There is currently no theory or process model in mainstream economics or

the study of Islamic Economics and social sciences that focuses on endogenous learning. In the natural sciences field, Gaia's inherent significance continues to be a goal in terms of knowledge and understanding (Primavesi, 2000). In the field of theoretical physics, it is noteworthy to consider the statement made by Hawking (1988, p. 33) regarding reverse (recursive) causality.

This statement emphasizes the significance of understanding the interplay between space, time, and the events occurring in the universe to establish a unique cosmological framework. Hawking's words suggest that space and time are not only influenced by external factors but also impact everything that transpires within the universe. The logical consequence of pervasive complementarities effectively refutes social and biological Darwinism (Xuemou & Dinghe, 1999).

CONCLUSION

The quest for a unified theory of nature is not limited to the natural sciences alone. A comprehensive, grand, unified theory should include the social sciences alongside other disciplines. The outcome would be a deliberate and significant formation of the interconnectedness of the economy, science, and society. The outcome will be a comprehensive theory that explains the interconnectedness and causal relationships among all phenomena. Within the field of social sciences, a socially embedded political economy is formed by systemic embedding, as described by Sztompka (1974). This text explores the fundamental nature of Islamic methodological viewpoints and their practical application in the context of knowledge and learning.

This paper has served as an indicator in that particular direction. Islamic Economics demonstrates a strong interconnectedness through its innovative theory of social-political economy and the incorporation of ethics in socio-economic modeling. Sociology is characterized by adopting a novel theory known as the world-system theory. Through its emergent theory, mathematics encompasses the study of complexity, systems, and cybernetics. The philosophy of science is characterized by the requirement for an evolving epistemological perspective (Thayer-Bacon, 2003). The formalism presented in this paper represents a significant advancement in the study of mathematical socio-scientific intellection, particularly in economics and social sciences. This breakthrough opens up new avenues for further research. The emerging knowledge will encompass the comprehensive domain of Islamic socio-scientific world-system analysis in a scientific and epistemological framework.

REFERENCES

Barrow, J. D. (1991). *Theories of Everything: The Quest for Ultimate Explanation* (Vol. 61). Oxford, Eng: Oxford University Press.

Beed, C., & Kane, O. (1991). What Is the Critique of the Mathematization of Economics? *Kyklos*, *44*(4), 581–612. https://doi.org/10.1111/j.1467-6435.1991.tb01798.x

Bertuglia, C. S., & Vaio, F. (2005). Dynamical systems and the phase space. In *Nonlinearity, Chaos, and Complexity* (pp. 49–59). Oxford University Press. https://doi.org/10.1093/oso/9780198567905.003.0008

Boland, L. A. (1990). The methodology of economic model building. *Journal of Macroeconomics*, *12*(2), 336.

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https://doi.org/10.1016/0164-0704(90)90047-E

Chichilnisky, G. (1990). *Topology and Economics: The Contribution of S. Smale* (M. W. Hirsch, J. E. Marsden, & M. Shub, Eds.). New York, NY: Springer-Verlag.

Choudhury, M. A. (2007). *The Universal Paradigm and the Islamic World-System*. World Scientific. https://doi.org/10.1142/6344

Choudhury, M. A. (2009). Which of the two ? - Knowledge or time. *Philosophical Papers and Review*, *1*(4), 6–16.

Debreu, G. (1990). Stephen Smale and the Economic Theory of General Equilibrium. In M. W. Hirsch, J. E. Marsden, & M. Shub (Eds.), *From Topology to Computation: Proceedings of the Smalefest* (pp. 131-146.). New York, NY: Springer-Verlag.

Gelfand, I. M. (1961). *Lectures on Linear Algebra. Gelfand*. Interscience.

George, H. (1897). The Science of Political Economy. In *Political Science Quarterly* (Vol. 13). New York: : Robert Schalkenbach Foundation.

Gruber, T. R. (1993). A translation approach to portable ontology specifications. *Knowledge Acquisition*, *5*(2), 199–220. https://doi.org/10.1006/knac.1993.1008

Hawking, S. W. (1988). Space and time". In *his Brief History of Time*. New York, NY: Bantam Books.

Hubner, K. (1985). *Foundations of a universal historistic theory of the empirical sciences in his Critique of Scientific Reason* (P. R. Dixon & H. M. Dixon, Trans.). Chicago, ILL: The University of Chicago Press.

Kupka, I. A. K., & Peixoto, M. M. (1993). On the enumerative geometry of geodesics. *From Topology to Computation: Proceedings of the Smalefest*, 243–253. Springer.

Prigogine, I. (1980). *From Being to Becoming*. San Francisco: CA: W.H. Freeman.

Primavesi, A. (2000). *Sacred Gaia*. London: Eng: Routledge.

Smale, S. (1990). The story of the higher dimensional poincaré conjecture (what actually happened on the beaches of rio). *The Mathematical Intelligencer*, *12*(2), 44–51. https://doi.org/10.1007/BF03024004

Soros, G. (1998). *Fallibility and reflexivity", in The Crisis of Global Capitalism*. New York: Public Affairs.

Sztompka, P. (1974). Systemic models in functional analysis". In *System and Function, Towards a Theory of Society* (pp. 47–57). New York, NY: Academic Press.

Sztompka, P. (1991). *Society in action: The theory of social becoming*. University of Chicago Press.

Thayer-Bacon, B. (2003). *Why '(e)pistemology?" in her Relational (e)pistemologies*. New York: Peter Lang.

Whitehead, A. N. (1978). *Process and Reality* (Vol. 6; D. R. Griffin & D. W. Sherburne, Eds.). New York, NY: Free Press. https://doi.org/10.5840/schoolman19306337

Xuemou, W., & Dinghe, G. (1999). Pansystems cybernetics: Framework, methodology and development. *Kybernetes*, *28*(6–7), 679–694. https://doi.org/10.1108/03684929910282953