

ARTIFICIAL KNOWLEDGE AND ITS CHALLENGES FOR THE KNOWLEDGE MANAGEMENT SYSTEMS

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Abstract

The purpose of this paper is to analyze the emergent concept of artificial knowledge with respect to artificial intelligence and human knowledge, and to identify its challenges for the knowledge management systems. Although the concept of artificial intelligence has been known for a long time, the concept of artificial knowledge is quite new and emerged with the explosion of Generative AI (GenAI) applications, especially with ChatGPT. This is a conceptual paper based on a semantic literature review and the theory of knowledge fields and knowledge dynamics. Artificial knowledge became a reality, and its analysis is performed within the framework of knowledge management systems. However, any search on Google or Google Scholar will show entries on artificial intelligence and not on artificial knowledge. That is a demonstration of the need to address research on artificial knowledge and to reflect on the mode of integrating artificial knowledge within the knowledge management systems. Artificial knowledge is the product of machine learning and deep learning processes and of the processing power of artificial intelligence. Unlike human knowledge that manifests in different forms, artificial knowledge manifests only as a rational form. Therefore, its integration within the knowledge management systems should be done only in those processes which are based on human rational knowledge. The present analysis helps managers in understanding how to combine human and artificial knowledge in the new hybrid knowledge management systems.

Keywords: Artificial knowledge, Artificial intelligence, Human knowledge, Knowledge management systems.

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1. INTRODUCTION

Herbert Simon, Nobel Laureate for Economics (1978), showed in his seminal book *The Science of the Artificial* that we are living in a world comprising both natural and artificial phenomena. Natural phenomena happen as a result of necessity, while artificial phenomena are a result of contingency. The artificial world is created by the human mind, and it contains artefacts as a result of artificial processes and phenomena. *Artificial knowledge* constitutes such an artefact, as a result of machine learning, deep learning, and the processing power of artificial intelligence (Baker, 2023, 2025; Russell & Norvig, 2023). However, researchers focus only on artificial intelligence and digital transformation, ignoring the role played by artificial knowledge. Even when they use in their papers' title the expression *artificial knowledge*, they do

not explain the concept or substitute its meaning with digital knowledge (Di Vaio et al., 2024; Saviano et al., 2023).

Artificial knowledge is an emergent concept that should be well-understood in order to identify the challenges it generates for knowledge management systems. It is totally different from human knowledge, human intelligence, and artificial intelligence and does not have the same semantic area as digital knowledge (Bratianu, 2022; Bratianu & Bejinaru, 2019; Lee & Qiufan, 2024; Kurzweil, 2024; Massingham, 2020; Searle, 1990). Our research questions for the present research are the following:

RQ1: What is artificial knowledge with respect to human knowledge?

RQ2: What are the main challenges of artificial knowledge for knowledge management systems?

This is a conceptual paper based on a semantic literature review and the theory of knowledge fields and knowledge dynamics. The method of research is based on a systematic literature review, a semantic analysis, and a comparative analysis between human knowledge creation and artificial knowledge creation. The structure of the paper is continued with a section on human knowledge and intelligence, a section on artificial knowledge and intelligence, a section on challenges generated by artificial knowledge and artificial intelligence for knowledge management systems, and some concluding remarks.

2. HUMAN KNOWLEDGE

2.1 Tacit and explicit knowledge

Knowledge is a complex abstract concept that can be understood using metaphorical thinking (Andriessen, 2008; Lakoff & Johnson, 1999). Therefore, any potential definition for *knowledge* depends on the metaphorical framework used. In epistemology, the concept of *knowledge* is defined as a *justified true belief* (Audi, 2011; Nonaka & Takeuchi, 1995). This definition shows the semantic relationship of knowledge with truth and the need for a certain justification. In epistemology, justification is performed using logical methods, while in organizations, managers use consensus. The search for truth is rooted in the Greek philosophers, who considered knowledge to be a result of reason, to satisfy the request of objectivity (Russell, 2009).

Plato was one of the first to show that human senses induce subjectivity in our thinking, and therefore, perception should be eliminated from the definition of knowledge. It is obvious that for the same aspect of reality, the perception of one individual may be different from the perception of another one. Only by using rationality can people acquire knowledge and understand reality objectively. Descartes (1997) continued to develop this flow of ideas, reaching the conclusion that only the mind is capable of creating knowledge. His famous saying, *Cogito, ergo sum!* remains as a clear duality between mind and body, and as an imperative for scientific knowledge that must be objective.

Aristotle (1999) had a different thinking framework from Plato and considered three categories of knowledge: *episteme*, *techne*, and *phronesis*. *Episteme* represents rational knowledge. It is objective and constitutes the foundation of science and technology. *Techne* represents the practical knowledge needed to do something. It is the actionable knowledge, related to production and technology. *Phronesis* is a metaknowledge because it incorporates both knowledge and decision-making. It is called *practical wisdom* because it helps people in finding the optimum solutions when there is uncertainty. Today, *phronesis* is used in wisdom management and wise leadership (Konno, 2024; Nonaka & Takeuchi, 2019; Rocha & Pinheiro, 2012).

Unlike the Cartesian dualism between mind and body, Japanese philosophy promotes the idea of the oneness of body and mind, as well as the harmony between people and nature (Nonaka & Takeuchi, 2019; Nonaka & Zhu, 2012). Therefore, knowledge integrates both subjectivity and objectivity. Knowledge is not an abstract concept to be learned rationally anymore. Knowledge is incorporated, and it is created through direct action and intersubjectivity in a specific context called *Ba* (Konno, 2024; Nonaka & Takeuchi, 1995, 2019). After Polanyi (1983) introduced the *tacit dimension* of knowing, Nonaka and Takeuchi introduced the concepts of *tacit knowledge* and *explicit knowledge*. These concepts are based on the iceberg metaphor: explicit knowledge is represented by the visible part of the iceberg that is above the waterline. In contrast, tacit knowledge is the hidden part of the iceberg that is under the water.

Tacit knowledge should be understood as a potential or a latent knowledge resulting from our body's interaction with the external environment. Tacit knowledge is wordless, and it can be expressed only through nonverbal and paraverbal language. "Subjective insights, intuitions, and hunches fall into this category of knowledge. Furthermore, tacit knowledge is deeply rooted in an individual's action and experience, as well as in the ideals, values, or emotions he or she embraces" (Nonaka & Takeuchi, 1995, p. 8). *Explicit knowledge* can be expressed using natural or symbolic languages. It can be codified and used in communication. It is the knowledge we learn in schools and universities, and it represents the Cartesian knowledge (Davenport & Prusak, 2000; Liu, 2020; Massingham, 2020).

2.2 The theory of knowledge fields

The metaphors used to explain knowledge, which are based on physical objects and fluid flows, have two main limitations. They induce ideas of *tangibility* and *linearity* within the semantic field of the knowledge concept. However, *knowledge is intangible and nonlinear* (Davenport & Prusak, 2000; Nonaka & Takeuchi, 1995, 2019). In order to eliminate these limitations, Bratianu (2011) suggested changing the paradigm of knowledge based on Newtonian thinking to a new paradigm based on thermodynamics. The new paradigm is constructed considering the concept of *energy* as a model. There are three fundamental ideas that can be transferred from the semantic field of *energy* to the semantic field of *knowledge*:

- Energy is a field – Therefore, knowledge is a field (intangible and nonlinear).
- Energy manifests in different forms (e.g., mechanical energy, thermal energy, electrical energy) – Therefore, knowledge can manifest in different forms (e.g., rational knowledge, emotional knowledge, spiritual knowledge).
- One form of energy can be transformed into another form of energy (e.g., mechanical energy can be transformed into thermal energy) – Therefore, one form of knowledge can be transformed into another form of knowledge (e.g., rational knowledge can be transformed into emotional knowledge).

The basic fields of knowledge have been defined based on the creation of each specific knowledge, and cognitive sciences research (Damasio, 1999, 2012; Hill, 2008; LeDoux, 1999). These fields are: rational knowledge, emotional knowledge, and spiritual knowledge. *Rational knowledge* is the result of rational thinking, and it is expressed by explicit knowledge. It is the knowledge defined by Plato and supported by Descartes. Rational knowledge is used in organizations and in any business environment. Simon (1996) introduced the concept of *limited rationality* to show the practical dimension of this field of knowledge, especially in economics and business. *Emotional knowledge* is tacit, and it is a result of learning by doing. It is an expression of our body's reaction to external stimuli, and it can be expressed only through nonverbal and paraverbal language (Bratianu, 2015; Bratianu & Bejinaru, 2019, 2020; Gladwell, 2005). *Spiritual knowledge* represents the existential dimension of human beings. It contains moral, ethical, and professional values and principles, as well as religious beliefs (Maxwell, 2007). Spiritual knowledge varies from culture to culture (Bratianu & Paiuc, 2022), and it is related to the concept of phronesis defined by Aristotle (1999). Figure 1 illustrates the RESK (Rational, Emotional, Spiritual, Knowledge) model.

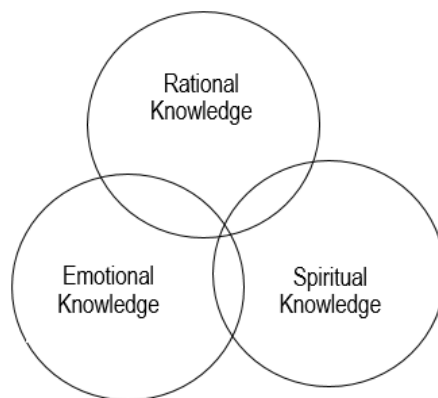


FIGURE 1. THE THREE FIELDS OF KNOWLEDGE
Source: Author's research.

Knowledge dynamics in this new framework represent the transformation of one form of knowledge into another form of knowledge, like the transformation of rational knowledge into emotional or spiritual

knowledge (Bratianu & Bejinaru, 2020). While *knowledge flow* represents a Newtonian paradigm, *knowledge transformation* constitutes a result of thermodynamics.

2.3 Knowledge creation models

There are two fundamental models for knowledge creation: Kolb's model, and Nonaka and Takeuchi's model. Kolb (2015) developed the experiential learning cycle by defining four basic processes: Concrete Experience (CE), Reflective Observation (RO), Abstract Conceptualization (AC), and Active Experimentation (AE).

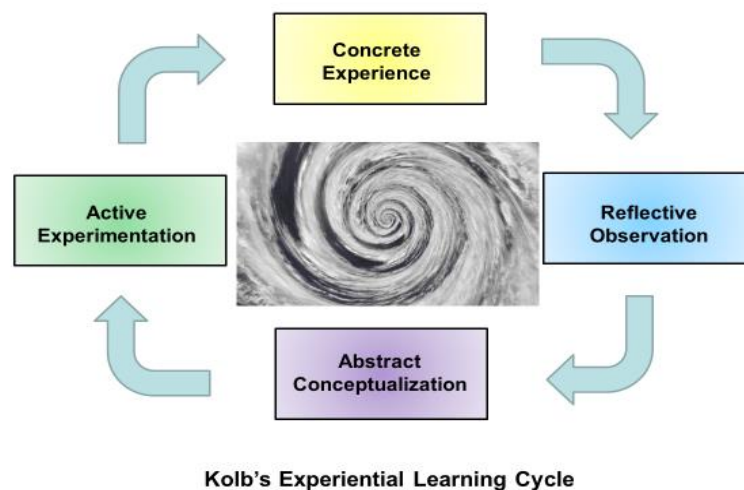


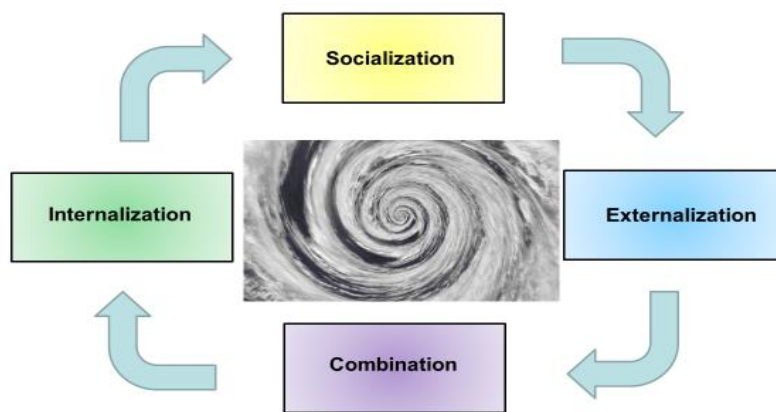
FIGURE 2. ILLUSTRATION FOR KOLB'S KNOWLEDGE CREATION MODEL

Source: Adapted from Kolb, 2015.

Concrete experience is the starting phase when the sensory system generates data and information from the body's interaction with the external environment. It is a result of human perception, that is subjective in interpreting the raw data. Concrete experience generates emotional knowledge that is processed by emotional intelligence. *Reflective observation* makes the transition toward the conscious zone of the human brain, where emotional knowledge is evaluated, filtered, and transformed into rational knowledge. *Abstract conceptualization* is a result of System 2 of thinking (Kahneman, 2011). Rational thinking transforms emotional knowledge into rational constructs and ideas using the metaphorical capability of the human brain and natural language. *Active experimentation* is the closing phase of Kolb's cycle, where the new concepts and ideas are tested in the external environment. "Learning, the creation of knowledge and meaning, occurs through internal reflection about the attributes of these experiences and ideas" (Kolb, 2015, p. 78). If we consider *time* as a process dimension, then the above cycle is developing into a

knowledge spiral. Also, we should consider the effect of unlearning, regardless of whether it is accidental or intentional (Cegarra-Navarro & Wensley, 2019).

Figure 3 presents the knowledge creation dynamics model proposed by Nonaka (1994), and then further developed by Nonaka and Takeuchi (1995, 2019). The model comprises four basic processes, similar to those proposed by Kolb (2015): Socialization (S), Externalization (E), Combination (C), and Internalization (I) – the SECI cycle.



Nonaka's Knowledge Dynamics Creation Cycle

FIGURE 3. THE SECI CYCLE

Source: Adopted from Nonaka & Takeuchi, 1995.

Socialization is the process of exchanging and creating new tacit knowledge within a given social context called *Ba*. Tacit knowledge sharing can be done only for people who are physically present in that specific *Ba* because we speak about emotional knowledge that is wordless. Socialization requires good connectivity and spatial proximity. This process is fundamental for Japanese people as a result of their education focused on teamwork (Konno, 2024; Nonaka & Takeuchi, 1995, 2029). *Externalization* is the transformation process of tacit knowledge into explicit knowledge at the individual level. It is a brain process done within the conscious zone and the help of analogies and metaphors. Explicit knowledge is expressed using natural or symbolic languages. It is codifiable knowledge used in communication. *Combination* is the process of knowledge sharing and amplification within a given *Ba*. Combination is essential in integrating individual knowledge into collective knowledge (i.e., team knowledge or organizational knowledge). It is an ontological process, while externalization is an epistemological one. *Internalization* represents the last process where explicit knowledge is transformed into tacit knowledge. Internalization contributes to changes in individual and organizational behavior. It is an epistemological process.

3. ARTIFICIAL KNOWLEDGE

3.1 What is artificial knowledge?

Knowledge is a result of a learning process. Human knowledge results from human learning, a cognitive process in which human intelligence acts on primary data and information. By similarity, how shall we consider the result of machine learning and *artificial intelligence* (AI) work on primary data and information? The only adequate name is *artificial knowledge* (Saviano et al., 2023), although some authors use the expression of *digital knowledge* (Di Vaio et al., 2024).

The concept of *Artificial Intelligence* (AI) was created by John McCarthy in 1956 at a conference organized by Dartmouth College. It is a metaphor that caught the imagination and expertise of many scientists. The first development phases of AI were based on simple algorithms incorporating the rule of *if >> then*, and deterministic thinking. Only with the switch to probabilistic thinking did the power of algorithms increase and performance become remarkable. For example, in 1997, IBM's Deep Blue computer won against the chess champion Gary Kasparov in a chess competition. In 2011, IBM Watson beat champions Ken Jennings and Brad Rutter at the game Jeopardy, a new demonstration of the AI power. A new demonstration came in 2016, when DeepMind's AlphaGo program beat Lee Sudo, the world champion GO player. All these outstanding results showed the incredible potential of AI applications (Hawkins & Blakeslee, 2004; Lee & Qiufan, 2024; Russell & Norvig, 2023). A new branch of AI that has exploded in recent years is *Generative AI* (GenAI) due to its capacity to generate texts, images, audio, video documents, or even new software in response to a request coming from a user (Stryker, 2024; Yu, 2023). GenAI uses deep learning models, which are based on *Large Language Models* (LLMs). Artificial knowledge is a product of these LLMs.

Artificial knowledge has no convergence toward truth and no relationship with the reflection upon the external environment. Therefore, artificial knowledge cannot be represented by the generic expression of being a *justified true belief* used for human knowledge (Nonaka & Takeuchi, 1995; Russell & Norvig, 2023). Artificial knowledge is an emergent construct that has been imposed by the Generative AI (GenAI) due to its capacity to generate human-like dialogues using texts. "Current GenAI models don't think or create things *per se*, but instead generate new things from parts of old things found in its database. (The term 'things' in this context being images, videos, numbers, or text, depending on the GenAI application you are using). A GenAI output is the model's best prediction of what you are seeking" (Baker, 2025, p. 11). Artificial knowledge is produced by a series of algorithms that process a huge database. Its consistency depends on the input data and the power of algorithms. If the input data contains some errors, the resulting artificial knowledge will incorporate those errors. Therefore, we should never trust the content

of artificial knowledge. We should always check it for its validity. The reliability of artificial knowledge depends entirely on the consistency and reliability of the dataset from which it is generated.

Artificial knowledge became familiar with the explosion of ChatGPT's popularity. ChatGPT is based on Large Language Models (LLMs). Although the human-like dialogue induces the idea of having a real dialogue with a rational agent, ChatGPT does not think and does not have any understanding of the meanings of the words used in generating the text outputs. It uses complex algorithms to make predictions based on probabilistic thinking and probability distributions associated with a certain language context. The paradox of artificial knowledge is that ChatGPT generates it based on syntactic rules and not on the text's semantics (Baker, 2023, 2025; Harfouche et al., 2017; Lee & Quifan, 2024; Russell & Norvig, 2023).

Researchers who use ChatGPT should know that artificial knowledge may have *hallucinations*. These phenomena are possible due to the syntactic process of knowledge generation that has nothing to do with the meaning of words and ideas contained in the outcomes provided by the program. Figure 4 illustrates the main phases of generating artificial knowledge.

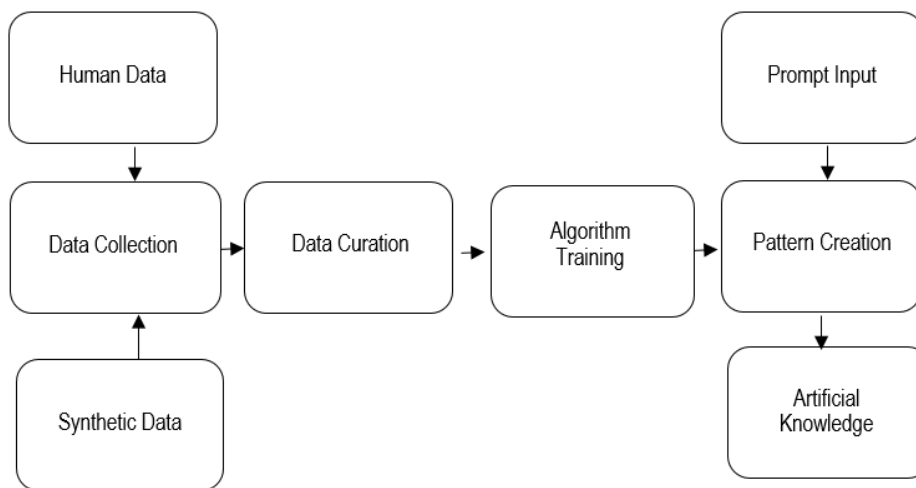


FIGURE 4. THE PROCESS OF GENERATING ARTIFICIAL KNOWLEDGE

Source: Author's creation.

3.2 Challenges of artificial knowledge for knowledge management systems

First, we should compare *artificial knowledge* with *human knowledge*, and only then identify the main challenges of artificial knowledge for knowledge management systems. The main difference between human knowledge and artificial knowledge comes from their relationship with truth and the reality we live in. Human knowledge is a justified true belief, and the human brain creates it to reflect the reality we are living in, to survive, and to accomplish our goals. Artificial knowledge has no relationship with reality, except for the input data. It is not a belief because computers have no consciousness, and there is no justification. While human knowledge is a result of a learning process and work performed by human

intelligences (i.e., rational, emotional, spiritual), artificial knowledge is a result of deep learning and complex algorithms. Human knowledge can manifest as tacit and explicit, or in an extended way as rational, emotional, and spiritual (Bratianu, 2015; Nonaka & Takeuchi, 1995). Artificial knowledge has only one form of manifestation, as rational knowledge. Because of reflection and rational thinking, human knowledge has a high level of reliability. Artificial knowledge may have hallucinations. The main aspects of the comparison between human knowledge and artificial knowledge are presented in Table 1.

TABLE 1. ARTIFICIAL KNOWLEDGE VERSUS HUMAN KNOWLEDGE

Criteria	Human Knowledge	Artificial Knowledge
Reflecting reality	A justified true belief. (Audi, 2011; Nonaka & Takeuchi, 1995, 2019).	A computer creation based on complex mathematical models and algorithms. (Baker, 2023, 2025; Russell & Norvig, 2023).
Data	Data obtained through sensory systems from direct interaction with the external environment. (Davenport & Prusak, 2000; Nonaka & Takeuchi, 1995).	Data obtained from technological sensors, from human databases, and from synthetic databases. (Baker, 2023, 2025; Russell & Norvig, 2023).
Forms	Tacit knowledge and explicit knowledge. (Nonaka & Takeuchi, 1995).	Explicit knowledge. (Baker, 2023, 2025).
Fields	Rational, emotional, and spiritual knowledge. (Bratianu, 2015; Bratianu & Bejinaru, 2019).	Rational knowledge. (Baker, 2023, 2025).
Reliability	A relatively high reliability due to the complex interplay between intuitive and rational thinking systems. (Kahneman, 2011).	A relatively low reliability due to potential hallucinations. (Baker, 2023, 2025; Russell & Norvig, 2023).

Source: Author's creation.

Knowing the characteristics of artificial knowledge, we can identify the main challenges for knowledge management systems. We may consider the SECI model as a guide to see what processes are suitable for integrating artificial knowledge. First of all, we should remark that artificial knowledge has only the explicit form of manifestation, and therefore, it cannot be transformed into any other form or field of knowledge. The only process from the SECI model that contains only explicit knowledge is combination. Therefore, the combination should be redesigned such that human knowledge and artificial knowledge can be integrated and amplified.

The power of analyzing a huge database very fast made GenAI an attractive rational agent for decision-making. However, managers should be aware of the fact that artificial knowledge has no relationship with truth and reality, and may generate hallucinations. Also, there are serious ethical issues in using AI or GenAI, as shown by many researchers (Baker, 2023, 2025; Floridi, 2023). We should keep in mind that artificial knowledge is created by algorithms based on syntactic rules and has no semantic control. Only the users can check the meaning and validity of artificial knowledge. Artificial knowledge has no emotional and spiritual dimensions, and from this perspective, it cannot replace human knowledge in the process of

decision-making, with the exception of some routine tasks. Wisdom remains the fundamental feature of human beings, and wise leadership is fundamentally a human dimension.

4. CONCLUSIONS

The purpose of this paper is to perform a semantic analysis of the new construct of artificial knowledge. Although artificial intelligence is a well-known construct from the '50s, artificial knowledge emerged recently with the advent of GenAI, especially with the explosion of ChatGPT due to its capacity to generate human-like dialogues. Artificial knowledge is a creation of deep learning and LLMs, which uses complex layers of neural networks to analyze huge databases and to predict the most probable text based on pure syntactic rules. It is amazing how these algorithms can create human-like dialogues without any capacity for thinking or semantics.

Artificial knowledge has only a rational dimension, and it can be integrated only with human explicit knowledge in combination, and knowledge sharing processes. It cannot be integrated in socialization, externalization, and internationalization because it lacks the capacity to interact with tacit knowledge, which is specific to human beings' experience. Artificial knowledge has a great potential to revolutionize knowledge management systems, but we should be aware of its possible hallucinations and the lack of any semantic mechanism in its generation.

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