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Integrating Artificial Intelligence and Artificial Knowledge in the Knowledge Management Systems

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Abstract. *The purpose of this paper is to introduce the concept of "artificial knowledge", and to show how managers should integrate Artificial Intelligence (AI) and Artificial Knowledge (AK) in the Knowledge Management Systems. While the concept of AI is well-known and there are thousands of entries on Google, the concept of AK does not exist. If one searches on the Internet for "artificial knowledge", the results show entries only with "artificial intelligence". The explosion of interest in the recent Generative Artificial Intelligence (GenAI) like ChatGPT, requires the introduction in the literature of the concept of "artificial knowledge" and the explanation of its integration with human knowledge in the Knowledge Management Systems (KMS). Artificial knowledge is a product of AI tools, especially of those using GenAI. Knowledge Management Systems integrate human knowledge and artificial knowledge in most of their operations from knowledge generation to knowledge sharing and knowledge use. However, there is a significant difference between human knowledge creation and artificial knowledge generation. The paper discusses all these aspects, underlining the fact that artificial knowledge does not replace human knowledge. Artificial knowledge complements human knowledge in knowledge management systems. It is important to understand both the similarities and differences between these two concepts in making decisions and designing knowledge strategies.*

Keywords: human knowledge, artificial knowledge, artificial intelligence, knowledge management systems, knowledge dynamics.

Introduction

It is a paradox that the concept of *artificial intelligence (AI)* was introduced in the literature by John McCarthy at a conference organized by Dartmouth College in 1956 (Russell & Norvig, 2022), but its associated product *artificial knowledge (AK)* does not exist in the literature yet. Both concepts reflect the research in the realm of artificial (Simon, 1996), and become essential in the knowledge economy and knowledge management systems (Becerra-Fernandez & Sabherwal, 2010; Massingham, 2020). However, *artificial knowledge* is distinguished from *human knowledge* and all the similarities and differences should be well-understood by knowledge managers. Artificial knowledge does not replace human knowledge but it complements it.

Knowledge management systems integrate humans and technology; consequently, they must integrate human knowledge with artificial knowledge, and human intelligence with artificial intelligence. In a generic perspective, intelligence is considered to be the capacity to process data, information, and knowledge, and to create patterns for the external world. "The brain uses vast

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amounts of memory to create a model of the world. Everything you know and have learned is stored in this model. The brain uses this memory-based model to make continuous predictions of future events" (Hawkins & Blakeslee, 2004, p. 6). The lack of literature on the concept of *artificial knowledge* makes us ask the following question: *If human knowledge is the result of learning and intelligence's work, what is the result of machine learning and artificial intelligence's work?*

The present paper tries to answer this research question.

Literature review

Human knowledge and intelligence

Aristotle (1999) considers three categories of knowledge that reflect the human capacity to reflect the reality we are living in: *episteme*, *techne*, and *phronesis*. *Episteme* is scientific knowledge. It is objective and reflects our mental models of physical objects and their properties. *Techne* is knowledge about how we do things. *Phronesis* is a meta-knowledge because it integrates the decision-making and action based on that decision. It is usually translated as *practical wisdom* (Rocha, 2021; Rocha, Kragulj & Pinheiro, 2022). For Aristotle, knowledge was a result of learning using all our senses and intelligence. However, for other philosophers like Plato, knowledge was considered only a result of rational learning because senses could induce errors through our subjective perception. "It follows that we cannot know things through the senses alone, since through senses alone we cannot know that things exist. Therefore, knowledge consists in reflection, not in impression, and perception is not knowledge" (Russell, 1972, p. 153). These two different approaches continued to develop as two distinct streams of thought: rationalism and empiricism (Nonaka & Takeuchi, 1995).

The stream of rationalism was amplified by Descartes (1997) who constructed the theory of dualism between mind and body, and only the mind could create knowledge. His theory was concentrated on the famous saying *Cogito, ergo sum!* The stream of empiricism focused on the integration of rational thinking with experiential learning, leading to an integrated understanding of mind and body. For example, the Japanese philosophy of oneness of mind and body considers three main aspects of life: oneness of humanity and nature, oneness of mind and body, and oneness of self and others (Kaufman, 1994; Nakagawara, 2004; Nonaka, Toyama & Hirata, 2008). In the Western philosophy of science, Polanyi (1983) demonstrates that knowing is an integral process based on subjective perception, reflection, and objective thinking. He introduces the concept of *tacit dimension*, underlying the importance of the body in the process of learning. "I shall reconsider human knowledge by starting from that *we can know more than we can tell*" (Polanyi, 1983, p. 4; italics in original). Based on this concept of tacit dimension Nonaka (1994) introduced the concept of *tacit knowledge* and created the cognitive dyad of *tacit knowledge-explicit knowledge*. Tacit knowledge is personal knowledge acquired through direct practice and it is processed by our cognitive unconsciousness. It is that knowledge we learn when practicing sports, arts, or professional manual work. It contains insights, experiences, reflections on our emotional states, and values. Explicit knowledge is the result of using natural language to express tacit knowledge. Explicit knowledge is rational. Using metaphorical thinking, explicit knowledge can be illustrated as the visible part of an iceberg, while tacit knowledge is the hidden part of the iceberg under the water (Nonaka & Takeuchi, 1995, 2019).

The theory of knowledge fields and knowledge dynamics created by Bratianu (2011), and developed further by Bratianu and Bejinaru (2019, 2020, 2023), states that knowledge can be interpreted as a field, that is intangible, dynamic, and nonlinear. At the individual level, there are

three basic knowledge fields: rational knowledge, emotional knowledge, and spiritual knowledge. Each form of knowledge can be transformed into any other form of knowledge, creating continuous dynamics. *Rational knowledge* is the result of rational thinking and learning. It is objective knowledge that can be communicated using natural or symbolic languages, i.e. it is explicit (Davenport & Prusak, 2000; Massingham, 2020). Being objective, rational knowledge is intensively used in science, technology, education, and business. For many people, rational knowledge is the only form of knowledge used in managerial decision-making and business strategy. *Emotional knowledge* is the result of experiential learning (Bratianu & Bejinaru, 2019; Kolb, 2015). It reflects the emotional states people get as a consequence of their interaction with the external environment. Emotional knowledge is a result of processing information generated by our sensory system. It is wordless and can be communicated using body language and facial expressions. It is subjective because perceptions, emotions, and feelings are subjective (Damasio, 1999, 2012; LeDoux, 1999). Emotional knowledge is faster than rational knowledge and becomes critical in emergent situations (Kahneman, 2011). *Spiritual knowledge* reflects our ethical, moral, and professional values. It is crucial in decision-making and constructing our behavior. Spiritual knowledge is about our existence and our connections with divinity, regardless of the mode we conceive it (Bratianu, 2022; Kaiser, 2024; Nonaka & Takeuchi, 2019). "We have to learn to see aspects of the world around us: stones, people, trees, sky. Equally, we have to learn to see meaning and value in the world around us, in our environment, in events, in human actions and lives" (Maxwell, 2007, p. 274). Humans are creators of meanings and symbols that help them integrate into the social environment.

Human knowledge is created by our mind and body as a result of learning, in any form that learning can be produced. The well-known hierarchy of knowledge explains to us in a generic way that knowledge is obtained by processing data and information (Bratianu & Bejinaru, 2023; Rowley, 2007). Kolb (2015) explains that knowledge is created as a result of experiential learning. He proposed a cycle of knowledge creation containing the following basic processes: a) concrete experience; b) reflective observation; c) abstract conceptualization; and d) active experimentation. Concrete experience generates emotional knowledge. Reflective observation and abstract conceptualization transform emotional knowledge into rational knowledge. Reflective observation, abstract conceptualization, and active experimentation transform emotional knowledge and rational knowledge into spiritual knowledge.

Nonaka and Takeuchi (1995, 2019) developed another cycle for knowledge creation dynamics composed of the following four basic processes: a) socialization (S); b) externalization (E); c) combination (C); and d) internalization (I) – the SECI model. Socialization is the process where tacit knowledge can be transferred between different people or new tacit knowledge to be created. Externalization is the process of transforming tacit knowledge into explicit knowledge at the individual level. Explicit knowledge is created by our conscious zone of the brain using natural language, analogies, and metaphors. Combination is the process of explicit knowledge exchange between different people. It is a specific process of integrating individual knowledge into collective knowledge and creating team and organizational knowledge. Combination is processing and amplifying rational knowledge. Internalization is the process of transforming explicit knowledge into tacit knowledge at the individual level. This transformation can produce new tacit knowledge that contributes to changing behavior. The SECI cycle becomes a knowledge spiral in time, as shown by Nonaka and Takeuchi (2019). The spiral can be described by epistemology, ontology, and time dimensions. On the epistemology dimension, there are transformations between tacit and explicit knowledge at the individual levels. In the ontology

dimension, knowledge transfers between people and knowledge integration processes may create new collective knowledge. The time dimension of the SECI model shows that knowledge creation at individual and collective levels is a complex and dynamic process involving human intelligence.

Gardner (1983, 2006) proposed the theory of multiple intelligences, suggesting that each intelligence represents a capacity to process information and knowledge specific to a certain life domain. He defined the following fundamental intelligences: linguistic, logical-mathematics, spatial, bodily-kinesthetic, musical, interpersonal, intrapersonal, naturalistic, and existential. They can be grouped into three categories, according to the theory of knowledge fields (Bratianu & Bejinaru, 2019): rational intelligence, processing rational knowledge; emotional intelligence, processing emotional knowledge; and existential intelligence, processing spiritual knowledge. If we consider social processes, then we may define *social knowledge* as a meta-knowledge concerning relations between people in different social contexts. In this case, we may discuss about social intelligence (Goleman, 2007). It is important to understand how human knowledge is a product of learning (Bratianu et al., 2011) and processing data, and information by human intelligence before discussing about artificial intelligence and artificial knowledge.

Artificial intelligence and generative artificial intelligence

Artificial intelligence (AI) is a metaphor that reflects in the realm of the artificial (Simon, 1996) the human intelligence capacity to process data and information. However, in this case, we consider the Shannonian information that is different than the human information. Shannon defined the concept of information from a mathematical perspective, devoid of any meaning (Bratianu & Bejinaru, 2023). Based on Boolean logic and Shannonian information, researchers developed *information science* as "a discipline that investigates the properties and behavior of information, the forces governing the flow of information, and the means of processing information for optimum accessibility and usability. It is concerned with that body of knowledge relating to the origination, collection, organization, storage, retrieval, interpretation, transmission, transformation, and utilization of information" (Borko, 1968, p. 3).

John McCarthy coined the term *artificial intelligence* as a metaphor, at an international conference organized by Dartmouth College in 1956 (Baker, 2025; Lee & Qiufan, 2024; Russell & Norvig, 2022). The metaphor is powerful but the progress of the new research domain was slow because the computers were at that time in their developmental stage. The AI attracted significant attention when IBM's Deep Blue computer was able to win against Gary Kasparov in a chess competition, and when the Deep Mind's AlphaGo program beat the Go champion Lee Sodol, in 2016. The launch of ChatGPT in 2022 created an exponential interest in AI due to its capability to converse with a human operator using natural language (Baker, 2023, 2025). ChatGPT belongs to the new Generative Artificial Intelligence (Gen AI) domain, where AI applications can generate texts, images, and music imitating human capacity. Gen AI programs use *deep learning models* that simulate human learning and decision-making processes. The capability of constructing a dialogue with a human operator using texts is based on *large language models (LLM)*. The best product of these models is ChatGPT (Generative Pretraining Transformer), developed by OpenAI (Baker, 2023). The question we considered for the present research is how can we interpret the outcomes of ChatGPT conversations with reference to human knowledge.

Methodology

This is a conceptual paper that is based on a critical literature review. We studied significant papers indexed in Web of Science, Scopus, and other databases focusing on human knowledge, human intelligence, and artificial intelligence. Also, we studied the specifics of the science of the artificial (Simon, 1996). Reflecting on the initial question of the present research, we interpret the products of Gen AI applications through the lens of the science of the artificial.

Discussions

Artificial knowledge

Computers do not reproduce human brains. They do not have perception, reflection, judgment, and wisdom. They compute based on algorithms written by humans. Their language is based on the binary alphabet composed of 0 and 1, and the Boolean algebra. However, they have amazing power and speed in performing computations that give them a certain advantage over the human brain, especially in solving complex sets of mathematical equations.

By analogy with human learning, researchers explain that *machine learning* is a process of improving the performance of a software program after some training. "When the agent is a computer, we call it machine learning; a computer observes some data, builds a model based on the data, and uses the model as both a hypothesis about the world and a piece of software that can solve the problem" (Russell & Norvig, 2022, p. 651). Learning can be supervised or unsupervised. In *supervised learning*, the algorithm is built to search for patterns between input and output data and to use those patterns for predictions. For instance, based on a training process with millions of images taken from the Internet, the machine is able to identify a "car" or an "airplane" when shown the respective images. In *unsupervised learning*, the machine learns patterns from the input set of data, without any connection with the output. Then, those patterns are used in predict the result of a new search. For example, after feeding a computer with millions of images of all sorts of dogs, it is capable of "learning" what is a dog and recognizing its image from a new set of data. The result of machine learning is a pattern or several patterns that are able to make predictions like human brains. The anatomy of the learning process is not the same for the human brain and the computer algorithm but the final results are similar.

Researchers use the expression *deep learning* when computers use complex neural networks, in structures with many layers to construct patterns based on Big Data as input. Deep learning is currently the most used technique for applications like machine translation, visual object recognition, speech recognition, and image synthesis (Baker, 2023, 2025; Russel & Norvig, 2022; Lee & Qiufang, 2024). When Big Data was not enough for training computers to learn, engineers generated *synthetic data*, i.e. data generated by the computer, without any relationship with a given piece of reality. In this case, a computer generates its own data and generates patterns able to anticipate new solutions for new problems. "With synthetic data, AI never has to leave its digital space where it can exercise complete control over any input and output of its processes. In more epistemological terms, synthetic data give AI the privileged position of maker's knowledge" (Floridi, 2023, p. 35).

Artificial knowledge is the result of processing huge databases or synthetic data by computers and generating outputs in line with the tasks formulated as inputs (Baker, 2023, 2025; Floridi, 2023; Russell & Norvig, 2022). Artificial knowledge is similar to human knowledge from the perspective of its generation as a result of a learning process. However, artificial knowledge is not a result of a cognition process and is not produced within a certain semantic field, like human knowledge. In the human learning process, meanings are essential because

people are creators of meanings and symbols. In the case of machine learning, there is no semantics. Artificial knowledge is generated based on a system of syntactic rules because computers don't have any semantic universe. Artificial knowledge is produced in concordance with some patterns created by the software programs during the training sessions. It is constructed based on some deterministic or probabilistic processes. In Gen AI applications engineers designed statistical processing mechanisms. For instance, "ChatGPT works by predicting which words will follow your prompt. It knows nothing. It calculates probabilities and issues an output with the highest probability of being correct, which can turn out to be 100 percent wrong" (Baker, 2023, p. 80). Unlike human knowledge that is *justified true belief* (Nonaka & Takeuchi, 1995), artificial knowledge has no relationship with any truths and there is no procedure to justify it. On the contrary, it must be checked because of the tendency of any ChatGPT to produce *hallucinations*, which may increase the level of knowledge risks (Bratianu et al., 2020).

As Baker remarks, "ChatGPT is predicting which words will follow your prompt, fulfill your intent, and adhere to the context in the prompt. When it predicts – or guesses – incorrectly but has determined on its own that this wrong response has a high probability of being correct, it is said to be *hallucinating*" (Baker, 2023, p. 35; italics in original). That is a paradox because artificial knowledge is generated by algorithms based on syntax and not semantics. ChatGPT does not understand any semantics and from this point of view, the output can be correct from the syntax used but wrong from our semantic point of view. We are giving sense and meaning to a ChatGPT answer within the framework of the input formulated in the prompt because its output is only a prediction of the most likely words to match the context created by the prompt.

A comparative analysis between human knowledge and artificial knowledge reveals that artificial knowledge is exclusively rational, as a result of an algorithm. There is no way to discuss about emotional knowledge because technology cannot be emotional. Also, technology cannot reflect upon itself and develop a set of moral and ethical values and principles. Therefore, artificial knowledge lacks the richness, depth, and intensity of human knowledge.

The impact of AI and AK on knowledge management systems

Knowledge management systems (KMS) are complex systems composed of humans and technology that process data, information, and knowledge to create value for the company and society. They are integrated components of the general managerial systems that have the purpose of using efficiently and effectively all resources of a given company to achieve competitive advantage. KMS processes only intangible resources.

The impact of AI and AK on KMS is significant because of the power of AI and especially Gen AI to generate AK and contribute to solving complex problems with an amazing speed. The family of ChatGPT systems creates the illusion of human conversations and interventions in the decision-making processes. Therefore, the impact is on the main knowledge management processes: knowledge creation, knowledge acquisition, knowledge sharing, knowledge transfer, knowledge translation, and knowledge use to produce value. However, managers must understand the limitations of artificial intelligence and the rational and synthetic nature of artificial knowledge. Also, managers should understand that "Computers are unable to reflect on their performance, to know that it knows as does a human person. Computers as already noted, can never step outside the code, reflect on the code, and contribute their own observations" (Sangzoni, Guzman & Bush, 2017, p. 11). Artificial knowledge does not replace human knowledge, but it complements it. Therefore, integrating artificial knowledge into

knowledge management systems constitutes a challenge of knowledge managers. The overall impact of integrating AI and AK in KMS can be measured by a significant increase in the power of knowledge processing, in the range covered with useful knowledge, and in the speed of decision-making. All of these will enhance the agility of the organization and will contribute to achieving a competitive advantage.

Some ethical issues of using AI and AK in KMS

Artificial intelligence applications are just tools. Like any other tool, they are not good or bad. They are neutral with respect to human values. However, they can be used to produce good or bad results, with great achievements or with harmful consequences for society. That has been discussed over and over, and many national or international institutions make efforts to create adequate legislation for using AI and AK (Baker, 2023, 2025; Floridi, 2023).

A hot topic exploded with the use of ChatGPT in academic and research activities. Many students started to ask ChatGPT to answer their homework questions and requirements, breaking this way the university's code of conduct. Similar situations happened in research when some authors prepared their papers using ChatGPT. All of these activities are non-ethical and they should be avoided by new ethical standards.

An important question that has not been answered yet concerns the intellectual property of artificial knowledge. Using artificial knowledge in writing research papers or preparing university dissertations increases the phenomenon of plagiarism and puts in a shadow the originality of those research outcomes.

Conclusions

The extensive use of artificial intelligence in the last years created the need to recognize that the output of all those tools is *artificial knowledge*. The purpose of this paper is to reveal the existence of this construct and to show its similarities and dissimilarities with respect to human knowledge. Artificial intelligence and artificial knowledge belong to the realm of sciences of the artificial, as demonstrated by Herbert Simon.

Artificial knowledge is exclusively rational and it is generated based on syntactic rules. It is a paradox that we consider the text outputs within a semantic framework although Gen AI uses only syntactic rules. Computers don't think like humans and don't have any semantic universe. They cannot understand meanings. They operate based on complex algorithms. Artificial knowledge does not reflect any truth, as is the case for human knowledge – a justified true belief.

Using artificial intelligence and artificial knowledge raises many ethical and moral issues that should be discussed and clarified, both in the academic and research environment. Also, the intellectual property of artificial knowledge remains an unsolved issue for the moment.

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