



Artificial Intelligence and the Transdisciplinary Human Mediation of HPTD-M

Leonardo da Silva Guimarães Martins da Costa*

Leonardo da Silva Guimarães Martins da Costa, Eng., MBA. Deputy Secretary-General of CIRET, Paris, France. Independent transdisciplinary theorist (HPTD-M). E-mail: leosgmc@gmail.com

*This paper reflects this author's opinion, not necessarily any public or private institution's view.

Received 28 November, 2023; Revised 9 January, 2024; Accepted 9 January, 2024

Available online 9 January, 2024 at www.atlas-tjes.org, doi: 10.22545/2024/00243

Abstract: *This article studies the scope of Artificial Intelligence (AI) through the HPTD-M theory, i.e., the Holopraxis Transdisciplinary Management. It aims at collaborating to the debate on the limits of AI, including ChatGPT simulations, comparing the four types of intelligence in the HPTD-M Theory, namely empirical, emotional, rational, and intuitive, with the nine types of Gardner's multiple intelligences theory (MI Theory). The types of intelligence are also compared with psychosomatics, the emotional shadow of the Western culture, the levels of the collective unconscious, and soft skills. The concept of mediating manager has an essential role in showing the limits of AI, which is an exceptional instrument for KNOWING but not UNDERSTANDING. An example of adequate use of AI through ChatGPT is demonstrated through a discussion on Plato's four virtues. A table considering the HPTD-M quaternary structure of intelligence shows how there cannot be consciousness awakening in AI, since it is limited to rationality. Besides, the HPTD-M's three types of logic, i.e., Binary, Feedback, and Included Third, are another way to demonstrate that AI is based merely on the Binary logic. Management tools need to be used a priori with awareness of the limits of their applications. AI is no different, a disruptive technology that every professional will have to learn to deal with, like the personal computer in the late 1980s, an excellent rational tool, but not an empirical, emotional, or intuitive resource for problem solving. The AI binary logic does not apply to the complexity of human phenomena. Furthermore, AI can function as a consultant or assistant in terms of an efficient source of information, but not as an effective manager or decision maker. Roughly, through the managerial theory, effectiveness is to do the right thing, which is more than efficiency (to do things right). Then, in this author's opinion constructed through simulations in the ChatGPT to obtain efficient results, the questions to AI need to be objective and precise in the concepts. There cannot be complex issues involving human phenomena: This is for the effective human decision maker, not for AI to answer since there can't be consciousness awakening in AI.*

Keywords: Artificial Intelligence, Transdisciplinarity, HPTD-M, Mediation, Organizations, Problem solving.

1 Introduction

Since the end of the 18th century, the Modern Age has promoted undeniable advances in the field of technoscience and quality of life in material terms. However, it has created a cycle of hypertrophy of binary logic and rationality, excluding intuition and empiricism from the scientific debate, making it difficult to solve concrete issues involving the complexity of human phenomena: Emotional intelligence tends to be absent. So, Western culture tends to be reduced to a mix of science (focused on causality) and ideology (as a result of dogmatism answering what science cannot explain): This creates conflicts between different cultures.

All this considered, this article studies the scope of Artificial Intelligence (AI) through the HPTD-M theory (*Holopraxis Transdisciplinary Management*) and aims at collaborating to the debate on the limits of AI, a disruptive technology as the personal computer was in the 1980s, in the sense of being an excellent instrument of rational intelligence and knowledge. However, from a transdisciplinary point of view, it does not seem to offer an answer to human conflicts and human phenomena, so it is not a solution for everything, as will be demonstrated in this article, using not only the HPTD-M with four types of intelligence but also ChatGPT simulations, the Gardner's MI theory with nine types of intelligence (multiple intelligences), as well as psychosomatics, the emotional shadow of the Western culture, the levels of the collective unconscious, and the reflections on soft skills. An example of adequate use of AI through ChatGPT is given through Plato's four virtues, in the sense that the questions need to be objective and precise in the concepts to obtain efficient results. Finally, the concept of mediating a manager has an essential role in showing the limits of AI, together with the demonstration through Table 1 that there cannot be consciousness awakening in AI.

Finally, this article involves this author's presentation as speaker, co-mediator, and co-organizer of the online International Symposium *Artificial Intelligence and Human Mediation*, of November 21-22, 2023, promoted by CIRET, a French NGO that promotes international research and studies in connection to transdisciplinarity: <http://ciret-transdisciplinarity.org/>, of which this author is a member. During the speakers' discussions in the two days panel, Dr. Mariana Thieriot Loisel proposed these four questions for the panel, revised by Dr. Florent Pasquier, president of CIRET, which this author answered as transcribed below. As a co-mediator of the panel, this author also made a closing speech before the president of CIRET after the four questions.

1. Is it possible to agree on a definition of “human being” within a transdisciplinary: technoscientific and philosophical perspective?

The human being can be seen as four ways of comprehension of reality, which are technoscience (technology in interaction with science), philosophy, tradition, and art. Those four are the main disciplines considering a Brazilian holistic transdisciplinary approach: This means the creation of an integrated comprehension, beyond and through disciplines. On the other hand, Artificial Intelligence cannot go beyond a rational tool and is unable to interact with disciplines in a human sense.

2. What are the main causes of inhumanity that block the evolution of certain zones of our society and that still generate cultural conflicts?

The Modern Age has created a focus on binary logic and rationality, which tends to exclude intuition and empiricism from scientific debate, making it difficult to solve concrete issues involving the complexity of human phenomena. Emotional intelligence seems to be almost absent in this discussion. So, Western culture tends to be reduced to a mix of science (focused on causality: cause and effect relations) and ideology. Ideology, in turn, is a result of dogmatism answering what mere science cannot explain. In my opinion, this is the origin of most cultural conflicts. Then, Artificial Intelligence should be used considering its limits of application as a tool, or else it can stimulate dogmatism through its mere rationality, coming to the same problem of scientism, which uses dogmatism to explain what is beyond science.

3. How can we develop problem-solving strategies to properly address the conflicts we dealt with yesterday (human; society) affecting nature and complex systems through human mediation? (locally/internationally).

In my perspective there are basically two questions: 1) To understand that human conflicts are complex and need to be solved through the Included Third logic, meaning the dialectical process, not the Binary Logic of Right and Wrong, True and False, Good and Evil, Manichaeism, scientism, or dogmatism. 2) Soft skills and hard skills have to interact in a complementary way through the process of looking for an agreement to solve conflicts.

4. Can we find a place at the University & in organizations: A GREY AND FUZZY ZONE to discuss these problems through an open, non-violent, and transdisciplinary dialogue?

I have experience with working groups in public administration complex problem solving. Yes, we can find a place, if in working groups we are aware of our unconscious ideological bias, our shadows, and accept different perspectives of reality. We must discuss positions we don't like. Not accepting discussion of certain questions configures emotional immaturity and the incapacity to concretely deal with problems. Furthermore, professors who try to impose their ideology on their students are not professors, but gurus, and must be despised because they are indirectly creating more conflicts in civil society when not accepting to discuss different points of view.

This author's final speech as mediator before the president of CIRET closed the event:

If we are talking about Artificial Intelligence, we need to be aware of our Western Culture's mechanistic and rational bias. In this connection, the risk of this AI tool is to be used in the context of scientism feedbacked by dogmatism, which hinders any attempt to solve conflict problems. So, we need to be aware of our own ideological biases before trying to mediate conflicts, to respect different cultures and perspectives. This means we must be mediators of ourselves, of our own shadows, before trying to mediate groups.

After the Symposium discussion, it was created by CIRET a group for the discussion of AI and transdisciplinarity, envisaging concrete problem solving in organizations and civil society, which demands time, collective thinking, and emotional welcoming. In fact, problem solving will demand authenticity in information sharing, which requires a transdisciplinary mediation with empiricism, emotional intelligence, rationality, and intuition. Finally, to achieve informational transparency and agree with the new technoscientific directions, we need time. Scientists tend not to be allowed to think together because of economic reasons. There seem to be no financial investments by governments and universities in transdisciplinary research because it demands extra time of dialogue after the scientific work. Transdisciplinarity means beyond and through disciplines, not only multidisciplinarity (many disciplines not interacting), or interdisciplinarity (interactions between and among disciplines). So, disciplinarity complements transdisciplinarity and vice-versa.

2 ChatGPT and Technoscience

There can be certain risks of the indiscriminate use of AI, given the concrete example simulated in ChatGPT, a program from a Microsoft startup that interacts in a conversational dialog format allows ChatGPT to answer follow-up questions, admit its mistakes, dispute incorrect assumptions, and reject inappropriate requests. [1]

ChatGPT itself answered the question if it is a platform: It is an AI language model developed by OpenAI. The model is designed to understand and generate human-like text based on the input it receives. It can be integrated into various platforms, applications, or systems to provide conversational capabilities. So while ChatGPT itself is not a platform, it can be used as a component within a platform to enable natural language interactions with users.

According to the Brazilian Dom Cabral Foundation (FDC), Microsoft invested USD 1 billion in OpenAI, a startup company that released ChatGPT in November 2022. The technology works by learning from large amounts of data how to respond to any request from a user in a human-like manner, offering information like a traditional search device but in a prose manner. [2]

In the context of the example that was thought of within HPTD-M, it is worth clarifying that there are basically four ways of reading reality, something settled in transdisciplinary scholars and through the Brazilian holistic transdisciplinarity: **technoscience** (technology + science), **philosophy**, **tradition** (includes culture and religion), and **art**. [3]

In developing the example, this author found that ChatGPT recognizes technoscience as the interplay of technology and science.

- **Question:** Can technoscience be understood as technology + science? Can technology create effective solutions independent or unexplained by science?
- **ChatGPT:** Technoscience is a term used to describe the interplay between technology and science. It recognizes the close relationship between the two fields and highlights their interconnectedness in modern society. Technoscience can be understood as a collaborative and integrated approach that combines scientific knowledge and technological advancements to address complex problems and develop innovative solutions.

Science provides the theoretical framework, methodologies, and empirical evidence to understand the natural world and its phenomena. It involves systematic observation, experimentation, and analysis to generate knowledge and explain how things work. On the other hand, technology refers to the practical application of scientific knowledge for practical purposes, aiming to create tools, devices, systems, and processes that enhance human life or solve specific problems.

While technology often relies on scientific principles and discoveries, technology can create effective solutions that are not fully explained or understood by existing scientific knowledge. In some cases, new technologies may be developed through trial and error, practical experimentation, or even by harnessing empirical knowledge gained from experience without a complete understanding of the underlying scientific principles.

Moreover, technology can also contribute to advancing scientific knowledge itself. New tools and instruments developed through technological innovation can enable scientists to make new observations, collect more accurate data, and explore previously inaccessible realms. This, in turn, can lead to the generation of new scientific theories and concepts.

However, it is important to note that the relationship between technology and science is symbiotic, and they often reinforce each other. Scientific discoveries provide the foundation for technological advancements, while technology, in turn, enables further scientific exploration and understanding. Thus, while technology may create effective solutions that go beyond our current scientific understanding, it is the synergy between technology and science that drives progress in the long term.

Although ChatGPT recognizes the concept of technoscience, as seen in the holistic transdisciplinarity of Weil, D'Ambrosio, and Crema [3] besides HPTD-M itself, ChatGPT does not admit there are technologies not explained in any way by science. However, this author, a civil engineer with professional experience in the area, has already seen some engineers that use empirical formulas for dimensioning: They have already discovered that technologies or techniques can be independent of science.

Another example comes from the health area. Once, this author watched an interview with Dr. Zerbini, a surgeon who performed the first heart transplant in Brazil (1968). The doctor reported seeing personally how the health system worked in China, impressed with a lung surgery in which the patient was anesthetized only with acupuncture.

In this context, some physicians and scientists, not being able to explain acupuncture scientifically, simply deny its existence, in this same isolated rationalist paradigm of the ChatGPT, and therefore do

not admit that a technique such as acupuncture exists independent of science. It is very risky to deny the existence of something simply because it cannot be explained rationally or scientifically, even if empirically it is evident, like the “off-label” prescription of medicines by physicians: They understand that it works but don’t know the mechanism. This is one of the risks of AI, if used indiscriminately, as this author envisions through the following analytical and synthetic HPTD M models.

3 HPTD-M Framework: Analytical and Synthetic Models

Jung’s Analytical Psychology, which cannot be confused with Freud’s Psychoanalysis, is one of the references of the HPTD-M Theory. The celebrated Jungian analyst Marie-Louise von Franz explains the quaternary structure of the psyche as universal patterns that were discovered by both modern physics and Jung empirically in his patients, as a psychiatrist, through the psyche functions of sensation, feeling, thinking, and intuition. [4]

Those four psyche functions of sensation, feeling, thinking, and intuition are essentially connected to the ancient principles of earth, water, air, and fire, respectively, as seen in Greek philosophy (Empedocles) and the European Alchemical Tradition, also related directly to the physical states of matter, i.e., solid, liquid, gas, and plasma. Therefore, a clear correspondence between psychology and physics emerges.

Jung himself already hinted in a 1957 interview that the psyche is a quality of matter, a different kind of matter. [5]

In physics, a state of matter is one of the distinct forms in which matter can exist. Not by coincidence, four states of matter are observable in everyday life. In the 20th century, increased states of matter were generally described based on qualities that can be seen or felt. Matter that feels hard and maintains a fixed shape is called a solid; matter that feels wet and maintains its volume but not its shape is called a liquid. Matter that can change both shape and volume is called a gas. Some introductory chemistry texts name solids, liquids, and gasses as the three states of matter, but higher-level texts recognize plasma as the fourth state of matter. Plasma is an ionized gas, a gas into which sufficient energy is provided to free electrons from atoms or molecules and to allow both species, ions, and electrons, to coexist. Plasma is the most common state of matter in the universe comprising more than 99% of our visible universe and most of that is not visible. Plasma occurs naturally and makes up the stuff of our sun, the core of stars, and occurs in quasars, x-beam-emitting pulsars, and supernovas. [6]

The HPTD-M theory is based on this quaternary structure of the psyche which is also reflected in physics and leads to the psychosomatics approach of Figure 5. HPTD-M also involves the complementarity principle, as seen in:

- Philosophy: Heraclitus’ Greek concept of enantiodromia and Taoist Ying-Yang.
- Modern Physics (Quantum and Relativistic): De Broglie’s wave-particle duality, Einstein’s mass-energy convertibility, Bohr’s concepts on subject-object and conscious-unconscious.
- Analytical Psychology: Jung’s complementarities can be seen in many ways, such as a conscious-unconscious, subject-object, introversion-extraversion (terms created by Jung), judgment perception, thinking feeling, and intuition-sensation.

So, the HPTD-M framework is about quaternary complementarities, i.e., opposites interacting in a quaternary structure or dualities seen through four elements. This perspective is demonstrated in the HPTD-M analytical model of Figure 1 and the synthetic model of Figure 2, whereby the four elements are shown in the vertices of the cross made of the blue axis and red axis, which can be seen as a Cartesian plane, translated into i) types of intelligence – empirical, emotional, rational, and intuitive; ii) dualities concrete-abstract and objective-subjective, besides four elements – concrete, subjective, objective, and abstract; iii) problem-solving requirements – feasibility, reasonableness, rationality, and meaningfulness; and iv) troubleshooting attributes – effectiveness, sustainability, simplicity, and dialectics. The idea of the mediating manager in organizations comes from the quaternary complementarities paradigm developed from 2022 to 2023. [7, 8, 9, 10]

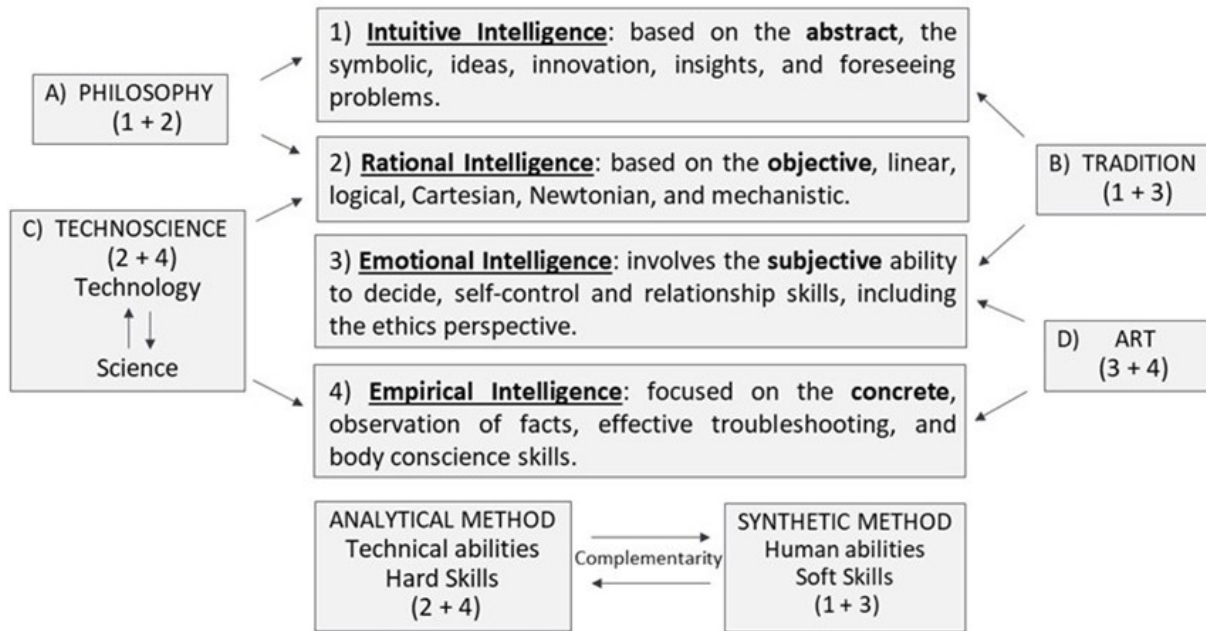


Figure 1: Simplified HPTD-M Analytical Model Showing Quaternary Complementarities [10]

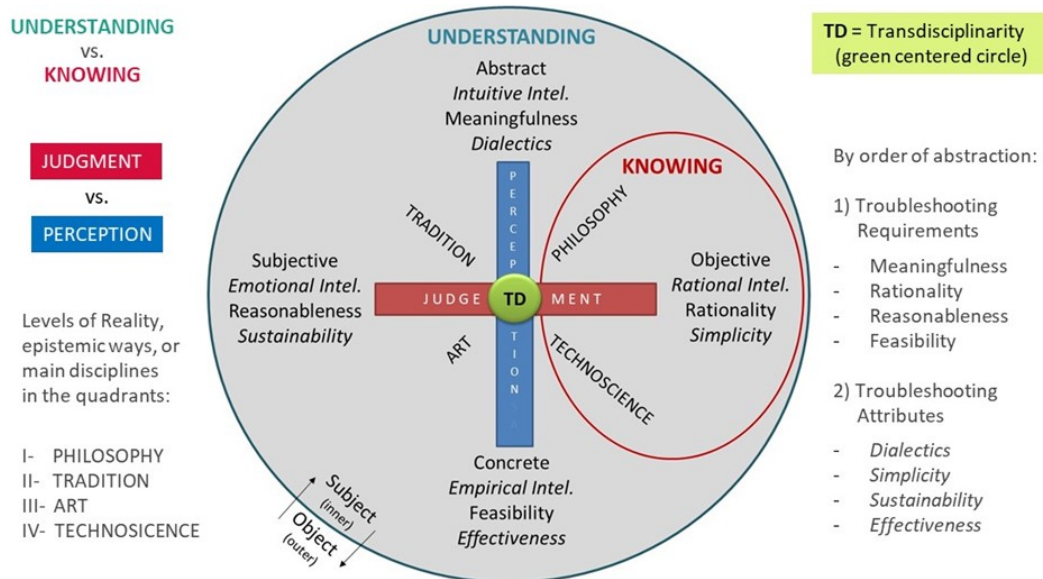


Figure 2: Full HPTD-M Synthetic Model of Quaternary Complementarities [7, 8, 9, 10]

In the HPTD-M framework, these four elements unfold in dualities or complementarities, such as human abilities (soft skills) represented by intuitive and emotional intelligence, through a dialogue with the technical abilities (hard skills) represented by rational and empirical intelligence. Another complementarity is evidenced in Figure 2, based on Jung’s psychological functions and the MBTI system of self-leadership and management (Myers-Briggs Type Indicator). It involves the red horizontal axis of the judgment functions (emotional and rational intelligence), in dialogue with the blue vertical axis of the perception

functions (intuitive and empirical intelligence). So, the idea of quaternary complementarities is a key to the HPTD M theory such as **soft skills vs. hard skills** and **judgment vs. perception**. There are others, such as epistemic forms or disciplines, that can be considered from the perspective of the Cartesian plane in Figure 2, formed by the horizontal axis of judgment and the vertical axis of perception, identified by the quadrants I, II, III, and IV, respectively:

- I- Philosophy** (rational and intuitive intelligence).
- II- Tradition** (intuitive and emotional intelligence).
- III- Art** (emotional and empirical intelligence).
- IV- Technoscience** (empirical and rational intelligence).

These connections are relative because art has intuitive aspects, tradition has developed rational foundations, and science itself often starts its theories at an intuitive level. Therefore, this model cannot be treated with a peremptory binary logic, but as the logic of the Included Third, known to transdisciplinary academia to solve complex problems. So, the HPTD-M synthetic model of Figure 2 sounds more like a compass, as a reference of direction, than a thermometer that measures quantities.

Also in Figure 2, apart from the four elements, it is understood that the concept of **UNDERSTANDING is much more than KNOWING**. The transdisciplinarity (TD) in the center represents the vision beyond and through the four elements, for COMPREHENSION in a broader sense to solve problems.

For the Chilean economist Max-Neef (1932-2019), an ex-professor of Stanford and Alternative Nobel Awarded in the early 1980s for his theory of Barefoot Economics: formal knowledge, linked to reason, is constructed according to the rules of method and causality, while understanding, more linked to intuition, regulates method and causality:

A strange sort of shyness seems to prevail in the sense that confessing the contribution of intuition may be perceived and ridiculed as indecent exposure, not worthy of a true scientist. Einstein, who could afford to be above and beyond such shyness, declared that “the intuitive mind is a sacred gift, and the rational mind is a faithful servant. We have created a society in which we honor the servant and have forgotten the gift.”

*“When Niels Bohr, the illustrious Danish physicist, was granted a title of nobility by the king of Denmark, as a tribute to his transcendental contributions to science and the culture of his country and the world, he was asked to make suggestions for the design of his coat of arms. His request was to put on the tincture the Taoist symbol of the Yin and Yang, and below the sentence: *Contraria sunt Complementa*. Through that act he revealed the essence of the most transcendental truth his wisdom had allowed him to surmise.” (Mallmann et al., 1979). [11]*

Also for Max-Neef in his book *La Economía Desenmascarada*, about his experience, initially as a professor of economics at Berkeley:

My whole discourse as a conventional economic academic was completely inadequate for me to say anything meaningful. I was used to diagnosing and analyzing, but I was not used to understanding. [12]

For Brazilian Roberto Crema (1951-), anthropologist, psychologist, creator of the Fifth Force in Therapy, and transdisciplinary theorist, there is a hypertrophy of information and knowledge, of broad, unrestricted, and immediate access, concomitant to the atrophy of the process of discernment and understanding. [13]

Still from Figure 2, apart from the four elements, it appears that the concept of UNDERSTANDING is broader than KNOWING. Transdisciplinarity (TD) in the center represents the vision beyond and through the four elements, for UNDERSTANDING in a broader sense for problem solving.

Finally, Figure 3 is the full HPTD-M Analytical model, which cannot be understood merely with a binary logic of “right and wrong” or 0 and 1 of Western culture, but also at the highest level of complexity as the logic of the Included Third, dialectics, expressing the middle-way to solve the most complex problems

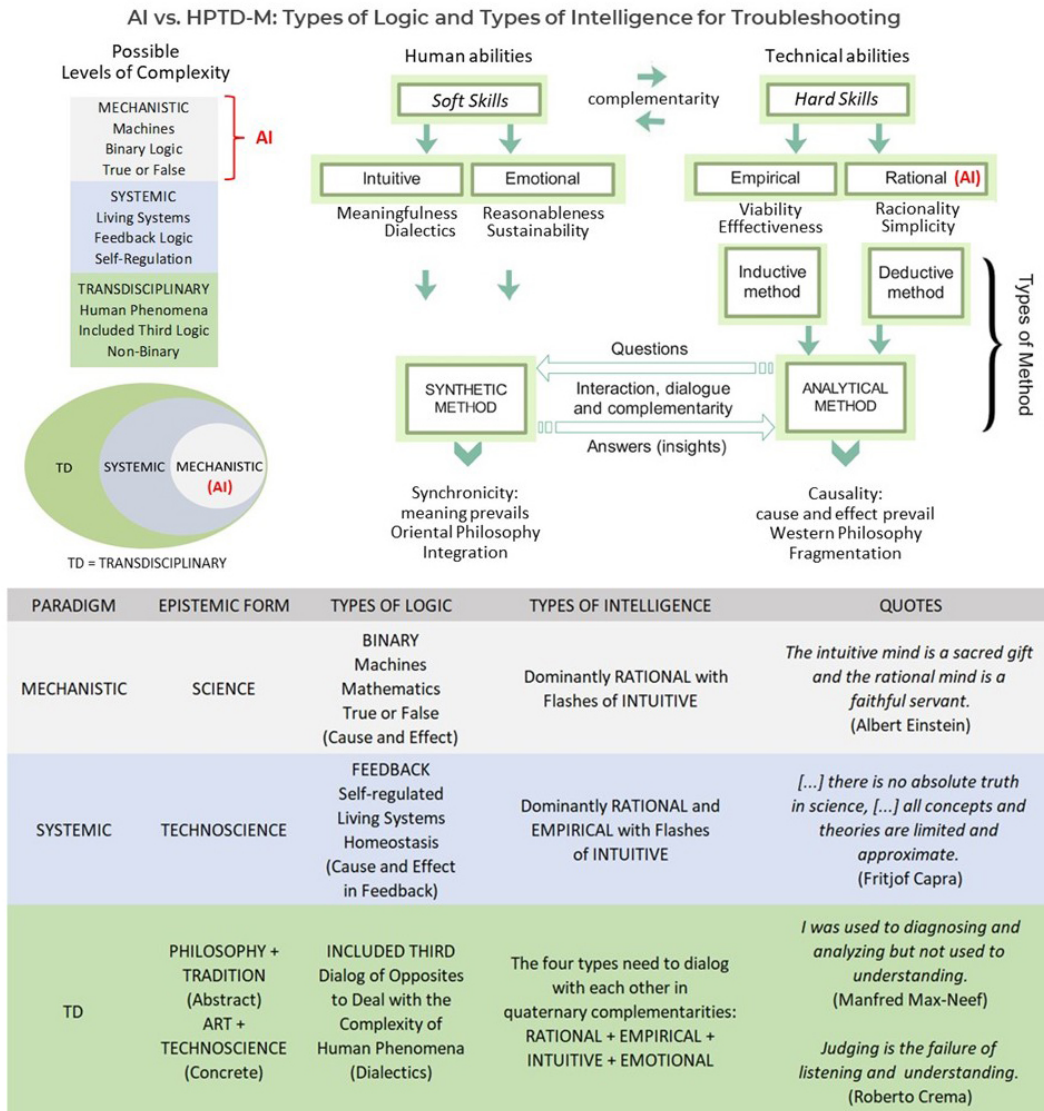


Figure 3: Full HPTD-M Analytical Model and AI Scope. Sources: Whole Figure [10]; direct quotes in the last column: Einstein [11], Capra [14], Max-Neef [12], and Crema [13]

of human phenomena, or as an intermediate logic of feedback, typical of living systems in Capra’s systemic holistic view. So, there are three levels of complexity for problem solving in logical terms: Binary Logic, Feedback Logic, and Included Third Logic. The most suitable for each concrete case must be used, considering the requirement of simplicity for problem solving.

Not only through the types of intelligence the scope of AI can be demonstrated but also by the three levels of complexity and the four epistemic ways correlated to those four types of intelligence. This idea was fully explained and presented by this author on July 30, 2023. Between minute 8 and minute 53 of the presentation in English, which was simultaneously translated from English to Portuguese with comments of Prof. Dr. Mariana Thieriot Loisel, the coordinator of the event: *The Transdisciplinary Mediator for Effective Problem Solving in Organizations and Civil Society*. [10]

During the presentation, there was a dialogue in French, translated to English, with Hubert Landier

from Paris, a mediation-oriented economist who practices social auditing in organizations. Dr. Landier was satisfied and identified with HPTD-M's presentation. On the same day, Dr. Landier shared with this author an excerpt from his book *Social Monitoring and Social Climate Audits: Why and How?*

Participants from the USA, Canada, France, Japan, Morocco, and Brazil attended the presentation, including Sorbonne professor Dr. HDR Florent Pasquier, President of the *Centre International de Recherches et Etudes Transdisciplinaires* (CIRET), who promoted the presentation in collaboration with Brazil's CETRANS.

4 MI Theory compared to HPTD-M in ChatGPT

There is a typology of nine intelligences in MI Theory, the multiple intelligences theory by Harvard professor Howard Gardner. As presented by Northern Illinois University [15]:

Gardner's Multiple Intelligences Summarized

1. *Verbal-linguistic intelligence (well-developed verbal skills and sensitivity to the sounds, meanings, and rhythms of words)*
2. *Logical-mathematical intelligence (ability to think conceptually and abstractly, and capacity to discern logical and numerical patterns)*
3. *Spatial-visual intelligence (capacity to think in images and pictures, to visualize accurately and abstractly)*
4. *Bodily-kinesthetic intelligence (ability to control one's body movements and to handle objects skillfully)*
5. *Musical intelligences (ability to produce and appreciate rhythm, pitch, and timber)*
6. *Interpersonal intelligence (capacity to detect and respond appropriately to the moods, motivations, and desires of others)*
7. *Intrapersonal (capacity to be self-aware and in tune with inner feelings, values, beliefs, and thinking processes)*
8. *Naturalist intelligence (ability to recognize and categorize plants, animals, and other objects in nature)*
9. *Existential intelligence (sensitivity and capacity to tackle deep questions about human existence such as, "What is the meaning of life? Why do we die? How did we get here?")*

ChatGPT also lists those nine types as Linguistic, Logical-Mathematical, Spatial, Musical, Bodily-Kinesthetic, Interpersonal, Intrapersonal, Naturalistic, and Existential.

Considering the HPTD-M was published in 2022 and the ChatGPT database is not beyond September/2021, ChatGPT does not recognize the relationship that this author made between Jung's four functions, sensation, feeling, thinking, and intuition, to conceptualize, within the HTPD-M theory, respectively the empirical, emotional, rational, and intuitive types of intelligence. In this sense, some simulations were made on ChatGPT in search of relationships between the HPTD-M's and Gardner's types, with specific questions, indirectly, starting from the functions of Jung. Thus, distortions and difficulties arose, such as relating spatial intelligence to intuition, which sounds absurd, and not relating intrapersonal intelligence to emotional intelligence, as if this was also linked to intuition (a misunderstanding). The reproduction below reflects the problem:

- **Question:** *Can you describe Gardner's nine intelligences and compare them to Jung's four functions, as if Jung's functions could be considered 4 intelligences?*
- **ChatGPT:** *Certainly! While Jung's four functions are not typically framed as intelligences, we can explore how they might relate to Howard Gardner's nine intelligences. It's important to note that this is an interpretation and not a direct correlation, as Jung and Gardner developed their theories within different contexts. With that in mind, let's examine the comparison:*

Thinking Function (Jung) vs. Logical-Mathematical Intelligence (Gardner):

Jung's thinking function involves objective analysis and logical reasoning. This can be loosely associated with Gardner's logical-mathematical intelligence, which encompasses skills related to mathematical reasoning, problem-solving, and logical thinking.

Feeling Function (Jung) vs. Interpersonal Intelligence (Gardner):

Jung's feeling function focuses on subjective values and empathy. While not an exact match, it can be compared to Gardner's interpersonal intelligence, which involves the ability to understand and interact effectively with others, showing empathy, and perceiving their emotions and motivations.

Sensation Function (Jung) vs. Bodily-Kinesthetic Intelligence (Gardner):

Jung's sensation function is related to the perception of sensory information and concrete experiences. It can be loosely associated with Gardner's bodily-kinesthetic intelligence, which involves skillful control and coordination of bodily movements, as well as a heightened awareness of the physical environment.

Intuition Function (Jung) vs. Spatial Intelligence (Gardner):

Jung's intuition function is characterized by perceiving patterns, possibilities, and connections beyond the immediate sensory information. While not a direct match, it shares some similarities with Gardner's spatial intelligence, which involves the ability to think in terms of visual and spatial representations, such as mental imagery, spatial reasoning, and navigation.

It's important to reiterate that these comparisons are an attempt to draw connections between the two frameworks. However, they should be understood as speculative and not definitive. Both Jung's four functions and Gardner's nine intelligences are complex constructs, and any attempt to map them onto each other will be an approximation rather than an exact match.

Therefore, in this author's view, which involves not only the rational aspects of AI, but it seems a broader understanding on a transdisciplinary level, the **four types of intelligence in the HPTD-M Theory** can be related to the **nine types in the MI Theory**, respectively, as follows.

Intuitive intelligence is connected to **existential**, as it is based on the abstract and sense-making.

Rational intelligence is related to **logical-mathematical** because it is objective, linear, logical, and mechanistic.

Emotional intelligence is connected to **intrapersonal and interpersonal** because it involves the human ability for self-control and relationships with others.

Empirical intelligence is related to **spatial-visual, bodily-kinesthetic, and naturalist** because it is focused on the concrete, on what can be experienced through the five senses.

Finally, **intuitive, emotional, and rational types of intelligence** can be connected or related to **musical and verbal-linguistic**, because both music and language involve abstract questions of meaning (making sense), subjective questions, and objective questions, respectively connected to intuition, feeling, and thinking.

Those are only approximations of reality because any taxonomy has its limits and cannot be peremptory or definitive. However, **HPTD-M is based on the four archetypal elements, transdisciplinary universal patterns from Greek Philosophy, European Alchemical Tradition, Modern Physics, and Jungian Psychology**, i.e.:

- Greek and Alchemical symbols of Earth, Water, Air, and Fire, considering Empedocles, Heraclitus, and Isaac Newton.

- Physical states of matter, Solid, Liquid, Gas, and Plasma.
- Psychological functions of Sensation, Feeling, Thinking, and Intuition.

AI will never catch up with issues related to sense-making, dialectics, the transdisciplinary logic of the included third party, the notion of reasonableness (different from rationality), and ethics: of what is acceptable and what is not. Summing up, soft skills are out of AI's capacity for processing data, doing combinatory analysis, and finding results through binary logic.

Not only soft skills are outside the scope of AI, but also empirical intelligence, as already seen in the example of empirical formulas of engineers and acupuncture.

In this context, the realization arises that AI can provide powerful tools for organizing data and distinct theories that may not yet communicate, but it will never provide the sense of human skills (soft skills) and the practical experience of a professional (empirical intelligence).

This discussion may be interesting in the context of leadership and mediation theories, as this author has addressed in his HPTD-M publications and a 14-hour course on the mediating manager of 2023, which evidences the necessity of understanding the three types of paradigms for problem solving the suitability of application of each one, depending on the concrete case: mechanistic, systemic, and transdisciplinary [16]. The HPTD-M is seen in this context as an integration of the three paradigms.

5 Efficiency vs. Effectiveness: AI may be a Consultant But Not a Decision Maker

As per the HPTD-M models developed in the article Effectiveness and Styles of Leadership in Public Management [8], the most concrete troubleshooting attribute according to the HPTD-M is **Effectiveness** (see the model in Figure 2), which is more than the **Efficiency** of the economy (costs) and conformity of processes (compliance and bureaucracy). Effectiveness means the result of management in the perception of civil society - the external environment impacts. However, the concept of Efficiency, as described, is partly comprised of Effectiveness. As per the HPTD-M model for problem solving, synthesized in Figure 4, **Effectiveness contains Efficiency** and can be applied to any public or private organization:

- **Efficiency:** compliance, cost, production, quality control, to do things right.
- **Effectiveness:** producing a decided, decisive, or desired effect by doing the right thing.

In this context of efficiency and effectiveness, HPTD-M has also concepts related to governance and governability for organizations, a type of complementary that creates the transdisciplinary leader as an articulator and facilitator of technicians, managers, politicians, and civil society in general, as per the HPTD M:

- Governance involves the internal environment and how the decisions are made for working groups and organizations. The results can be seen in the perspective of the inner effectiveness.
- Governability is related to the external environment and the systemic stability in large public organizations, involving the dialogue between politicians and the civil society that they represent. The outer effectiveness can be seen as the level of support of civil society.

There is clearly a difference between efficiency and effectiveness in management, roughly and respectively the difference between “doing things right” and “doing the right thing”. So, AI tends to be an efficient source of information, like a consultant or an assistant, because it can select a database much better and faster than a human would do. However, AI can never be an effective manager or a decision maker, because it has no soft skills, as far as human phenomena are concerned, especially regarding meaningful new ideas, foreseeing problems, relationship skills with all actors involved, and wisdom in the decision-making process. This important point is one of the core points of this article.

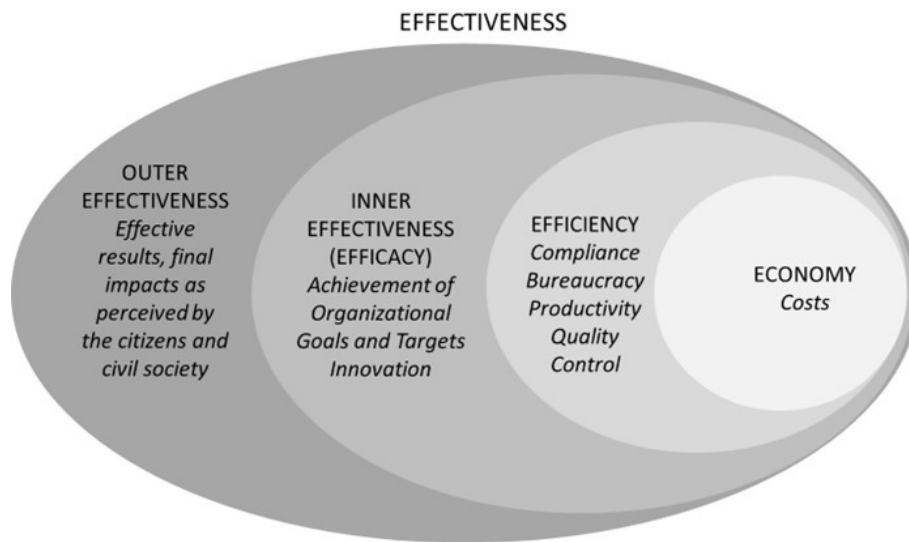


Figure 4: PTD-M Synthetic Model for Effectiveness vs. Efficiency for Problem Solving in Organizations
Source: This new HPTD-M Model expresses a synthesis of the article [8]

6 Adequate Use of AI: Example of Plato's Four Virtues

As an example of adequate use of AI as an efficient source of information, this author made a very specific question about Plato's philosophy, with precise and well-determined concepts. The essential point here is to show that efficient results come when being very clear in what is being asked. Otherwise, the answers will not achieve the goal, i.e., to use AI one needs to be objective, even considering the complexity of Plato's philosophy hermeneutics:

- **Question:** *In Plato, can Justice be understood as a fourth virtue that balances the other three related to the parts of the soul, namely rational wisdom, irascible strength, and concupiscible temperance?*
- **ChatGPT:** *In Plato's philosophy, justice is indeed considered as a fundamental virtue, and it can be understood as a fourth virtue that harmonizes and balances the other three related to the parts of the soul. Plato's understanding of justice is intricately tied to his theory of the tripartite soul, which he presents in his famous work "The Republic."*

According to Plato, the human soul consists of three distinct parts:

Rational (Wisdom): This part of the soul is associated with reason, intellect, and the capacity to make rational decisions. It seeks knowledge, truth, and understanding.

Irascible (Strength or Spirit): This part is associated with emotions, courage, and the desire for honor and victory. It can manifest in both positive aspects like bravery and negative aspects like anger and aggression.

Concupiscible (Temperance or Appetite): This part is related to desires, physical pleasures, and basic instincts such as hunger, thirst, and sexual desires.

Plato's conception of justice involves each part of the soul performing its proper function without interfering with the functions of the other parts. When the soul is in a state of internal harmony, where reason rules over emotions and desires, and each part fulfills its role, justice prevails within the individual.

In "The Republic," Plato explores the idea of justice on both the individual and the societal levels. He suggests that a just society would mirror the just soul, where each member performs their proper role and contributes to the well-being of the whole community. In such a society, philosophers would be the rulers (representing the rational part), guardians would provide defense and protection (representing the irascible part), and producers would fulfill the economic functions (representing the concupiscible part).

Plato's vision of justice involves the harmony and balance of these different parts within the soul and society. It is the proper alignment and cooperation of these elements that lead to a just and flourishing individual and community. Justice, therefore, acts as the unifying principle that ensures the well-functioning and flourishing of the whole, be it in the soul or the society.

The answer from ChatGPT is remarkable, the exegesis converges to the one of the 1949 Calouste Gulbenkian Foundation edition, from Lisbon, of Plato's *The Republic*, footnote 31 of p. 204, which considers justice the harmonious meeting of three different elements, i.e., rational, irascible, and concupiscible [17]

This interpretation can be analyzed through Plato's dialogue *Fedro* [18], in the myth of the chariot Plato compares the soul to a chariot pulled by two horses, one docile and the other indocile. The human body is the chariot, and the chariot-driver is Reason, which drives the two horses (feelings and instincts, respectively) using the reins (thinking control).

In this myth context, according to Olleta [19], Plato considers that the soul is the excellent part of man, which is immortal and unites us with the divine world. **The soul is divided into:**

- **Rational:** The myth of the chariot represents the rational soul with the metaphor of the chariot-driver. It is the excellent part of the soul, identified with reason and with the achievement of goodness and justice, in which rulers should be mirrored.
- **Irascible:** The myth of the chariot represents the irascible soul with the metaphor of the good and docile white horse. Thanks to this horse, the chariot driver can accompany the gods to the world of ideas. In the irascible soul is found the will and strength typical of warriors.
- **Concupiscent:** In the myth of the chariot, Plato represents this part with the bad horse, black, not very docile, and directed towards the sensible world. It is a part of the human soul that is more related to the body, to sensitive pleasures and appetites for sex, food, fame, wealth... Its virtue is temperance, in which merchants should mirror themselves.

Also, according to Olleta, the theme of virtue in Plato includes two fundamental questions: concerning how one can possess virtue and concerning its essence or nature. Regarding the first question, we see in the philosopher the influence of his teacher Socrates - whoever possesses a virtue has some knowledge: you cannot do Good or Justice if you do not know what Good and Justice are, just as you cannot perform a specific job if you do not have knowledge for the second question of the essence of virtue, Plato conceived it as a state that corresponds to the soul according to its own nature. Like the soul, we find several parts, each of a certain kind of virtue that suits it. Thus, **the rational part of virtue is wisdom or prudence**, which consists in the knowledge of the ultimate truth of human behavior, the knowledge of what to do on each particular occasion; to **the irascible part will correspond the virtue of strength or courage**, a disposition of the will by which we can carry out conduct that prudence teaches is appropriate at each moment, an accomplishment that often involves renouncing pleasures and benefits of one's own. Finally, **the concupiscible part will have the virtue of temperance:** moderating the disposition of appetites, which allows the soul not to be continually disturbed by abundant and intense desires. That is, to control desires. [19]

Through the HPTD-M interpretation, Plato's four virtues are another way of seeing the quaternary structure of the psyche through Jung's functions or the archetypal four elements, i.e.: 1) temperate concupiscible sensation, 2) strong irascible feeling, 3) prudent rational thinking, and 4) just intellectual intuition involving the search of the abstract idea of goodness (in Plato's theory of Ideas shown in *The Republic*).

So, the archetypal quaternary structure of the psyche can also be seen in ancient Greek philosophy, not only through the four elements of Empedocles or through Plato's virtues, but also as per Plato's levels of knowledge that explain the concept of a direct understanding of reality without the rationality, like through the insights, which can be seen in philosophy as "intellectual intuition" (noesis), mentioned in another quaternary context – *noesis*, *dianoia*, *pystis*, and *eikasia*, explained through one article of this author just before publishing the HPTD-M theory:

By platonic epistemology (episteme in the sense of comprehensive knowledge in the transdisciplinary context): i) noesis is intellectual intuition, and episteme is knowledge acquired through noesis, it is synonymous with broader understanding in this context, it is not just about intellectual knowledge; ii) thinking, when contemplating forms or ideas, offers the rational view of knowledge (dianoia), as in mathematics; iii) noesis and dianoia then form knowledge in the sense of comprehensive understanding of platonic vision, as opposed to the opinion of the lower levels of pystis (belief or conviction) and eikasia (opinion by perception only). Hence one can observe the parallelism between the Jungian functions and Plato levels:

- A) **Eikasia**—sensation (perception function).
- B) **Pistis**—feeling (belief is a form of feeling).
- C) **Dianoia**—thought (mathematics is a form of logical thinking).
- D) **Noesis**—comes from nous (spirit), which means to understand the essence through intuition. [20]

For all the above reasons, management tools need to be used a priori with the awareness of the limits of their applications. AI is no different, a disruptive technology that every professional will have to learn to deal with, as happened with the personal computer in the late 1980s, an excellent rational tool, but not an empirical, emotional, or intuitive for problem solving, as corroborated by Gardner's MI Theory (Multiple Intelligences) and the HPTD-M idea of soft skill (emotional + intuitive intelligence). The view that AI is connected to rational intelligence and KNOWLEDGE, but not to the broader COMPREHENSION of reality, also draws attention. These are issues that involve the complexity of human phenomena, which cannot be reduced to rationalistic and/or mechanistic models as if those paradigms were a solution for everything. An example of this is the leadership and mediation visions that the HPTD-M theory has developed along with ways of solving problems in organizations. Binary logic does not apply in this case, that is, the transdisciplinary logic of the Included Third is more appropriate. Besides, AI works as a consultant or assistant, an efficient information source, but not as a manager or decision maker with effectiveness since the limits of AI are the complexity of human phenomena.

7 The HPTD-M Mediating Manager vs. AI

The concept of the mediating manager has an essential role in showing the limits of AI. In connection with the perspective of social audit of the French economist and mediator Dr. Hubert Landier, through HPTD-M emerges the idea of the transdisciplinary mediating manager as an alternative for problem solving in organizations.

The rationalist models borrowed from the hard sciences configure a reductionist approach of merely mechanistic AI or biological-environmental views, which can't be applied to complex human phenomena, for which the proposal of the mediating manager emerges as a possible alternative. An HPTD-M article evolved this perspective [9] together with a training course given by this author to public managers in Brazil [16].

The idea of the HPTD-M mediating manager involves various disciplines to create an integration by understanding beyond and through disciplines, which may lead the mediator to four dimensions

- **Generalist:** Manager as an articulating leader, a generalist articulating many specialists.

- **Peacemaker:** A mediator promotes agreement between the parties to resolve conflicts before judicializing an issue, including by using techniques along the lines of the Systemic Law discipline of the Brazilian Bar OAB [21]. In the case of public management, the manager is in the role of facilitator, articulator, and conflict harmonizer.
- **Ghostbusters:** With the ability to put the right people in the right place. Two mediators in a social audit (different from an accounting audit) looking for the "ghosts in the organizations' environments", according to Dr. Landier: The ever-present, yet unspoken memory of an event or a person that destabilized the community and contributes to keeping this collectivity divided, for no apparent reason [22]. In the specific case of the public manager, the development of the expertise to put the right people in the right place so that "ghosts" are prevented through organizational synergy.
- **Welcoming in a broad sense:** The capacity to listen, to hear, and to welcome all the actors. A therapist is a mediator for the conscience development of his clients, on a personal, family, or organizational level. As for the manager, the ability to listen and welcome (accept and integrate) all stakeholders or actors involved in work groups and organizations, so that the best solutions are developed. About the levels of listening within working groups:
 - **level 1 – Distracted listening,** not paying attention completely to what is said.
 - **level 2 – Burocratic or proforma** listening, just taking notes of what is said.
 - **level 3 – Listening rationally:** according to personal/organizational mindset or mental model. Those may swear that listen to everyone, but they do it only proforma or bureaucratically, not accepting different opinions.
 - **level 4 – Welcoming in a strict sense: i) acceptance:** the leader must emotionally accept to discuss new ways or ideas, even if considered weird or unusual, through the skill of emotional intelligence; **ii) integration** of all stakeholders into the workgroup, making everybody feel included, which is difficult, but it is what solves the problem dialectically and effectively, as per the HPTD-M analytical model attributes from the most abstract to the more concrete: dialectics, sustainability, simplicity, and effectiveness.

This expertise can avoid costs for organizations and civil society because the problem is solved before it happens, or in the beginning. Transdisciplinary mediators act like *fire extinguishers* before the fire spreads. Also, those mediators promote the consciousness development to listen more than bureaucratically and rationally, with acceptance and integration of all the stakeholders or actors involved in work groups and organizations.

So, effective solutions are developed in cases **where the crisis is already installed**, but there can be also preventive actions. In both cases the intervention is necessary.

The **Ghostbusters** with the ability to put the right people in the right place: Two mediators in a social audit (different from an accounting audit) looking for the "ghosts in the organizations' environments", according to the vision of Dr. Landier, as already seen. [22]

In the HPTD-M paradigm, the training of the TD mediating manager involves conscience development, not only through the strict sense training of KNOWLEDGE but especially the development of UNDERSTANDING, of learning to learn, with oneself and with others. The conscience development, which Jung named the "individuation" process, in the view of HPTD M applies not only to the individual but also to the collective level of organizations, especially the collective unconscious and the shadows that permeate the many levels, like in the "ghosts" detected in Landier's social audits, which have connections to the HPTD-M model of Figure 6.

Involving an unconscious influence of the Western rational culture, the traditional prejudice against psychology as an effective instrument for conscience development in organizations must be dissolved. Rationalists, mechanists, and reductionists tend to call for psychology only when they understand that there is a disorder like a disease, as this author has already witnessed in the speech of a foreign professor, in

a lecture on emotional intelligence, when he replied, regarding organizational therapies, that psychological disorders should be dealt with “separately”.

Management problems cannot be solved only with mechanisms because human phenomena are much more complex than mechanical, biological, and ecological issues, even in a systemic vision, hence the HPTD-M paradigm is a way of approaching the experienced reality, while considering the mechanistic and systemic paradigms, when applied as a simpler way of solving problems. This is much beyond AI scope.

8 Psychosomatics and the Shadow of Emotional Intelligence

The Western rational culture’s difficulty with psychological approaches for concrete problem solving is related to the limits of AI itself. Through a transdisciplinary context and a holistic systemic context, psychosomatics has a relevant role, highlighting the view of Dr. Muresan’s *Healing and health systems. Integralist-transdisciplinary benchmarks* [23]. Summarizing some ideas presented by the author, to compare with the HPTD-M approach:

- There is a connection between thoughts, emotions, and illness.
- The more we defend ourselves, the slower we develop.
- An acute infection is the result of a violent emotion, for a short period.
- A chronic infection refers to a negative emotion that has existed for a long time.
- An infection indicates an accumulation of negative emotions.
- A viral infection indicates that someone else is in control of your life.
- Inflammation can indicate your opposition to changing something that is needed in your life.
- The immune system is directly related to your emotional states. Intense suffering reduces its strength.

Part of the HPTD-M psychosomatic model was published in 2022 [24] but was developed before this author had contact with Dr. Muresan’s article on integralist-transdisciplinary references for healing and health. There are some convergences of ideas that corroborate the principle of quaternary complementarities of HPTD-M arising from the basis of the health framework presented by the author.

To clarify what was published in 2022: this author is not a doctor nor a psychologist, just an engineer with an MBA who worked with civil engineering and business management, including foreign trade. Currently, out of professional necessity, he transits in public management, economics, and law, having developed HPTD-M from experience with organizations and working groups. Therefore, this author has been in his professional career a generalist who articulates specialists. In addition, for more than 30 years he has studied the systemic vision combined later with the transdisciplinary perspective, since reading Capra’s holistic systems in 1987 in the book *The Turning Point*. Incidentally, Capra is a Ph.D. in physics who evidenced parallels between modern physics, ancient traditions, philosophies, psychology, health, and economics. [25]

In this context, HPTD-M understands the psychosomatic process not only in terms of people but especially of the organizations they are part of, whether the organization is a family, a company, or even a small working group. The origin of the term is the fusion of PSIQUE and SOMA (from Greek), soul and body, psychological, and physical part, as they interact in a dynamic balance, in harmony. Imbalances need to be resolved at the emotional and/or mental/intellectual level, but ultimately, they are resolved physiologically in the human organism if the imbalance is not addressed at the psychological level. In organizations, these imbalances ultimately resolve in somatization among participants. In other words, participants get ill when the work environment becomes toxic, especially when essential issues are avoided, even if unconsciously (unintentionally), and thrown “under the carpet”. This HPTD-M view is very similar to Dr. Landier’s “ghosts in organizations” [22]. Dr. Landier himself corroborated, when he was present at the international presentation of this author on 30.06.2023, promoted by CIRET (French transdisciplinary center) and CETRANS (Center for Transdisciplinary Education in Brazil), as he asked questions and

showed his convergence with the HPTD-M view [10]. Like people, organizations also get ill, but only at the psychological level: The illness will be manifested individually in the participants through the somatic level, i.e., they can get physically sick in many ways.

To illustrate, through psychotherapy it is possible to understand some unconscious (unintentional) defense mechanisms that avoid dealing directly with emotional discomforts:

- **Escaping** to the symbolic/noetic world (from the Greek NOUS), as if our physical and concrete world were an illusion, without understanding that emotional conflicts are part of learning processes. Meditation and mindfulness can be a tool to improve our intuition, our insights, and our creativity, but they are only a means, not an end in themselves.
- **Rationalizing** everything, as if the mere logical understanding of a problem automatically implies the solution. This defense mechanism tends to be the most common in our Western rational culture.
- **Dramatizing** emotion, as in a theater, as an unconscious way of not dealing directly with emotional pain. It may even be an intermediate resource to get used to the pain before confronting it directly. Figure 5 details this map, as it engages with emotional intelligence in the shadow sense of our Western culture, as will be explained.
- **Somatizing** unconsciously as a last systemic resort to balance escape from emotional discomfort. When psychogenic illness occurs, it means that our psyche has not accepted the problem or has not been able to deal with it consciously, so the last solution to balance our system is physical. Everyone has emotional discomforts and cannot hide from them. We must learn from our mistakes: psychosomatics is clear in this sense. If an imbalance reaches the somatic level, it means that the psychic level has failed to deal with the problem. Jung, who was a psychiatrist, called these psychogenic diseases [26]. This is the last resort to harmonize the whole system.

Of course, there are other somatic disorders, such as hereditary or external influences, e.g. chemical intoxication and radiation: these are not psychogenic diseases. In this sense, the framework of the HPTD-M psychosomatic process is through the interaction between the object (external environment) and the subject, the internal environment of all. Four levels of subtlety correspond to our types of intelligence. Those levels are:

- **Physiological** (physical balance of the body).
- **Energetic** (vitality to carry out activities).
- **Emotional** (feelings).
- **Intellectual** (rationality).

The four types of intelligence model of HPTD-M can relate to these levels:

- **Empirical** - concrete with the Physiological and Energetic.
- **Emotional** - subjective with the emotion itself.
- **Rational** - objective with the Intellectual.
- **Intuitive** - abstract with what is beyond the Intellectual on an abstract level.

According to Franz, in a book on the theory of synchronicity, which can be applied to situations where sense rather than causality prevails: There is a relationship between physical and psychic energy, and while physical energy can be measured quantitatively, we have no way yet of measuring the amount of psychic energy except by the sense of awareness of intensity. The function of feeling is to give us guidance on this when we talk about something that moves us. [27]

So, this connection between emotional energy and the psychosomatic process can be seen in Figure 5.

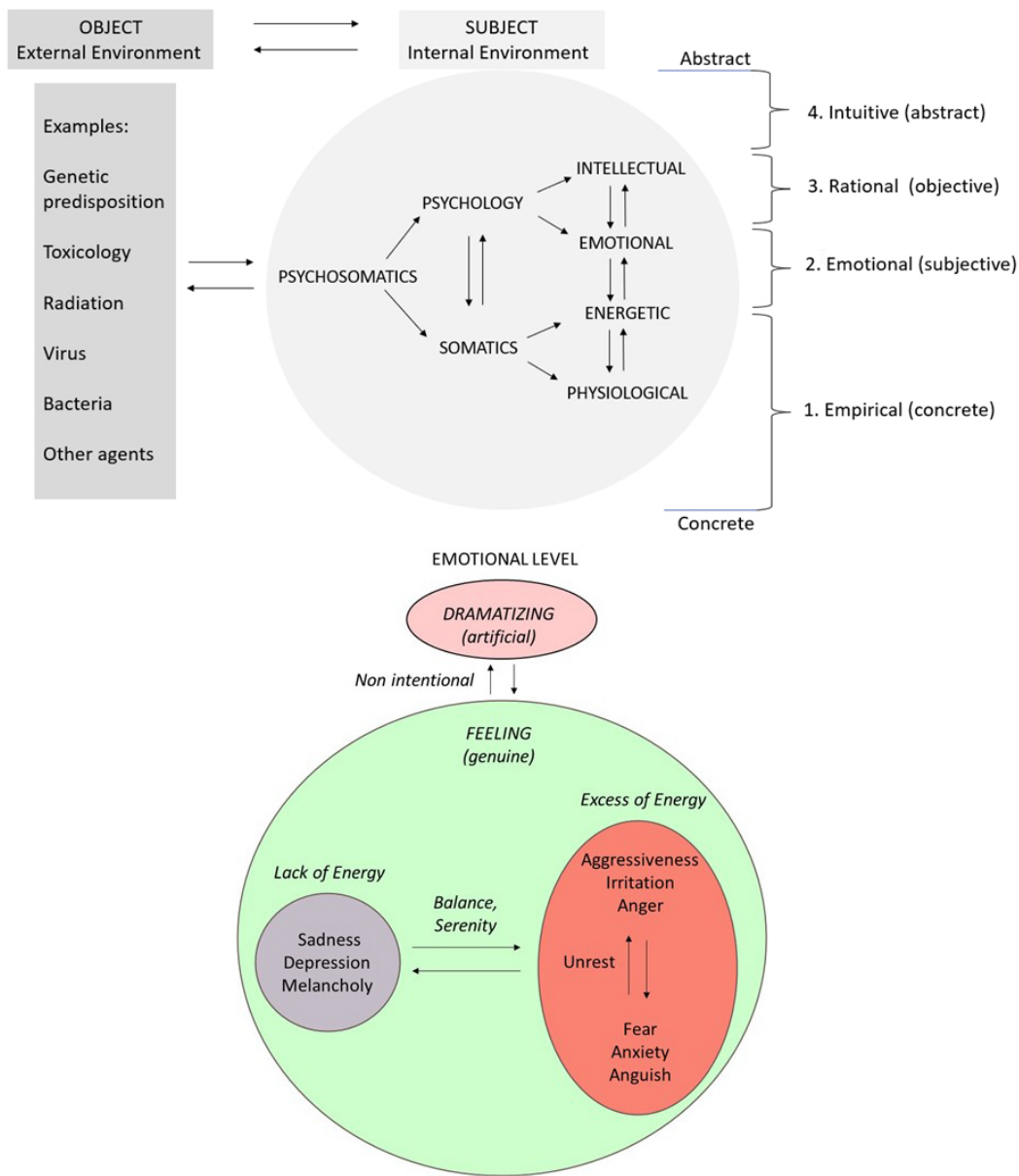


Figure 5: HPTD-M Psychosomatics Model: Emotional Level as a Shadow of the Rational Western Culture. Source: This new HPTD-M Model improves the 2022 previous one [24] through the schema of the EMOTIONAL level

9 Beyond AI’s Scope: Shadow Levels, Soft Skills, and Empirical Intelligence

The Jungian concept of the shadow should be understood in this context. Jung said that we are conscious of only a small part of the world. Our vision reaches only a certain distance, our memory is insufficient, and our sensory perceptions, important for our orientation, also. Many things happen that we are too blind to see. Consciousness is like a lighthouse that travels across the field; only the illuminated points

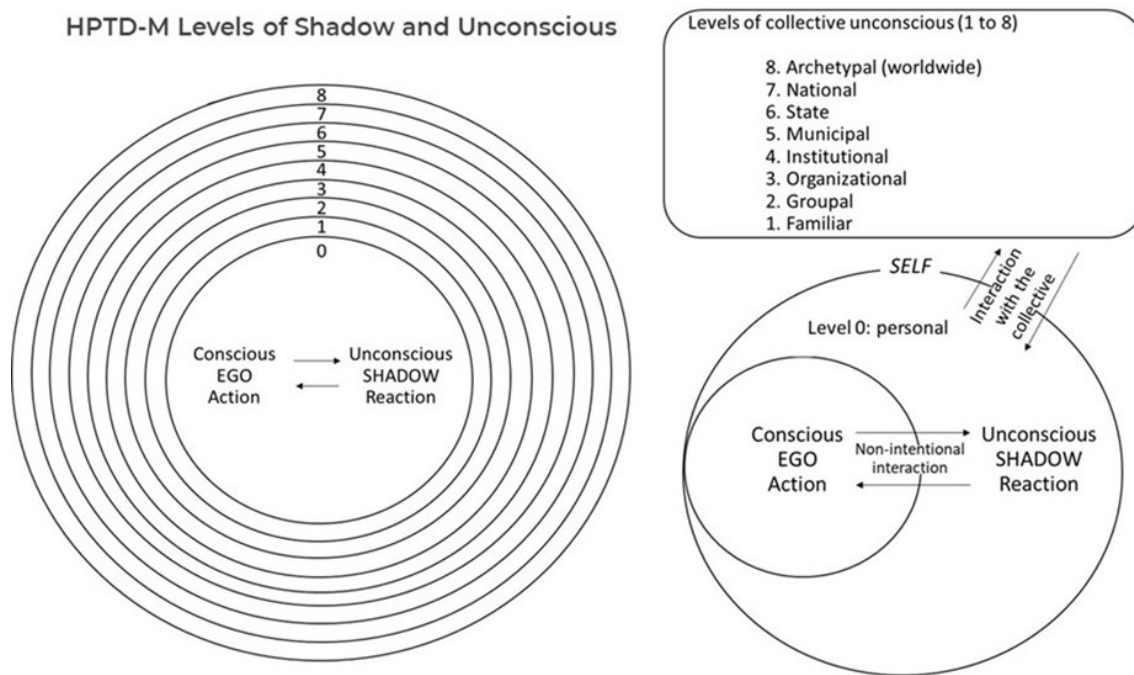


Figure 6: Shadow Levels of the Collective Unconscious [28]

are conscious. The sphere of shadow is the unconscious, or dark side, the habitually unconscious part. To be conscious you must be focused; we are always conscious of something specific. The total personality could be described as the consciousness plus the unconscious. There is the usually unconscious area and the relatively unconscious area; there are times when we are conscious of this and times when we are conscious of something else. We think we know something about the nature of (physical) matter, but what is consciousness? We have no idea. We have no perspective away from consciousness, to judge its properties. The conscience is like a headlight traveling through the field; only the illuminated points are conscious. The unconscious, or dark side, the part that is usually unconscious, is the shadow sphere. To be conscious you must be focused; we are always conscious of something specific. The total personality could be described as the conscious plus the unconscious. There is the area of the habitually unconscious and the area of the relatively unconscious; there are times when we are conscious of this and times when we are conscious of something else. [26]

The shadow is everything that one cannot be aware of or that is repressed in some way, not only on the personal level but on the various collective levels, from the family, organizations, cities, states, and countries, until reaching the world archetypal level, according to the model presented by this author in an article published in 2022, adapted in Figure 6. [28]

AI cannot understand the shadow of our Western culture inherited from the mechanistic Modern Age. With a hypertrophy of rational intelligence about others, reducing the subject to the object, the tendency is that the shadow of the West directly involves emotional intelligence and the subject, the opposites, something in line with Heraclitus' idea of enantiodromia, which Jung incorporated in his Analytical Psychology. In this context, the emotional complementarities in Figure 5 are a detailed map of the EMOTIONAL level, including artificial dramatization versus genuine feeling, as already described in the sense of a psychological defense mechanism. Figure 5 is relevant because modern Western culture tends to be rational and to overlook the relevance of feelings in individual and collective psychological well-being, i.e. physiological health through psychosomatic health. This means that emotional intelligence tends to be the shadow of Western culture in the face of rational intelligence that represses its complementary. The

balance between emotion and reason for health in a holistic perspective would be recommended, including concrete solutions to problems in organizations, at various levels, Figure 5 complementarity presents the context of psychic energy related to emotions: lack (sadness), excess (anger), and balance (serenity). The principle of Complementarity is the key.

The soft skills of intuitive intelligence intertwined with emotional intelligence will now be expressly addressed, which AI also does not achieve. According to Galvão, professor of applied philosophy at New Acropolis Brazil, symbolic vision, intuition, imagination, creativity, innovation, inspiration, ethics, justice, principles, meaning, purpose, and ideals, the AI does not reach with its mechanical logic, combinatory analysis, and positivism. Aligned with the HPTD-M vision, the teacher understands that our culture is hypertrophied logically and thus many people have occupied the place of machines for a long time with their deductions and mechanisms. For Galvão, the need to develop human skills is now apparent. What this author argues, is: AI reaches only the rational intelligence, but not the intuitive and the emotional. The teacher implicitly corroborates by saying that AI can be a wonderful encyclopedia for doing combinatorial analysis never seen before, but it only makes from what exists, it does not create, and advances in human culture happen through innovations. [29]

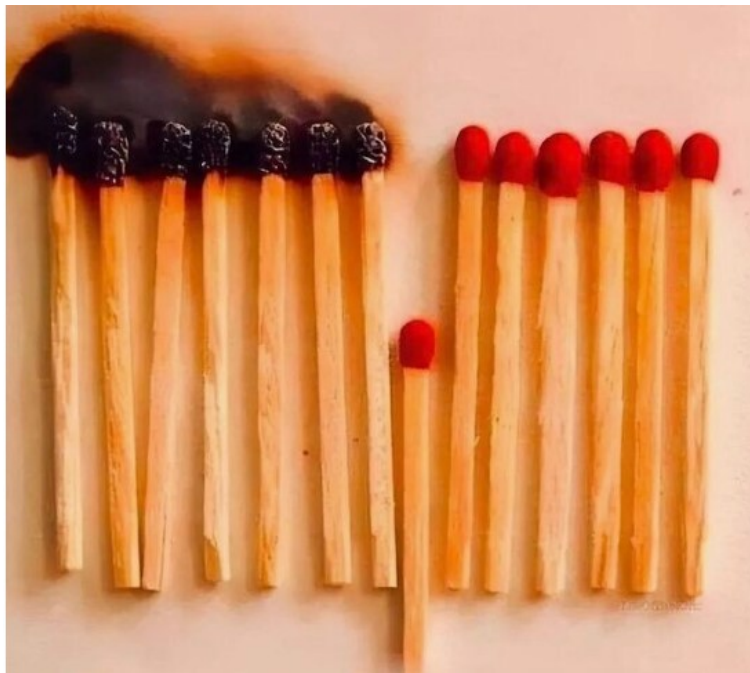


Figure 7: Choosing to leave a toxic situation - the power of stepping away [36]

Considering this HPTD-M context of levels of collective unconscious and the shadow of emotional intelligence in our Western culture, Dr. Mariana Thieriot Loisel shared Figure 7 with this author, through LinkedIn [36]. The reflection provoked by Figure 7 involves the result of choosing to leave a toxic situation, i.e., the power of stepping away. Dr. Loisel is a transdisciplinary author who has a theory of Grey Zones, as well as a post-doctorate in philosophy, science, and technology. After examining Figure 7, another Brazilian friend, Debora Santille, a Brazilian expert in governance and finance besides a former business executive, currently focused on companies' boards of directors, understands it applies to corporate risk mitigation. Alternatively, according to Carlos Adolfo M. da C. Câmara, an economist in the Brazilian career of São Paulo state tax auditor, Figure 7 represents the interruption of a flow of mistaken thoughts by means of a disruptive measure. The reflections from Santille and Câmara corroborate the HPTD-M approach that AI, with its rational limitation as a tool, can generate a succession of mistaken attitudes if not mediated by the

empirical, emotional, and intuitive intelligence of the decision maker, i.e., human mediation.

Finally, AI will never be able to reach issues related to "making sense", dialectics, the transdisciplinary logic of the third party included, the notion of reasonableness (different from rationality), and ethics, of what is acceptable and what is not. In short, soft skills are beyond the reach of AI. Soft skills and empirical intelligence are already seen in the example of the empirical formulas of engineers, acupuncture, and "off-label" medicines. In this context, the realization arises that AI can provide powerful tools for organizing data and different theories that may not yet have been communicated, but it will never provide the sense of human skills (soft skills) and the practical experience of a professional (empirical intelligence). This discussion may be interesting in the context of leadership and mediation theories such as the one presented by this author in 2023 when teaching a 14-hour course on the mediating manager to address problem solving. [16]

10 No Consciousness Awakening in AI

HPTD-M understands that insights can come from the personal and/or collective unconscious. Conscious and unconscious interact in a duality. According to Jung's Analytical Psychology, there is a personal unconscious and an impersonal or transpersonal unconscious, i.e., the collective unconscious, because it is detached from anything personal and is common to all men since its contents can be found everywhere, which is naturally not the case with the personal contents. The personal unconscious contains lost memories, painful ideas that are repressed (i.e., forgotten on purpose), subliminal perceptions, which are meant sense perceptions that were not strong enough to reach consciousness, and finally, contents that are not yet ripe for consciousness. It corresponds to the figure of the shadow so frequently met with in dreams [30]. HPTD-M considers the ancient concept of *egregore* [31] through a modern perspective, as a group that reflects a common collective unconscious, in connection with the Jungian concept, including the model in Figure 6 that describes levels of the collective unconscious, from 0 (personal) to 8 (worldwide). HPTD-M has therefore developed a model to address the issue of the unconscious in organizations, by classifying the collective unconscious through levels, from the families, organizations, groups, municipalities, states, and nationalities, also to the higher level of the global (archetypal). In this context emerges the Jungian idea of shadow, which is present in Figure 5 and Figure 6. The unconscious and the shadow involve also the concept of "ghosts" in organizational environments, developed by Landier [22], and also the idea of non-intentional interaction between the conscious and unconscious from Loisel's *Les mutations humaines: philosophie et science* [32].

As per Table 1, there is a relation between AI and one of the five main HPTD-M models: Psychosomatics in Figure 5, which connects the Physiological, Energetic, Emotional, and Intellectual levels to the observer, which could be considered the individual human Consciousness, beyond this psychosomatics level.

This paradigm is corroborated by Figure 8: The consolidated schema from New Acropolis, Galvão, Loisel, and HPTD-M shows the square as the human instruments, masks, or vehicles of consciousness manifestation (Physical, Vital-Energetic, Emotional, and Mental), besides the triangle as the human being essence or human consciousness. There can be made a comparison between the psychosomatics schema of Figure 5 and the Greek Philosophy (Soma = Physiological-Energetic, Psyche = Emotional-Mental, and Nous = Intuition). So, Figure 8 configures a transdisciplinary schema, simultaneously reflecting many views of the square and triangle related to Indian philosophy, a Greek philosophical view (Soma, Psyche, and Nous), besides the European Alchemical Symbolic Elements (Earth, Water, Air, and Fire). The archetypal Alchemical elements, in turn, can be manifested in two levels, i.e., physical (solid, liquid, gas, and plasma), besides psychological (sensation, feeling, thinking, and intuition). In this connection, Brazilian philosopher Galvão gave a 2016 lecture on the Indian Bhagavad Gita, mentioning five levels, namely physical, energetic, emotional, mental, and the conscience as an observer. This view can be clearly compared to the square of Figure 8 as the four first levels (physical, vital-energetic, emotional, mental), and conscience as the representation of the triangle. Galvão also understands a complementarity between the quaternary vehicles, as the representation of the material world, and the ternary consciousness, as the spiritual world [33].

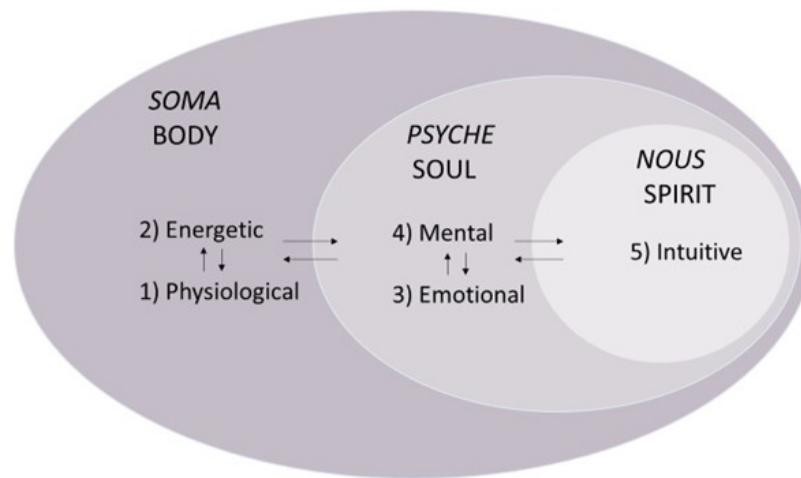
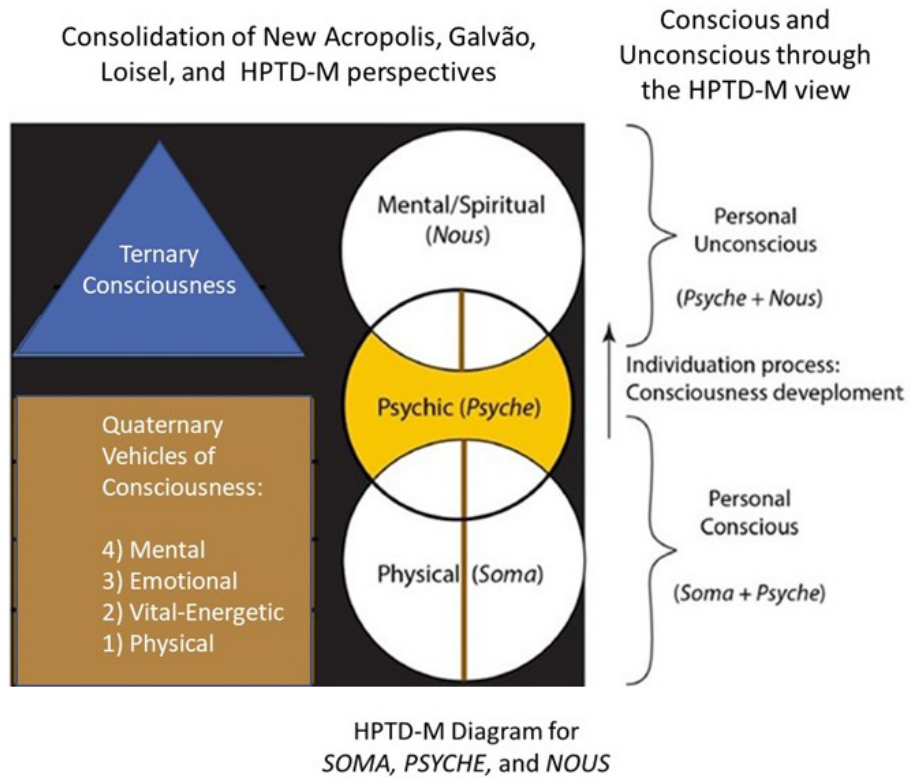


Figure 8: Soma, Psyche, and Nous through New Acropolis, Galvão, Loisel, and HPTD-M Perspectives [7, 32, 33, 34]

Besides, as per a New Acropolis article from Ramos in Coimbra, Portugal, this triangle corresponds to what the author shows as superior mind, intuition, and will [34].

Considering the HPTD-M view, AI will never be able to replace the human consciousness, also expressed in Table 1 as Nous or Intuition, depending on the approach. AI is a remarkable rational instrument for efficient sources of information and the establishment of cause-and-effect relations but cannot reproduce the empirical/emotional types of intelligence and cannot be conscious or reflect intuitive intelligence, i.e.,

effectiveness is beyond the AI's capacity. In management, as already seen, efficiency can be seen as "doing things right", and effectiveness as "doing the right thing". So, the duality of efficiency-effectiveness is a rough but simple way to understand this discussion. Not only in management and through HPTD-M, but even in Sci-Fi movies.

Dr. Mariana Thieriot Loisel, a member of the CIRET Board, has noticed in her book that cognition can take place in the computer's field without consciousness. Hence, decision making cannot be the only result of cognition and needs the interaction between cognition and consciousness. [32]

Finally, an example of AI is seen through the epistemic form of art in a Sci-Fi film, 2001: A Space Odyssey (1968). In this movie, the Hal 9000 computer tries to take control of a spaceship, kills one astronaut, and tries to kill another until it is disconnected. The supposed high level of AI cognitive functions of the HAL 9000, as seen in the movie, is only a rational tool, and malfunction is unpredictable if not supervised by a human, i.e., "malfunction" may be directly connected to the program itself. So, the computer's judgment that resulted in those actions was merely rational and even compatible with what it was programmed to. This is just another way to show that AI can be a wonderful rational tool, but won't work for empirical, emotional, and intuitive purposes. So, through the HPTD-M perspective, AI cannot replace human consciousness, emotion, and empiricism.

11 Conclusion

The HPTD-M theory or *Holopraxis Transdisciplinary Management* involves three types of logic, four epistemic ways, and four archetypal elements translated to four types of intelligence showing how **AI cannot be compared to human consciousness.**

The scope of AI was explained and demonstrated basically through:

- The three types of logic:

- **Binary** (True or False) for the mechanistic troubleshooting (AI).
- **Feedback** (of cause and effect) for the systemic environmental-biologic problem solving.
- **Included Third** (dialectics) for the transdisciplinary complexity of human phenomena in troubleshooting.

- The four types of intelligence: empirical, emotional, rational, and intuitive, as compared to the well-known Gardner's MI theory of multiple intelligences, which involves nine types.

AI is an excellent rational tool, but not an empirical, emotional, or intuitive one for problem solving, as evidenced in i) the ChatGPT simulations, ii) the HPTD-M models in dialogue with Gardner's MI Theory, iii) psychosomatics, iv) the emotional shadow of the Western culture, v) the levels of the collective unconscious, and vi) the reflections on soft skills.

The concept of the mediating manager has an essential role in showing the limits of AI. It is essential to the view that **AI involves rational intelligence and KNOWLEDGE, but not a broader UNDERSTANDING of reality.** These are issues that involve the complexity of human phenomena, which cannot be reduced to rationalist and/or mechanistic models, as if these paradigms were the solution to everything, leaving the shadow of emotional intelligence exposed, as a major deficiency of our Western culture. An example is the visions of leadership and mediation that the HPTD-M theory has developed along with the ways of solving problems in organizations. Binary logic does not apply in this case, i.e., the transdisciplinary logic of the Included Third is more appropriate in the face of complexity. Besides, the idea of consciousness, as demonstrated in Table 1, is another way to see the scope of AI, which is merely rational.

Management tools need to be used a priori with awareness of the limits of their applications. AI is no different, a disruptive technology that every professional will have to learn to deal with, like the personal computer in the late 1980s. AI is an excellent rational tool. However, the AI binary logic does not apply to the complexity of human phenomena. Furthermore, **AI can function as a consultant or assistant in terms of an efficient source of information, but not as an effective manager or decision**

Table 1: AI vs. Consciousness in the HPTD-M Context of the Four Elements and the Four Types of Intelligence

Type of Approach	Vehicles or Instruments of Consciousness Manifestation			Observer/Consciousness
1. Alchemical Symbolic Elements [35]	Earth	Water	Air	Fire
2. States of Matter [35]	Solid	Liquid	Gas	Plasma
3. Psychological Functions [35]	Sensation	Feeling	Thinking	Intuition
4. Greek Philosophy [24]	Soma	Psyche		Nous
5. HPTD-M Types of Intelligence [24]	Empirical	Emotional	Rational	Intuitive
6. HPTD-M Psychosomatics [24]	Physiological-Energetic	Emotional	Intellectual	Consciousness
7. Galvão view [33]	Physical-Energetic	Emotional	Mental	Consciousness
8. Loisel view [32]	----	----	Cognition	Consciousness of the <i>Non Intentional</i>
9. Artificial Intelligence (AI)	----	----	AI	----

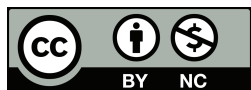
maker. Roughly, through the managerial theory, effectiveness is to do the right thing, which is more than efficiency (to do things right). Then, in this author's opinion constructed through simulations in the ChatGPT to obtain efficient results, the questions to AI need to be objective and precise in the concepts. There can't be complex issues involving human phenomena: This is for the effective human decision maker, not for AI to answer since there can't be consciousness awakening in AI, as demonstrated.

Acknowledgment

The author thanks Prof. Dr. Mariana Thieriot Loisel for her support and discussions through the board of CIRET. The author also thanks Debora Santille, a Brazilian specialist in Governance and Finance, <https://www.linkedin.com/in/dsantille/>, regarding the idea of including Gardner's MI Theory in the discussion.

Funding: This research received no grant from any funding agency.

Conflicts of Interest: The author reports no conflict of interest.



Copyright © 2023 by the authors. This is an open access article distributed under the Creative Commons Attribution License (CC BY-NC International, <https://creativecommons.org/licenses/by/4.0/>), which allow others to share, make adaptations, tweak, and build upon your work non-commercially, provided the original work is properly cited. The authors can reuse their work commercially.

References

- [1] Introducing ChatGPT. *OpenAi*. <https://openai.com/blog/chatgpt>
- [2] Fundação Dom Cabral (2023). What is ChatGPT, which was highlighted at Davos [O que é o ChatGPT, que foi destaque em Davos]. *Sejarelevante* by FDC. <https://sejarelevante.fdc.org.br/o-que-e-o-chatgpt-que-foi-destaque-em-davos/>
- [3] Weil, Pierre; Crema, Roberto; D'Ambrosio, Ubiratan (1993). *Rumo à nova transdisciplinaridade: sistemas abertos de conhecimento*. Summus Editorial. <https://www.amazon.com.br/Rumo-Nova-Transdisciplinaridade-Pierre-Weil/dp/8532304427>

- [4] Franz, Marie-Louise von (1980). *Projection and re-collection in Jungian psychology: reflections of the soul*. Open Court Publishing, 1980. ISBN: 0875484174. https://www.goodreads.com/book/show/426156.Projection_and_Re_collection_in_Jungian_Psychology
- [5] Jung, Carl Gustav (1957). Interview with Dr. Richard I. Evans of the Department of Psychology at the *University of Houston*. The excerpt consists of minutes 38 to 40 of 77. <https://www.youtube.com/watch>
- [6] Goodstein, David I. (1985). *States of matter*. Courier Corporation. 9780486649276; 500 p. <https://pegomatepal.files.wordpress.com/2018/10/id-states-of-matter.pdf>
- [7] Costa, L. S. G. M. (2022). HPTD-M: The Holopraxis Transdisciplinary Management Theory. Communication and mindsets as the applied main example. *Transdisciplinary Journal of Engineering & Science (TJES)* 13. <http://atlas-tjes.org/index.php/tjes/article/view/272/229>
- [8] Costa, L.S.G.M. (2022). Effectiveness and styles of leadership in Public Management: Quality in the context of transdisciplinary HPTD-M Theory. *Integral Leadership Review*, vol. 22, no. 1, Dec. 2022. <https://ilr.scholasticahq.com/article/57734-effectiveness-and-styles-of-leadership-in-public-management-quality-in-the-context-of-transdisciplinary-hptd-m-theory>
- [9] Costa, L.S.G.M. (2023). The Mediating Manager for Effective Troubleshooting in Organizations: A Transdisciplinary View from HPTD-M. *Transdisciplinary Journal of Engineering & Science*, 14. <https://doi.org/10.22545/2023/00228>
- [10] Costa, L.S.G.M.; Loisel, M.T. (2023) International Presentation: The Transdisciplinary Mediator for Effective Problem Solving in Organizations and Civil Society *CIRET-CETRANS*. Slides: <http://dx.doi.org/10.13140/RG.2.2.20460.54401/1> Video: <https://www.youtube.com/watch?v=pSnHVXUEGSg>
- [11] Max-Neef, Manfred A. (2005). Foundations of transdisciplinarity. *Ecological Economics*, 53 (2005) 5-16. Elsevier, p. 10. https://nova.org.za/assets/max_neef_2005_foundations_of_transdisciplinarity.pdf
- [12] Max-Neef, Manfred; Smith, Philip B. (2014). La economía desenmascarada. Icaria editorial, 1 ed., 2014. Free translation from Spanish to English of part of p. 13: *Todo mi discurso como académico económico convencional era completamente inadecuado para que pudiese decir algo significativo. Estaba acostumbrado a diagnosticar y analizar, pero no estaba acostumbrado a comprender*. <https://www.traficantes.net/sites/default/files/pdfs/9788498885576.pdf>
- [13] Crema, Roberto (2010). Paper Conference – Understanding: convergence between knowledge and being [Apresentação em Congresso: Compreensão: convergência entre conhecimento e ser]. *Conferência Internacional Os Sete Conhecimentos para a Educação de Hoje*, de Edgar Morin. Fortaleza, Brasil, de 21 a 24 de setembro de 2010 (UNESCO, UEC, UCB). Available in Portuguese: <https://robertocrema.com.br/compreensao-convergencia-entre-o-saber-e-o-ser/>
- [14] Capra Fritjof (1988). The turning point: science, society, and the rising culture. Bantam Books, direct quote of p. 57. [http://pustaka.unp.ac.id/file/abstrak_kki/EBOOKS/CAPRA%20Fritjof_Capra-The_Turning_Point_Science,_Society,_and_the_Rising_Culture.-Bantam\(1988\).pdf](http://pustaka.unp.ac.id/file/abstrak_kki/EBOOKS/CAPRA%20Fritjof_Capra-The_Turning_Point_Science,_Society,_and_the_Rising_Culture.-Bantam(1988).pdf)
- [15] Northern Illinois University Center for Innovative Teaching and Learning (2020). Howard Gardner's theory of multiple intelligences. In *Instructional guide for university faculty and teaching assistants*. <https://www.niu.edu/citl/resources/guides/instructional-guide/gardners-theory-of-multiple-intelligences.shtml>
- [16] Costa, L.S.G.M. (2023). The mediating manager. A course of transdisciplinary tools applied to organizations, based on the HPTD-M theory and the new conception of mediation and leadership. *Brazilian National School of Public Administration (ENAP)*. <https://suap.enap.gov.br/portaldoaluno/curso/2136/?area=16>. The ENAP certificate is in the following link, which also explains the course main topics through translation from Portuguese to English, so that English-speaking researchers may understand the content: <http://dx.doi.org/10.13140/RG.2.2.28025.54884>
- [17] Plato (n.a.). *The republic [A república]*. Lisboa: Fundação Calouste Gulbenkian. 1949, footnote 31 of p. 204 (Justice virtue as the balance of three others). Available in Portuguese at: <https://cafcamanaos.files.wordpress.com/2012/11/platc3a3o-a-repc3bablica-calouste-gulbenkian.pdf>
- [18] Plato (n.a.). *Fedro (Platón, obras completas)*. Madrid: Edición de Patricio de Azcárate, tomo 2, 1871. Full text available in Spanish at: <http://www.filosofia.org/cla/pla/img/azf02257.pdf>

- [19] Olleta, Javier Echegoyen (2022-2023). *Historia de la Filosofía. Volumen 1: Filosofía Griega*. Olleta. Editorial Edinumen. Edition in Spanish. In Platón – Filosofía Griega – Alma racional, irascible y concupiscible. Available in Spanish at: <https://e-torredebabel.com/platon-filosofia-griega-alma-racional-irascible-y-concupiscible/>;
- [20] Costa, L.S.G.M. (2022). Applied transdisciplinarity through Plato philosophy, Taoism, Alchemical tradition, and Jungian psychology. *Transdisciplinary Journal of Engineering & Science*, 13. <https://www.atlas-tjes.org/index.php/tjes/article/view/261/214>
- [21] Brazilian Bar – OAB (2020). Systemic Law Booklet [Cartilha de Direito Sistemico]. *OAB Santa Catarina*. Booklet available in Portuguese at: <https://oabms.org.br/wp-content/uploads/2020/02/cartilha-ebook-1.pdf>. Release note of the booklet available in Portuguese at: <https://www.oab-sc.org.br/noticias/cartilha-comissao-direito-sistemico-ja-esta-disponivel-para-download/17300>
- [22] Landier, Hubert (2023). Uneasiness in organizations: how to get rid of ghosts? Translated from French to Portuguese by Mariana Thieriot: [Mal-estar nas organizações: como livrar-se de fantasmas?]. *Centro de Educação Transdisciplinar (CETRANS)*. Parte do Boletim CETRANS INTER@TIVO 56, Ano XIV, Outono 2023. https://shoutout.wix.com/so/6eOQjPmVI?languageTag=pt&cid=bbe59b07-b178-46ed-be18-10b2d6f1b4a8&fbclid=IwAR1iy_R7rG-4hESSP9DmxSPOBzfeY0eZca-biXTyCubyi2HC3kOnQlYZstU
- [23] Muresan, Lucia (2020). Healing and health systems integralist transdisciplinary benchmarks. *CIRET - Centre International de Recherches et Études Transdisciplinaires*. https://ciret-transdisciplinarity.org/ARTICLES/b25/36_Lucia_Muresan.pdf
- [24] Costa, L. S. G. M. (2022). HPTD-M: A transdisciplinary integration of three paradigms - Mechanistic, Systemic, and Synchronistic. *Transdisciplinary Journal of Human Plasticity (PLASTIR)*, 65, June/2022 (Quarterly Journal, bilingual/ISSN n° 2105-2794). <http://www.plasticities-sciences-arts.org/PLASTIR/daCosta>
- [25] Capra Fritjof (1982). *The turning point: science, society, and the rising culture*. Bantam Books. 1988 edition: [http://pustaka.unp.ac.id/file/abstrak_kki/EBOOKS/CAPRA%20Fritjof_Capra-The_Turning_Point_Science,_Society,_and_the_Rising_Culture_-Bantam\(1988\).pdf](http://pustaka.unp.ac.id/file/abstrak_kki/EBOOKS/CAPRA%20Fritjof_Capra-The_Turning_Point_Science,_Society,_and_the_Rising_Culture_-Bantam(1988).pdf) [26] Jung, Carl Gustav (1984). *Dream analysis: notes of the seminar given in 1928-1930*. Princeton University Press, 757 p.
- [26] Jung, Carl Gustav (1984). *Dream analysis: notes of the seminar given in 1928-1930*. Princeton University Press, 757 p.
- [27] Franz, Marie-Louise von (1980). *On divination and synchronicity: the psychology of meaningful chance*. Inner City Books. Available at: https://kupdf.net/download/on-divination-and-synchronicity_598ace7adc0d605e44300d1a.pdf
- [28] Costa, L. S. G. M. (2022). Adapted from Figure 9: Dualities ego-shadow, conscious-unconscious and personal-collective. In HPTD-M: The Holopraxis Transdisciplinary Management Theory. Communication and Mindsets as the applied main example. *Transdisciplinary Journal of Engineering & Science*, 13. <http://atlas-tjes.org/index.php/tjes/article/view/272/229>
- [29] Galvão, Lúcia Helena (2023). Symbolic vision vs. artificial intelligence [Visão simbólica x inteligência artificial]. 45-minute lecture by *New Acropolis Brazil in Portuguese*. <https://youtu.be/HW0xqoTDEw8>.
- [30] Jung, C.G. (1966) *Two Essays in Analytical Psychology*. Princeton University Press. <https://vdoc.pub/documents/two-essays-on-analytical-psychology-5m8ujeupn00>
- [31] Languagehat (2018). Egregor or egregore comes from the French égrégore (“group spirit”), from the ancient Greek noun (“watcher”). It is concept representing a “thoughtform” or “collective group mind”. The symbiotic relationship between an egregore and its group has been compared to the more recent, non-occult concepts of the corporation (as a legal entity) and the meme. <https://languagehat.com/egregore/>
- [32] Loisel, Mariana Thieriot (2016) *Les mutations humaines: philosophie et science*. Éditions Amaltee. <https://www.calameo.com/read/00741761974d749c26ba3>
- [33] Galvão, Lúcia Helena (2016). BHAGAVAD GITA - Comentários filosóficos sobre o livro sagrado indiano. [BHAGAVAD GITA - Philosophical commentary on the Indian holy book]. *New Acropolis Brazil*. <https://youtu.be/FYqJ5fwR4Ps?si=OQcp3AZONdJlrs1r>
- [34] Ramos, Jose (2022). Os 3 tesouros da saúde [The 3 treasures of health]. *New Acropolis Coimbra, Portugal*. <https://www.nova-acropole.pt/os-3-tesouros-da-saude/>

[35] Costa, L.S.G.M. (2023). A stress test for the HPTD-M transdisciplinarity through Alchemical Psychology. *Transdisciplinary Journal of Engineering & Science*, 14. <https://www.atlas-tjes.org/index.php/tjes/article/view/503/334>

[36] https://www.linkedin.com/feed/update/urn:li:activity:7131968399361859584/?origin=SHARED_BY_YOUR_NETWORK

About the Author



Leonardo da Silva Guimarães Martins da Costa is a Brazilian civil engineer with emphasis on sanitary engineering (1992). Business manager of a third generation of civil engineering entrepreneurs (1992-2008). Post-graduate degree in engineering economics (1996). Executive MBA in Business Management (2002). Brazilian Federal public servant in the management cycle: Career of Federal Auditor of Finance and Control - AFFC (since 2009). The author acted as an articulator, coordinating working groups of generalists and specialists and promoted process simplification through the transdisciplinary approach. Executive Secretary of the Board of the PIS-PASEP Fund, a Brazilian savings account fund from workers (2011-2020). Executive Secretary of the Board of FCVS, a Brazilian public special fund (since 2022). Deputy Secretary-General of CIRET, a French NGO in Paris promoting international research and studies on transdisciplinarity (since 2023). Independent transdisciplinary researcher and creator of the Holopraxis Transdisciplinary Management Theory (HPTD-M). From 2022 to 2024, nine articles published in English: USA (6), France (1), Canada (1), and South Africa (1). In Portuguese, the background publications of the HPTD-M theory involve one book (2020), two monographs (2011 and 2021), and four articles (2012-2023). ResearchGate profile: <https://www.researchgate.net/profile/Leonardo-Costa-44/research>. E-mail: [HYPERLINK "mailto:leosgmc@gmail.com"leosgmc@gmail.com](mailto:leosgmc@gmail.com).
