

## FROM DISCIPLINARITY TO TRANS-DISCIPLINARITY

**Professor Ph.D. Emil DINGA\***, Senior Researcher  
“Victor Slăvescu” Financial and Monetary Research Center,  
Roumanian Academy, Romania  
E-mail: emildinga2004@gmail.com

**Abstract:** *Scientific research, but also the taxonomy of sciences, are confronted with relatively unclear concepts, going to terminological and even conceptual confusions about entities such as discipline/disciplinarity, multidisciplinary or pluridisciplinarity, interdisciplinarity or transdisciplinarity. The paper aims to examine this conceptual family in a logical and semantic manner and suggests definitions and distinctions of content that avoid the ambiguity of the use of related terms and help construct arguments about the phenomenology of research and scientific knowledge. Finally, the study proposes a specific paradigm for moving from disciplinarity, through intermediary stages, to transdisciplinarity (the latter seen as a secondary disciplinarity).*

**Key - words:** *disciplinarity, interdisciplinarity, transdisciplinarity.*

**JEL Classification:** *B40, O30, Y9.*

### 1. Specific of knowledge, research, and practice in social and humanistic field

In contrast with the natural sciences, the social and humanistic field exhibit some crucial characteristics which should be strongly taken into consideration in the knowledge process.

#### (a) **Inter-disciplinarity** requirement

- economic subject is part of economic object (it is indiscernible from the object);
- observer (cognitive) subject is coincident with the actional (praxeological) subject;
- „movement law” is not invariant (more exactly, there are no laws in the strong sense);
- variability of the initial conditions is necessary (not contingency, as in the natural sciences).

#### (b) **Creativity** requirement

- economic truth and its testing are necessarily contextual
  - that is, they are depending on values, which transforms the economic knowledge into a hermeneutics;
- „movement law” is strongly sensitive from the initial conditions
  - economic dynamics is chaotic (i.e., a non-linearity punctually unpredictable);
  - economic dynamic is not reversible (or, at least, it is not ergodic);
  - economic dynamic is strongly dominated by hysteresis.

#### (c) **Causality**

- most often, the *effect* precedes the cause
  - because the effect is of the goal nature (the goal is a species of cause – Aristotle’s final cause), which appears before the economic action (which is the efficient cause);
- most often, the *cause* cannot be known (observed)
  - in the best case: the cause appears as a causal mechanism (causal chain without a first cause, but with only causes with different degrees of proximity to the effect)

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\* Emil Dinga is Professor of Theoretical Economics, and Economic Epistemology, senior researcher and supervisor for doctoral and post-doctoral programs in the economic field, at Romanian Academy.

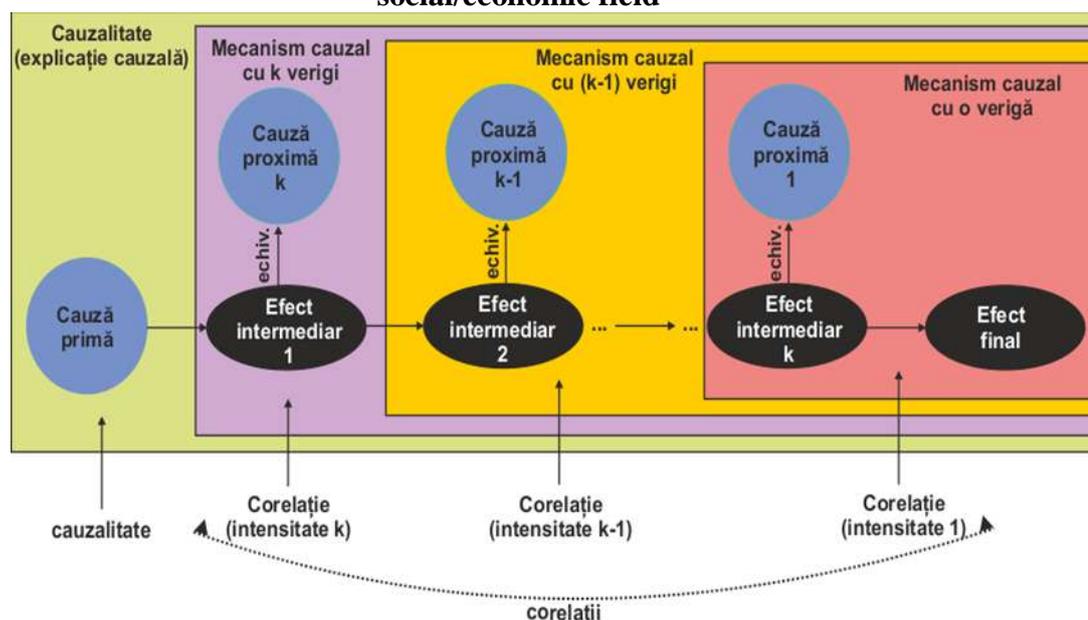
➤ in the worst (and more frequent) case: the cause appears as a simple *correlation* (either structural or functional, but not causal);

NB: anywhere we have a causal chain, it is about correlation, but not about causal explanation

- causal asymmetry
  - identical causes can lead, under the same conditions, to different effects (morphostasis);
  - different causes can lead, under the same conditions, to the same effect (morphogenesis).
- causality is not („sunken” into trajectories (which are reversible, by inverting the algebraic sign of the time variable), but into *processes* (which are irreversible, because the entropy law).

In figure 1 is shown the relationship between the cause and the causal mechanism.

**Figure 1. The relationship between the cause and the causal mechanism in the social/economic field**



Source: author.

(d) **Trans-disciplinarization** requirement

- in economic discipline, the explanation, as a causal description, has a more accessible, but sufficient proxy: *comprehension* (understanding);
- comprehension is not accessible than by integrating all the essential sides of the subject (firstly, the *goal-values*);
- this means the mandatorily trans-disciplinary approaches in research, respectively the desirability of *trans-disciplinary* descriptions of the causal mechanisms.

(e) **Questioning** requirement

- there is no genuine research in economics (more general, in the social field) without a challenging *problem* (for example: a structural or causal incompleteness);
- research must identify problems of *scientific* type, that is, susceptible to enlarge the knowledge horizon which is factually testable (that is, it is under the

*correspondence-truth testing*) or, at least, susceptible to enlarge the list of factually testable hypotheses;

- questioning implies growing the weight of the *deductive* nature or, at least, of the *abductive* nature in formulating the hypotheses and in testing their veracity.
- (f) **Invention** requirement
- in economic (more general, social) field, there is a dominance of *invention* over the discovery
    - by the contrary, in natural sciences, there is an inversely dominance
  - in economic (more general, social) field, the conceptualization consists, preponderantly, in building *heuristic fictions*
    - is used, massively, the method *as if*
  - invention implies a more risk of *error* than discovery
    - in fact, any theory is, essentially, an invention (theory has not ontological statute, although Karl Popper classified it within the „third world” – the world of the objective contents of thinking)
  - building *meta-theories* (i.e., meta-explanations), is the most secure way to manage the informational explosion (NB: there is also the categorially knowledge)
    - the extreme abstracting must constitute the final target of the economic or social fundamental research
    - the more and more de-contextualization of the scientific result is a symptom of veracity (similar to the formal aesthetic configuration of the formula in the natural sciences)
- (g) **Openness to questioning** requirement
- a genuine scientific result is that which proposes, concomitantly, new *interrogations* which generates necessarily (otherwise, it is tautological);
  - social research must aspire, essentially, to *comprehension* (understanding); in the social field, many explanations are not, cannot be, and shouldn't be than descriptions of comprehension of the human behaviour;
  - scientific research in economics (more general, in social field) must take into consideration the fact that the rationality of decision and of human behaviour are *false targets*, because it is principled impossible to be reached (the desiderative thinking always dominates the rational thinking – the last is simply an adequacy of the means to the goal);
  - testing the true of the economic sentences (or of the economic predicates, after the case) remains relatively *contextual*, which dig a fissure of unsurpassing face to Popper's falsifiability criterion (it is difficult to replicate the context of the prediction in the testing experiment).

## 2. Discipline and disciplinarity in social knowledge

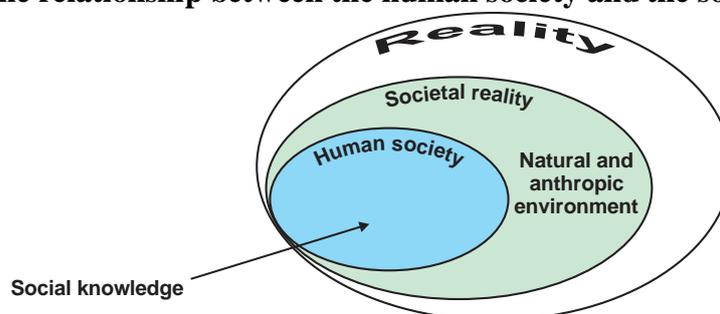
In order to understand the passing from disciplinarity to trans-disciplinarity, some definitions and conceptual clarifications are required.

- *disciplinarity*: parameter of a cognitive approach that maintains knowledge within the theoretical framework of an assumed cognitive discipline (Christie & Maton, 2013)
  - (def) theoretical framework: the set of hypotheses (e.g. principles, axioms, etc.) that constrain the explanations provided by a certain cognitive discipline

- **consequence:** the results of knowledge are theoretically closed, that is, they are valid (provide acceptable explanations) only in that theoretical framework
- **comment 1:** the disciplinarity has the strongest force of intellectual penetration of the object of knowledge, generated by its „specialization" on the aspect offered by its theoretical framework
- **comment 2:** disciplinarity is the first, obligatory, approach to the object of knowledge (any cognitive object is elucidated, in the first instance, disciplinarily)
- **comment 3:** the disciplinarity implies an arbitrary choice of the aspect to be elucidated cognitively (or, in other words, of the theoretical-guide framework of the research)
- **comment 4:** sometimes, by disciplinarity is meant the study of a certain segment cut in reality, from the perspective of the cognitive interest: we consider that this acceptance is wrong, because it would mean to favor the individual, who never provides authentic knowledge, but only pragmatic, instrumental knowledge (due to the high contextuality – e.g. induction)

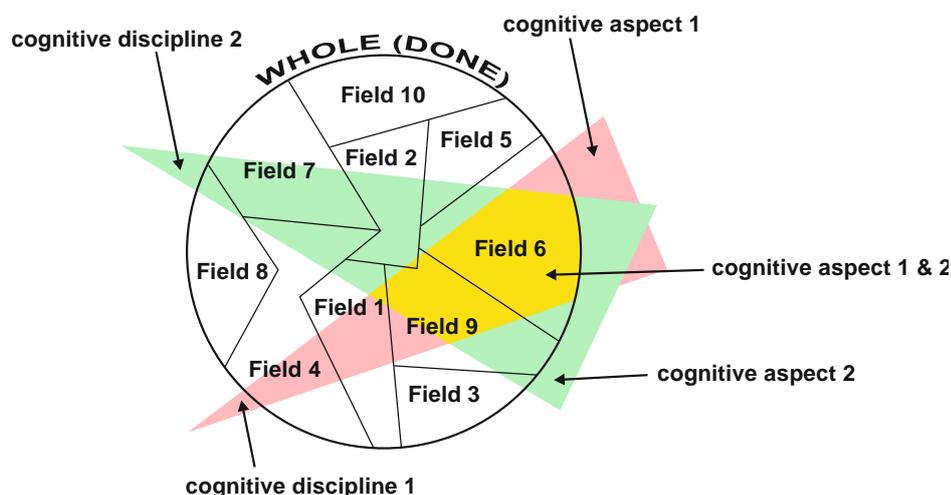
Figure 2 indicates the „topological" relationship between the human society and the societal reality, while figure 3 shows the way in which the cognitive aspect and the cognitive discipline are related to each other regarding the knowledge process.

**Figure 2. The relationship between the human society and the societal reality**



Source: author.

**Figure 3. The relationship between cognitive aspect and the cognitive discipline**



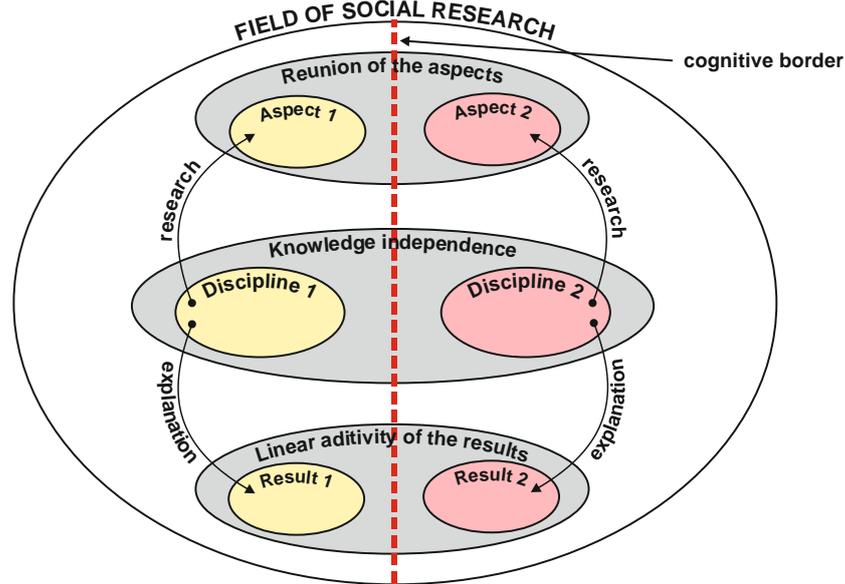
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### 3. Conceptual demarcations UD-MD-ID-TD

In this paragraph, we will define and examine the logical (and psychological as well) stages to pass from disciplinarity to transdisciplinarity and again to a new disciplinarity and so on.

- **Unidisciplinarity (UD):** approach, at a given time or in a given time interval, of a single aspect of a research field, through a cognitive discipline
  - the conditions of sufficiency for UD:
    - ✓ *bijection* between discipline and cognitive aspect: each aspect represents the research object of a discipline and vice versa
    - ✓ *subsequentness* of cognitive approach: each aspect of the domain must be approached successively, even if several such aspects are ultimately investigated
    - ✓ *independence* of disciplines: the disciplines investigate the associated aspects in terms of autonomy vis-à-vis other disciplines that carry out similar cognitive approaches (NB: however, the independence of the aspects of the field in question is not necessary!)
    - ✓ *non-coincidence and independence of cognitive subjects*: the cognitive subjects that carry out the successive research are distinct and independent from each other
- **Multidisciplinarity (MD):** the simultaneous and independent approach of several different cognitive aspects of the same research field, through several cognitive disciplines (McConney, 2013)
  - the conditions of sufficiency for the MD:
    - ✓ *bijection* between discipline and cognitive aspect: each aspect represents the research object of a discipline and vice versa
    - ✓ *independence* of disciplines: the disciplines investigate the associated aspects in terms of autonomy vis-à-vis other disciplines that carry out concomitant cognitive approaches (NB: however, the independence of the aspects of the field in question is not necessary!)
    - ✓ *uniqueness* of the cognitive subject: the cognitive subject that develops several disciplines for the cognitive elucidation of several aspects of a given research field must be the same (obviously, it may be a collective cognitive subject)
  - the conditions of necessity for the MD:
    4. *explanatory extensivity*: the explanations provided by the disciplines involved in the research of the field concerned extend the knowledge in an exclusively quantitative way
    5. *linear additivity of the multiple explanation*: the independent explanations provided by each discipline can be summed up in a purely descriptive aspect (descriptive explanatory list)
    6. (*conjecture 1/theorem 1*) *theoretical closing reunion*: the theoretical closing of the results obtained in a multi-disciplinary way is given by the reunion of the theoretical closures of the results obtained by the disciplines involved.

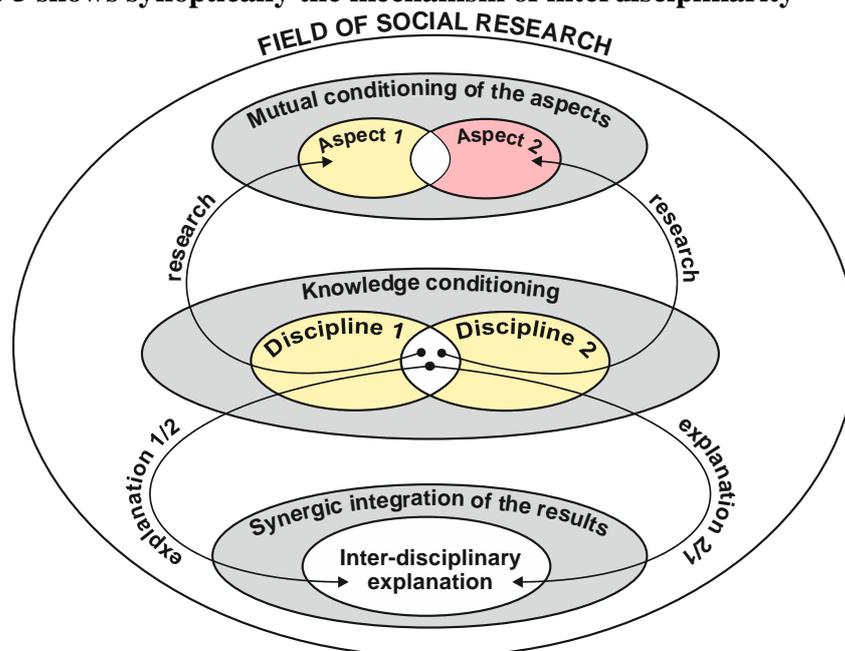
Figure 4 shows synoptically the mechanism of multidisciplinary.



Source: author.

- **interdisciplinarity (ID):** the approach, concomitant and conditional, of several different aspects of the same field of research, through several cognitive disciplines (Miller, 2010)
  - the conditions of sufficiency for ID:
    - ✓ *bijection* between discipline and cognitive aspect: each aspect represents the research object of a discipline and vice versa
    - ✓ *non-independence of the disciplines*: the disciplines involved in the research of the different aspects of the field realize a sui generis communication between them, the final explanation provided being one integrated at the level of all the disciplines involved
    - ✓ *uniqueness of the cognitive subject*: the cognitive subject that develops several disciplines for the cognitive elucidation of the same aspect of a given research field must be the same (obviously, it may also be a collective cognitive topic)
  - the conditions of necessity for ID:
    - ✓ *explanatory intensity*: the explanations provided by the disciplines involved in the research of a given aspect of a domain extend the knowledge in a qualitative way
    - ✓ *logical additivity of the explanation*: the conditional explanations provided by each discipline can be summed up in a non-descriptive, synergistic aspect; this means that the achievement of a disciplinary result is conditioned by the constraints of another / other disciplines; the final explanation is therefore a synergistic one (could not be obtained separately from any of the disciplines involved)
    - ✓ *(conjecture 2/theorem 2) theoretical closing intersection*: the theoretical closure of the results obtained inter-disciplinary is given by the intersection of the theoretical closures of the results obtained by the disciplines involved.

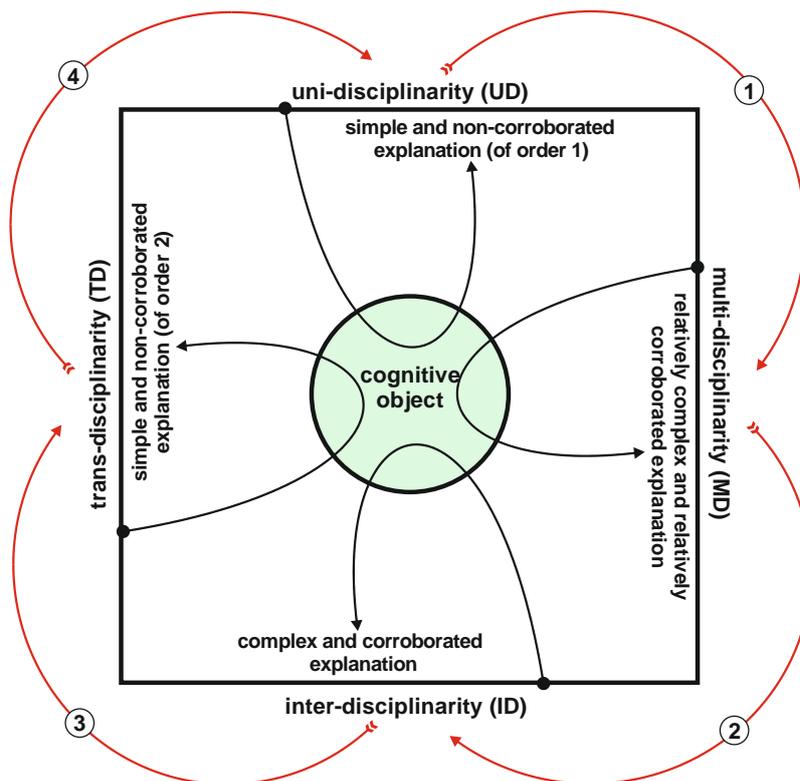
Figure 5 shows synoptically the mechanism of interdisciplinarity



Source: author.

- **transdisciplinarity (TD)**: meta-cognitive approach to an aspect of a research field, through disciplinary transcendence (Nicolesco, 2010)
  - the conditions of sufficiency for TD:
    - ✓ explanatory impossibility: the approach (either UD, MD, or ID) of the scientific interest in the given field cannot provide acceptable explanations within the accepted theoretical framework (so the problem cannot be solved)
    - ✓ explanatory incompleteness (the truncated character of the general explanation) is a kind of explanatory impossibility
    - ✓ the explanatory locality (the local character of the explanation) is a kind of explanatory impossibility (the locality is a kind of contextuality)
  - the conditions of necessity for TD:
    - ✓ explanatory novelty: the explanation is not covered by any of the theoretical frameworks involved (e.g. if MD or ID)
      - consequence 1: TD generates its own theoretical framework
      - consequence 2: at a certain level, the new theoretical framework generates disciplinary innovation (border disciplines – e.g. sociobiology - or new disciplines – e.g. systems theory); NB: TD is not a qualitative leap from the MD or the ID, but represents a new, emergent look (the emergency generates novelty), in the knowledge

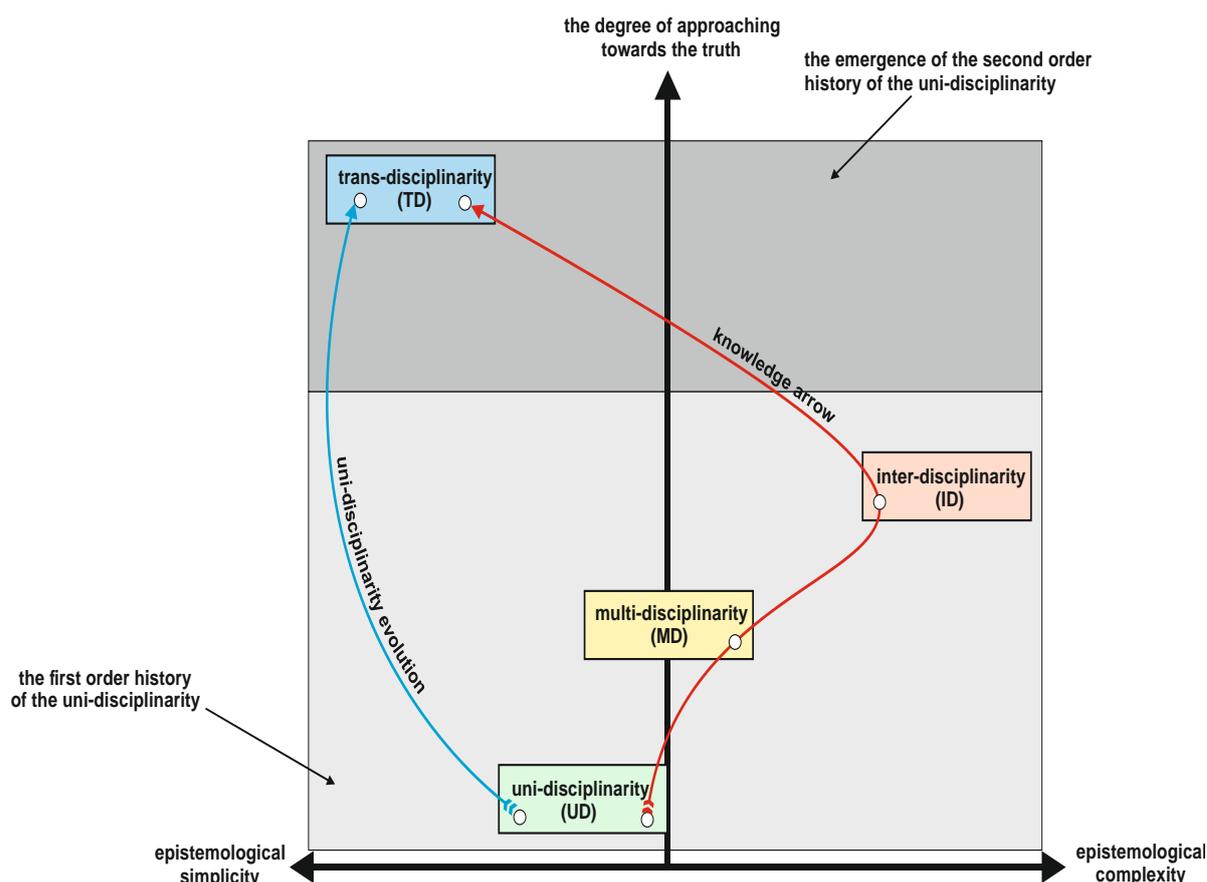
Figure 6 shows synoptically the mechanism of transdisciplinarity



Source: author.

Once the transdisciplinarity is reached, a new disciplinarity emerges and the cycle UD-MD-ID-TD is resumed sine die. Figure 7 synthesizes such an endless cycle.

Figure 7. The continue cycle of UD-MD-ID-TD



Source: author.

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