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Notes on the other side of creativity in mathematical physics development: schizotypy and the need for a new approach in exploring new physics

Victor Christianto* + Florentin Smarandache**

*Ekklesia Advanced School of Theology, Jakarta, INDONESIA; Halton Arp Institute, affiliated to International Mariinskaya Academy, St. Petersburg; **Dept. Mathematics Sciences, University of New Mexico, Gallup, NM, USA.

1 Introduction

As one of the authors (VC) notes a few days ago, there is a book we have just published by one of the publishers in Jakarta, entitled Koinomics: Relational Economics to bring Pancasila to life (Jakarta: Bina Warga, 2022). At the end of the book, a senior writer as well as a lecturer and practitioner at one of Management Studies Schoolin Jakarta, wrote a Reflective Closing as follows: "We have long observed that various fields of science are engrossed in playing with methods and techniques each other's logic. Also what is the focus is rarely enriched by focus and findings in other areas that are completely beyond his concerns. As if they prison in strict scientific rules according to their fields, such as methods of theology, diction, and tradition of their respective logics and basic assumptions that are rarely explored repeat. This book is different. When the metaphor of a river is used, the flow of the water brings with it gravel, leaves, roots, stones, and sand. As a result, going with the flow is not always easy. Especially if the author is someone who is brave and tries to find the relationship of one thing in a field of science with other things outside the field of science which at first glance have absolutely nothing to do and make jumps. Moreover, linking theology or spirituality with economics, mysticism, ways of working brain, mathematics, and so on will indeed stretch the ability of appreciation- active reader." Then we can ask: How do we approach a creative process? If you look at the latest articles, it seems that an "sane-acceptable level of insanity" is needed, or perhaps it can be called, within the framework of Fuzzy Logic or Neutrosophic Logic: "Neutrosophic Degree of Madness in Creativity Theoretical Development." How then to address the "acceptable insanity"... or

the accepted a fair-degree of madness? In another article, we call it: Principle of Minimal Madness.

2 A few recent literatures

Is it true: People with a little mental disorder are more creative? (From daily news: Kompas.com) - Art lovers may have known for a long time that Van Gogh, who cut off his own ear, suffered from a mental disorder. Another exemplary case is, just for the sake of giving an example: the late mathematician Prof. John Forbes Nash, Jr., whose biography has been made into a major movie: "A beautiful mind." This fact seems to be the same as the conclusion of a study conducted by a team from Sweden's Karolinska Institute which states that an artist's creativity may be linked to mental disorders. By studying 1.2 million patients, including inpatients and outpatients, the researchers found that artists, scientists, and professions that require creativity generally come from families with a history of bipolar disorder, depression, anxiety, autism, anorexia, suicide-tendency, ADHD etc.[13] Another news from Stockholm - There are people who have a high level of creativity and ideas that other people don't think of. But often such people are suspected of suffering from mental illness. Is there a relationship between creativity and mental illness? Recent studies have shown that the brain responds similarly to the chemical dopamine in people with schizophrenia as well as highly creative people. The results showed that there were similarities between highly creative people and those with mental disorder, which then it is called "schizotypy." These findings suggest that creative people may not be able to filter information in their heads like normal people, so creative people are better able to make connections to create unique ideas.[14] Besides their own disadvantages of being quite-awkward people among their society, they can be expected to give a contribution, to find new physics beyond just "Dirac recipe." As we know, mathematical physicists are often so obsessed in finding new physics by exploring new mathematics; which can be attributed to Paul A.M. Dirac' advise, as we will discuss as follows. As Anderson Joshi wrote, which can be para-phrased as follows: "One of the significant ways improvement happens in math is through a course of generalization. A portrayal given by Kitcher of one of the significant ways math advances, which he distinguishes as one of "generalization." This refines an idea communicated by Dirac in 1931 on the manner by which certain progressions in science can play a huge heuristic occupation in material science."[1] See also how Maxwell and Heavyside worked out their way. [2][3] Actually, Dirac advises as follows: "....that a "powerful new method" for the physicist comprises of picking a branch of arithmetic and afterward continuing "to foster it along appropriate lines, simultaneously searching for that manner by which it seems to loan itself normally to actual translation."[4] While initially such an advise sounds clear and worth to follow, but from the last few decades, there is a quite unhealthy trend, a kind of obsession to find new and the largest group ever, and then physicists try to find if there is signature of Nature's approval of their wild adventure. Such a gloomy

situation has been reported in Hossenfelder's "Lost in Math," which attracts responses from various luminaries such as Wilczek etc. Ref. cf. [5] As far as we can consider, these situations are caused because physicists tend to be absorbed more on mathematical structures, symmetry, beauty -so to speak. While they often forget to ask Nature what it actually says - through experiments. Such a simple problem. Even, there are rumours that Michelson-Morley experiment was designed and ordered as such to prove that "ether" the all-filling-primary fluid does not exist. Therefore, many more precise experiments which came later, such as Miller etc., are systematically discarded. They say: ether is not required – by definition, they would prefer "mathematical beauty" over reality itself (these are the attitude of many mathematicians and physicists alike, even if some of them do not agree with special relativity). Such and such is the case, until we found the arrogance of string theorists, who insist that string and superstring etc. should be the only game in town. Thanks to Peter Woit etc., we know that supertring theories are far from being the correct theory we sought for.[7][8] Part of the problem, as we can think, is that most physicists forget the latter part of Dirac's advise above : "at the same time looking for that way in which it appears to lend itself naturally to physical interpretation."[4] Therefore, what Dirac actually wrote is to find a balance between mathematical structures but we shall keep our feet on the grounds. See our paper in J, where we argue that it is actually Kolmogorov's theorem of contradiction that show the possibility of complicated mathematical theories to yield so many paradoxes and problems, as it also was proved by Godel (1931). Therefore allow us to argue a few guides, including a simple one-to-one correspondence between mathematical variables and physical observables, as well as keep our postulates to a minimum. [6] In a more general parlance, provided we can accept that actually all of us are crazy, especially we mathematical physicists in general, only with varying degree of madness, then what we argue is to keep principle of parsimony. This may be called, in a rather light way, as "Principle of minimal madness." The question is how to find ways beyond mere Dirac's recipe. One way is to suggest to look not only at more and more general mathematics, but to merge ideas, which of course require certain degree of inclusive thinking. See 2 examples that we will discuss here: phase transition in city dynamics, and also topology of data modeling, especially in the world of new data structures offered by new language Go and Golang database. See also, ref. [9]-[12].

3 Example 1: Merging ideas, Phase transition + city dynamics

Phase transition is known concept in experimental physics, but to merge this observed concept with city dynamics is entirely something else. Phase transition to turbulence is also known in studies related to non-equilibrium dynamics or self-organized criticality. According to Joel Dearden et al. [15] in their abstract: "We also identify key characteristics of the dynamics such as velocity

and how the phase space landscape changes over time. This analysis is then linked with equilibrium-size graphs, which allow insights from state space to be applicable to models with large numbers of zones. More generally this type of analysis can potentially offer insights into the nature of the dynamics in any dynamical-systems-type urban model. This is critical for increasing our understanding and helping stakeholders and policy-makers to plan for future urban changes." We believe that such an approach is very promising to combine concept already known in experimental physics, e.g. phase transition dynamics; towards analysing spatial dynamics or urban development problems.

4 Example 2: Merging ideas, Topology + data modeling

Beyond just relational tables and relational databases, there is growing need for new types of data structures and new ways of data modeling. For instance, by introducing geometric triangulation. As N. Sharp wrote in introduction to his dissertation (2021): "As geometric data becomes more ubiquitous in applications ranging from scientific computing (...), there is a pressing need to develop algorithms that work reliably on low-quality data. Intrinsic triangulations provide a powerful framework for these problems, by decoupling the mesh used to encode geometry from the one used for computation. The basic shift in perspective is to encode the geometry of a mesh not with ordinary vertex positions, but instead with only edge lengths." ['9] Besides, there are a number of new programming languages, for instance Go and its particular database, called Golang. And one of its new features is the so-called topological relationship, which can be viewed as merging two ideas: topology from advanced geometry studies and data modeling.[18] See the following figures for illustrating the new approach to relationship in data modeling.

To summarize, we can expect new fields of study, not only by finding more general mathematics, but by merging two or more ideas as per required by problem at hand. From that perspective, sometimes we can find a unique role of schizotypic persons with their unique view of reality and also their "inclusive thinking" approach, such as we observed in the biography of Prof. John F. Nash, Jr.

5 Concluding remark

There is indeed an apparent fine line between unconventional creativity and true madness. Although we are aware of the role of schizotypy which includes, among other things, inclusiveness in thinking (meaning crossing common boundaries in scientific disciplines), there is a certain point when creativity becomes pure madness. To summarize, we can expect new fields of study, not only by finding more general mathematics, but by merging two or more ideas as per required by problem at hand. From that perspective, sometimes we can find a unique role

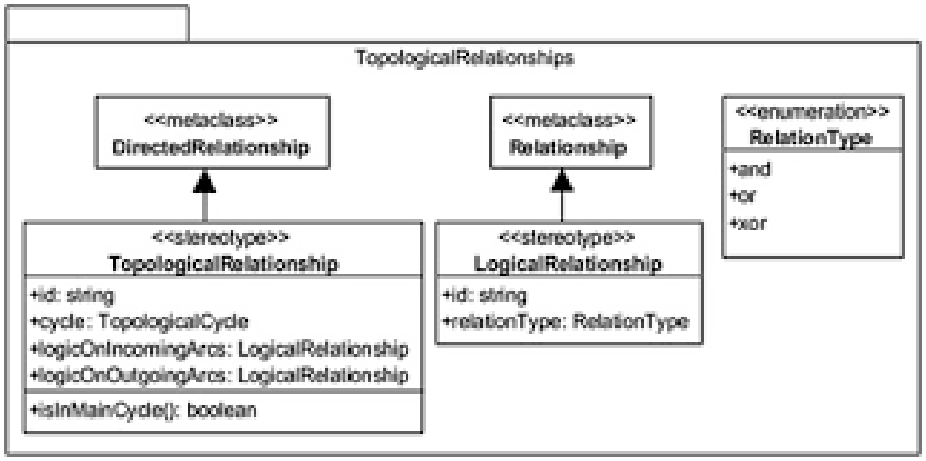

Figure 1: Example: Topological relationship.

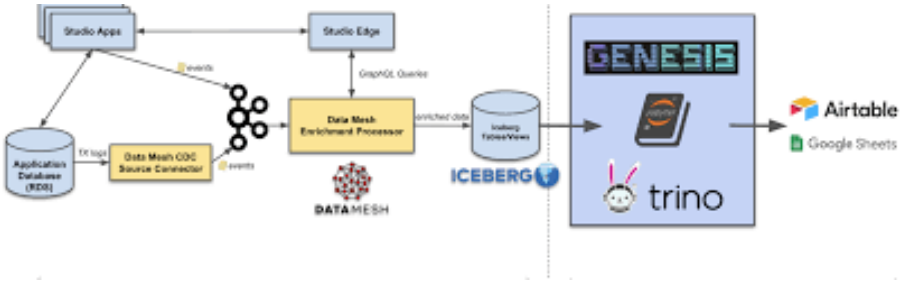

Figure 2: Example: Data Mesh and Data Modeling of Netflix services.

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