

Towards a Collective Spatial Analysis: proposal of a new paradigm for supporting the spatial decision-making from a Geoprospective approach

Juan Daniel Castillo Rosas^{1,3}, María Amparo Núñez Andrés², Josep María Monguet Fierro¹ and Alex Jiménez Vélez^{2,4}

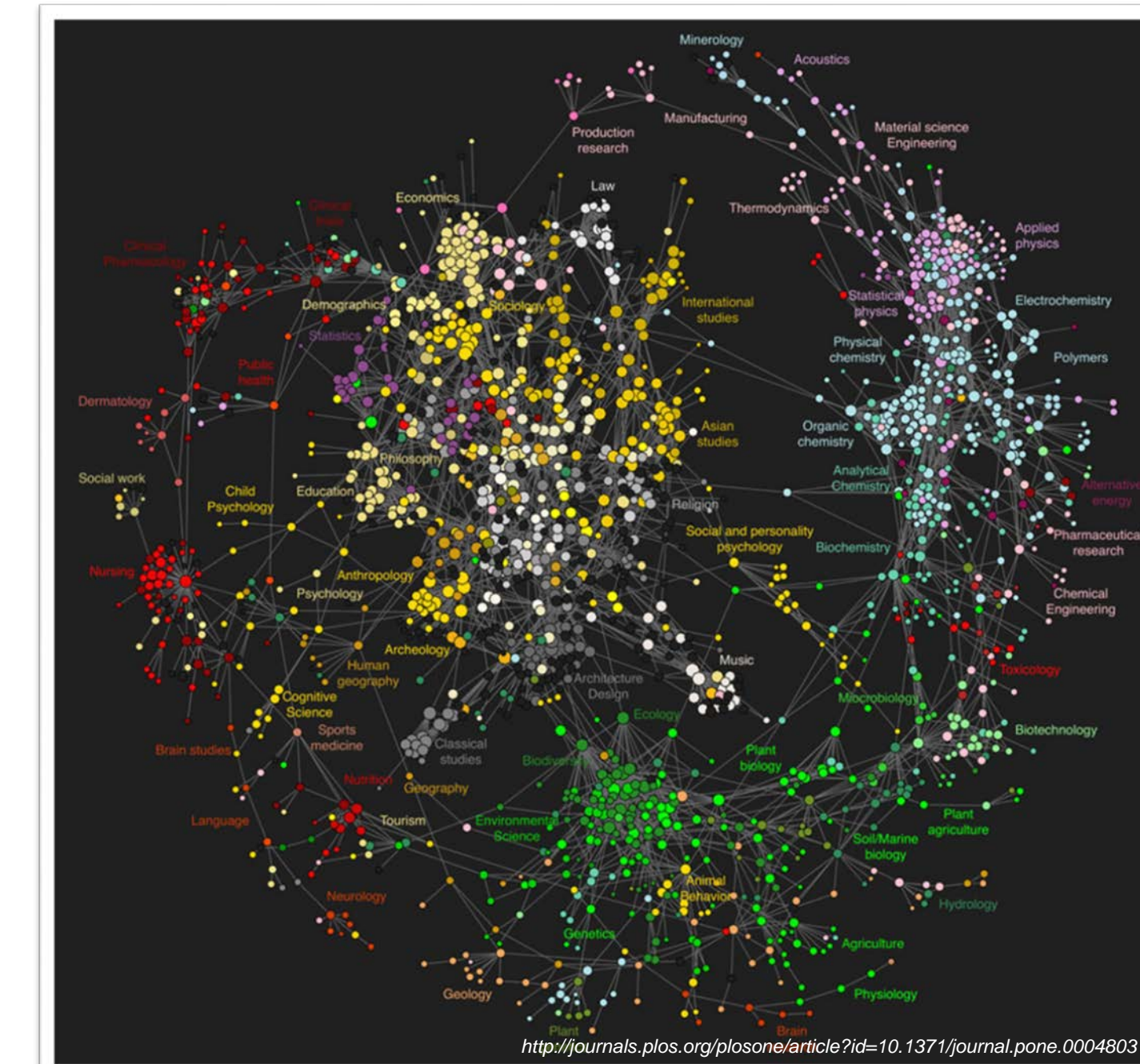
¹ Departament d'Expressió Gràfica i l'Enginyeria, Universitat Politècnica de Catalunya (UPC-BarcelonaTech), Av. Diagonal, 647, Barcelona, España.
² Departament d'Enginyeria del Terreny, Cartogràfica i Geofísica, Universitat Politècnica de Catalunya (UPC-BarcelonaTech), C. Jordi Girona, 1-3, Barcelona, España.
³ Dirección General de Cartografía, SEDENA, Av. Industria Militar 261, Naucalpan de Juárez, México.
⁴ Universidad de las Fuerzas Armadas (ESPE), Av. Gral. Rumiñahui s/n, Sangolquí, Ecuador.

* Author to whom correspondence should be addressed; E-mail: juan.daniel.castillo@estudiant.upc.edu.

Abstract

This paper presents the progress of a research work that seeks to establish prospective spatio-temporal locations of goods, services or events in a given territory primarily through the application of concepts and/or tools that combine Collective Intelligence (CI), Geographic Information Science (GISc) and Complexity Theory. Relying on this notion, probable and plausible future scenarios could be projected to conduct various studies within the context of the Geoprospective (an emerging field of research aimed at issues of territorial forecasting), which might provide valuable alternatives in the decision-making process in order to carry out anticipatory actions to achieve or avoid such scenarios. In the light of the above, it is suggested that this kind of Collective Spatial Analysis (CSA) would provide a new paradigm about how to perform spatial analysis, the same that is based on a cognitive approach of a multidisciplinary group of users who collectively participate with their knowledge on an interdisciplinary basis, and not from a limited single user approach that uses geometric, statistical or mathematical geoprocessing algorithms.

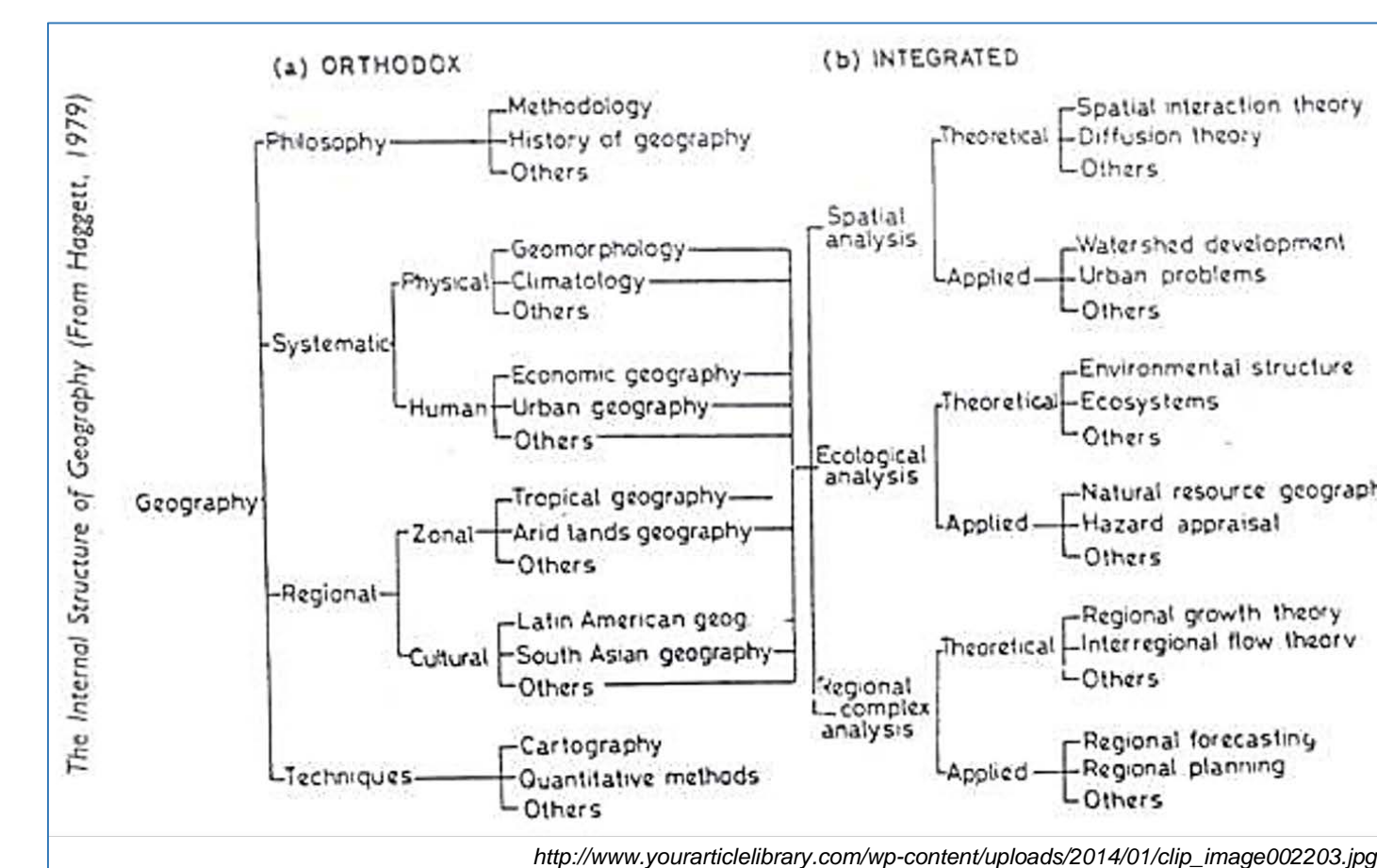
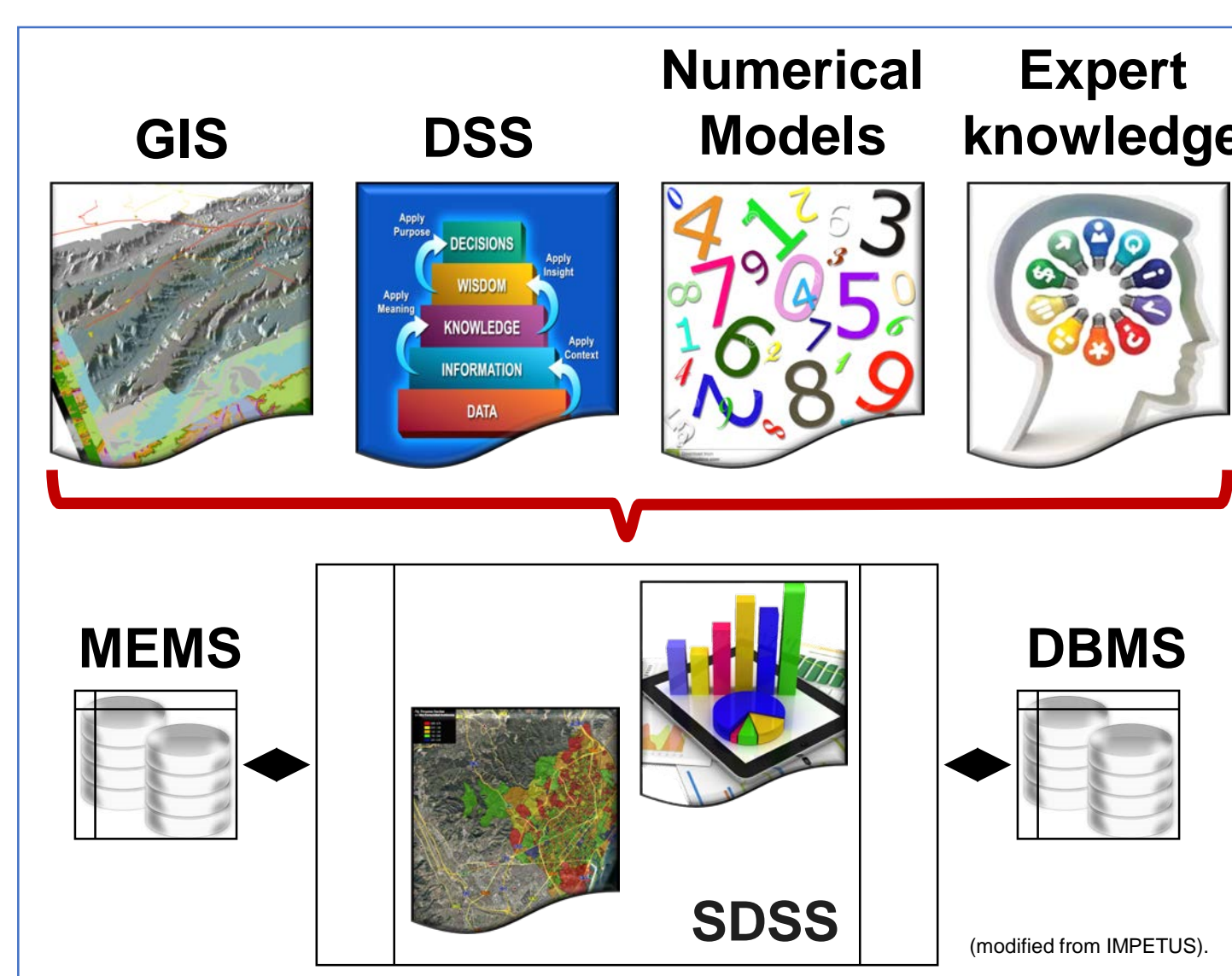
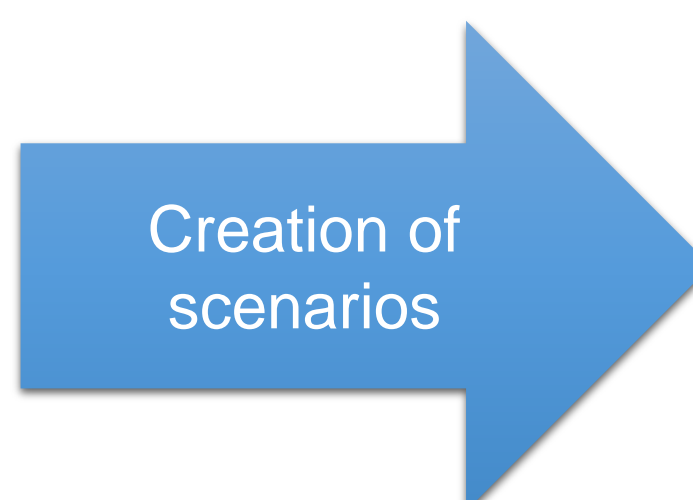
It is the geographical space in which most of the human activities are conducted and will take place.



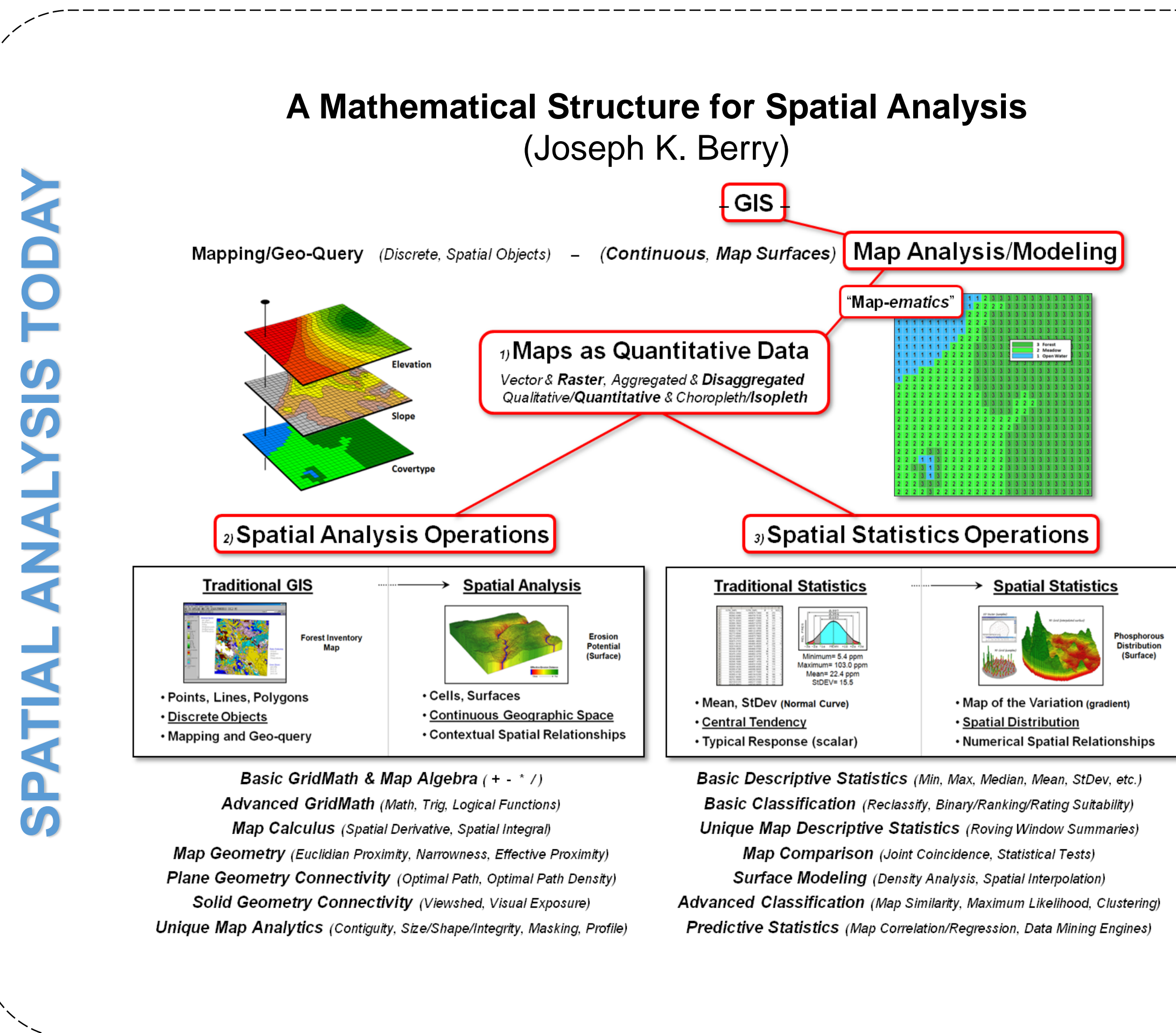
Under this approach, one or more future possible or plausible scenarios are intended to generate interdisciplinarily which will help early decision-making to achieve the objectives pursued.



The same problem may be approached differently according to the reasoning of each user.

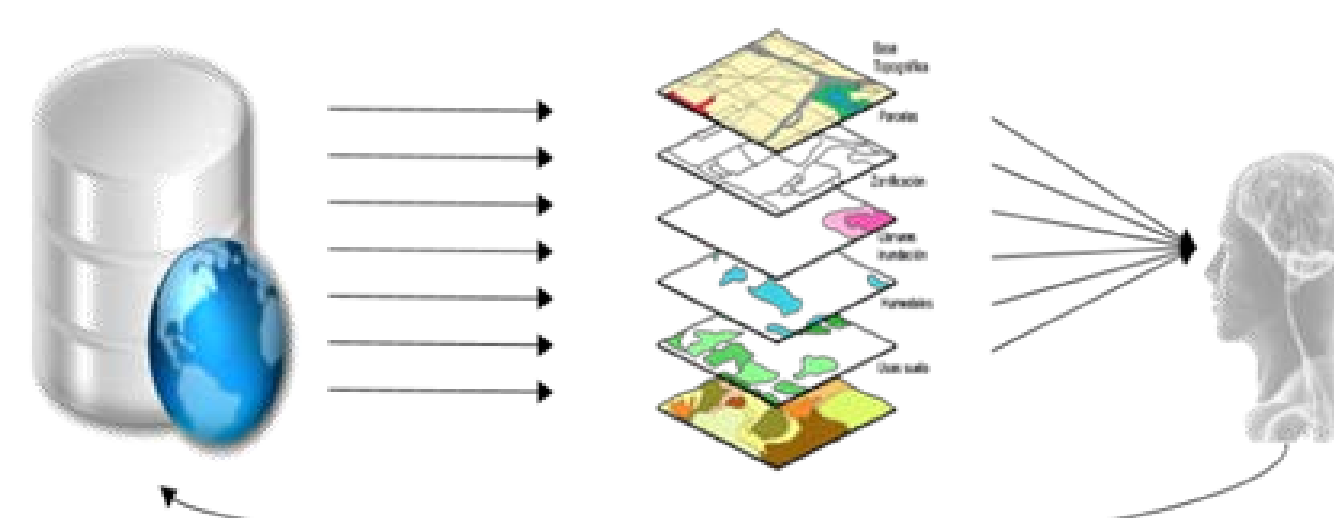


Spatial Analysis can be understood as the set of systematic procedures that allow studying the characteristics of the complexity of geographical space to draw conclusions, assumptions or solutions to certain questions that will help to better understand the world that surrounds us.

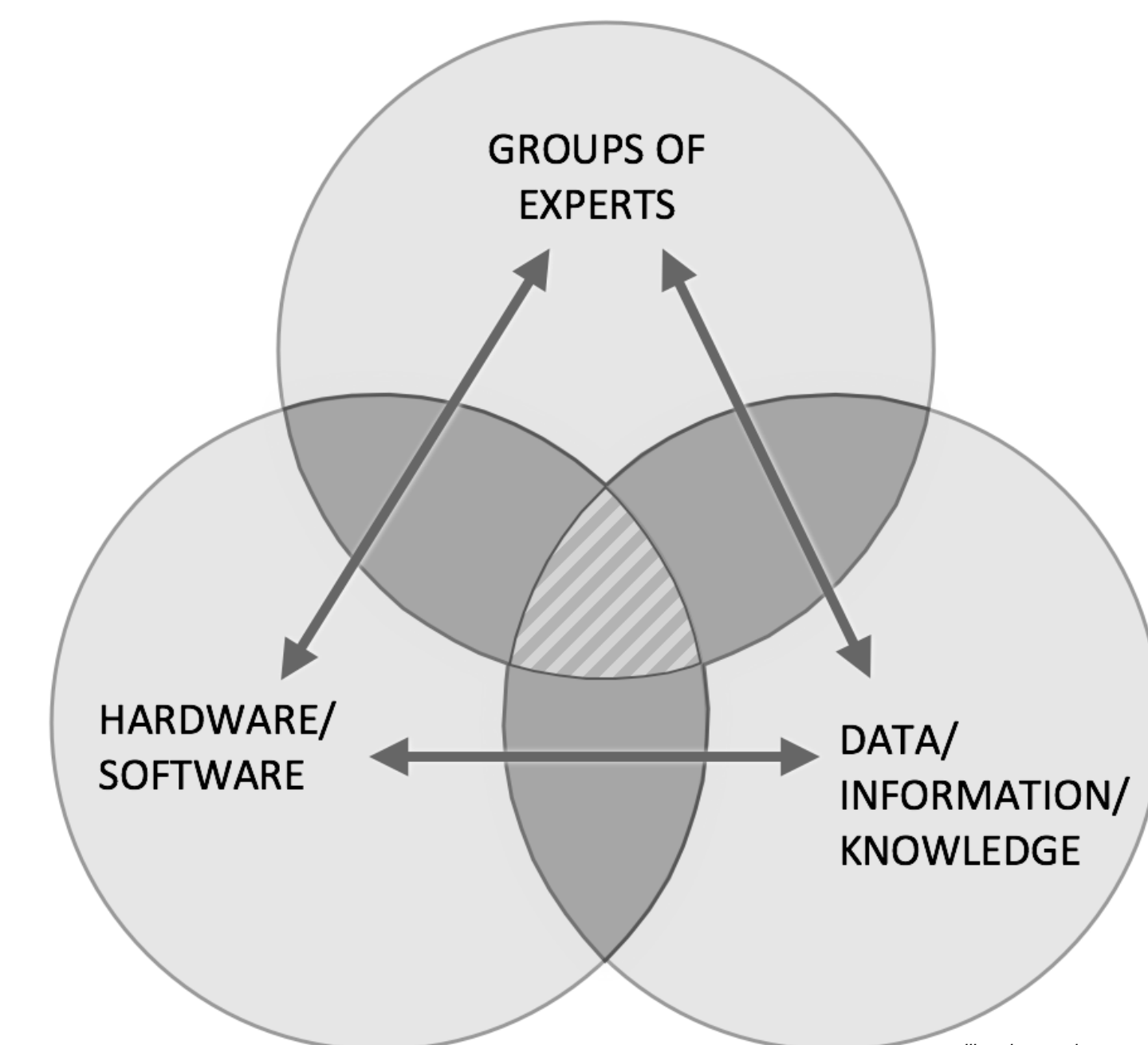


SPATIAL ANALYSIS METHOD	DESCRIPTION
Queries	Retrieve information from database.
Measurements	Numerical value that describes geographic entities and relations between geographic entities.
Transformations	Changing, combining or comparing datasets.
Descriptive summaries	Descriptive statistics applied in GIS.
Optimisation	P-median problem – selecting ideal locations according to well-define rules.
Hypothesis testing	Make generalisations about the whole From a sample dataset.

Methods and description to Spatial Analysis (Elisabeta A. Haller).

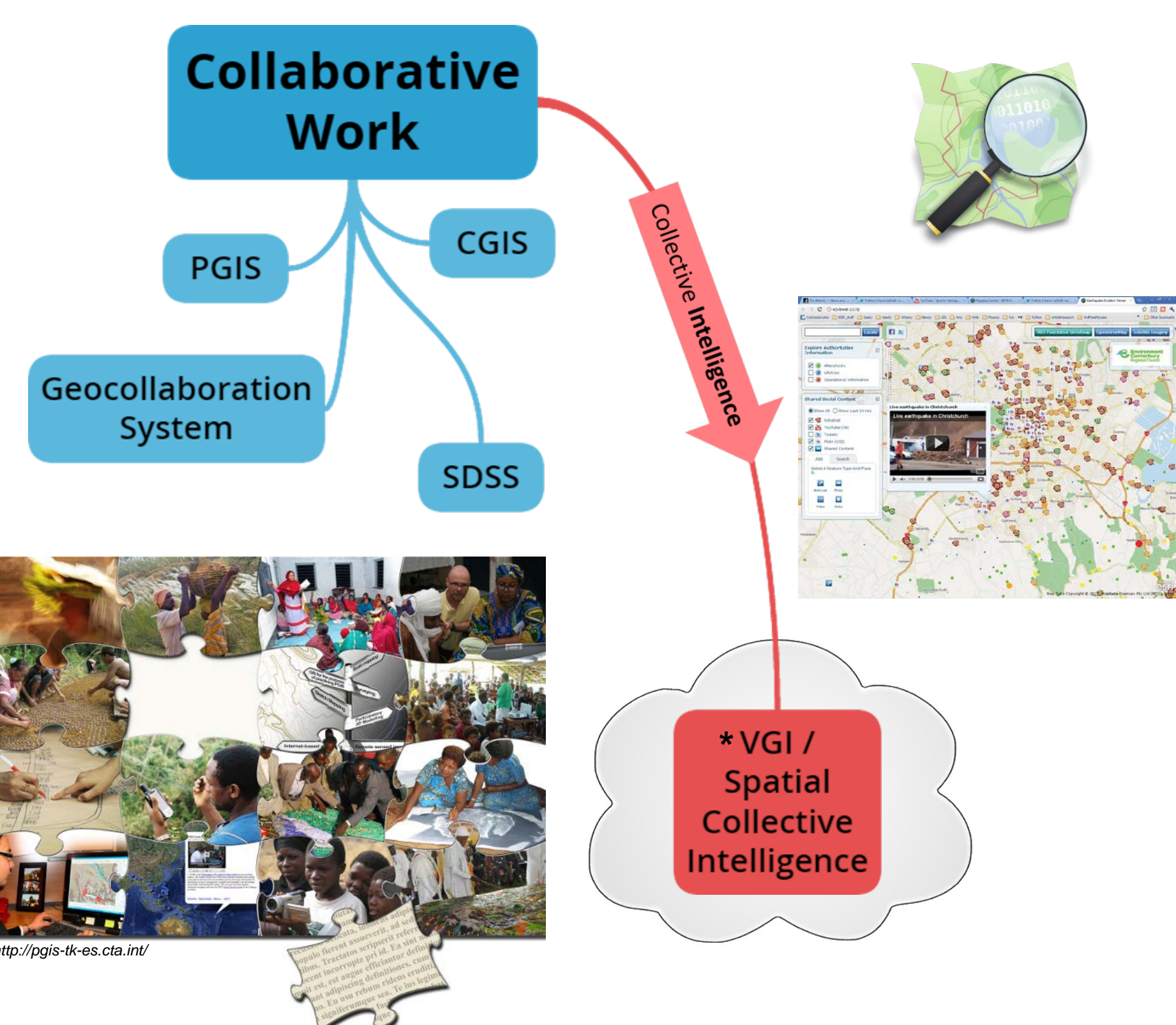


Traditional Spatial Analysis, from a single cognitive stance.



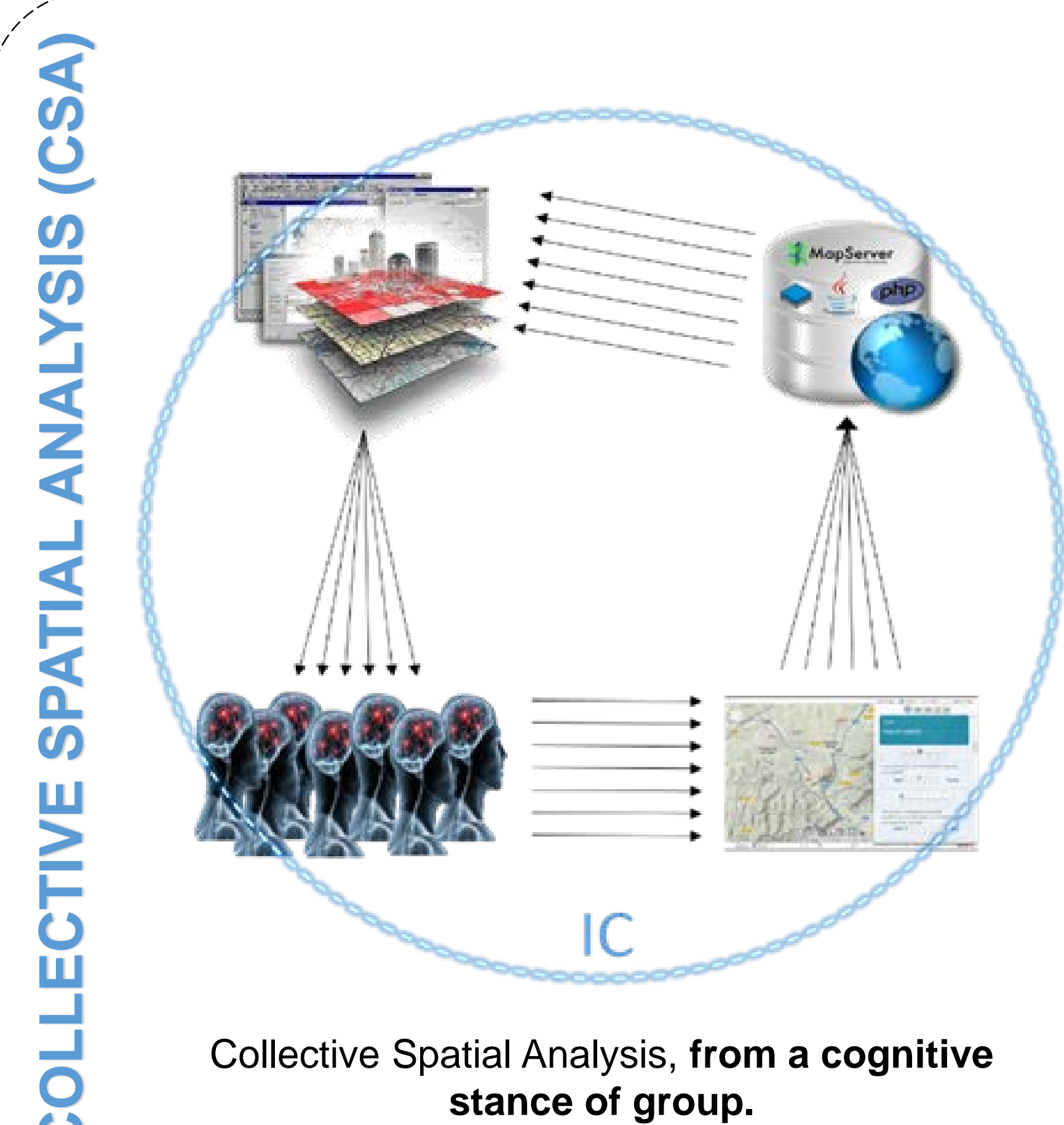
COLLECTIVE INTELLIGENCE

The capacity of human collectives to engage in intellectual cooperation in order to create, innovate, and invent (Pierre Lévy).



The Collaborative Work implies the interaction among the individuals to work towards common goals.

*Given the nature of its production, exists a whole debate regarding the quality and the reliability of this information.



The Collective Spatial Analysis, can be defined as the ability of a human collective -that cooperates intellectually- to investigate the complexity of geographical space in order to create, innovate or draw conclusions, assumptions or solutions to certain questions that will make a contribution for a better understanding of the world around us.

