Demarcation and Levels of Analysis in Knowledge Based Development

Guest Editorial


When we speak of the Knowledge Economy as a “new game” we imply -in terms of formal game theory- that new boundaries, new elements and new rules apply. New boundaries because the blend of natural phenomena involved in value production and distribution have shifted from a predominantly physical realm (matter, energy, products and their monetary substitutes) to a predominantly psychological realm (e.g., ideas, emotions, relations, cultural creations and all other knowledge capital). New elements because land, natural resources, muscular strength/dexterity and material means of production like tools and equipment are now overweighted in terms of value addition by R&D, innovation, design, creativity and ITC-based means of production. New rules because the very physical base of agricultural and industrial production determined economic realities such as diminishing returns, exclusive property, limited distribution, that even if permanent, are no longer dominant. While the new value dynamics for knowledge-based organizations (i.e., a knowledge-based theory of the firm) and societies (i.e., a theory of knowledge-based development) is mostly unknown, physics-based economics is plagued with the kind of contradictions, paradoxes and explanatory constraints that throughout the history of science and ideas call for a re-definition of the field.

A fundamental aspect of natural science that every scientific field has to deal with is the construction of a structure of categories from which both analytic and systemic relations can be described and explained. Testability against empirical evidence, completeness and internal consistency are the criteria to select those “natural fracture points” in the classic expression by B. F. Skinner. In theory, units of analysis evolve as best-fit categories to explain the natural phenomena within a given field (e.g., urban identity). In practice, they become the currency for structuring, differentiating and assessing Knowledge Based Development (KBD) policies, programs, publications, events, etc.

¿What are the units of analysis currently in use in KBD and to what extent they belong to conceptual systems that satisfy these criteria? In the following paragraphs some aspects of current research in KBD will be explored in order to build a preliminary picture of existing and emerging levels of analysis. As it will be shown, a consistent determination of the levels of analysis also involves a demarcation of the field. In fact, we will distinguish two demarcation approaches. Synthetic demarcation allows to determine whether a specific instance belongs or not into the field. Analytic demarcation allows to determine the relative position of any given unit of analysis –or combination of them- within that field.
Synthetic demarcation

Determining the boundaries of a field is in fact an act of definition. In these special issues, two contrasting views of KBD have already been identified. On the one hand, KBD can be, and most often is regarded as an increase in monetary mass resulting from technological and educational-based productivity. On the other hand, KBD begins to be characterized as a dynamic equilibrium between all common value elements in a community, socio-cultural as well as physical and financial. Such definitions are based on an implicit or explicit axiological base epistemologically and politically grounded. The conceptual models, analytical categories, measurement units and resulting data and indices can be located at either of these perspectives or somewhere in between. In this context, I have advocated a Radical Approach to KBD, defined as the deliberate, balanced and systematic development of a community’s overall value base. The focus of such approach is to characterize a distinctive contribution of the KBD concept, otherwise diluted and therefore render redundant into peripheral preexisting concepts such as economic growth, regional development, urban planning, etc. This in turn leads to a definition of the subfield of Knowledge Cities as “a permanent settlement of relative higher rank in which citizenship undertakes a deliberate, systematic attempt to identify and develop its capital system in a balanced, sustainable manner.” Again, this radical definition departs from transitional concepts such as technopoles, clusters, innovation regions, digital cities, etc., where social knowledge capital is valued insofar it might be instrumental to economic growth.

Analytic demarcation

An inductive or single-case demarcation is required to determine the location of a specific instance within the dimensional coordinates of a given field. In the current and still embryonic years of KBD, a natural practice has been to associate a specific case –policy, program, model– to the closest subsidiary discipline. The annual JKM special issue on KBD has intended to serve as a platform to display the rich contributions of disciplines such as Economics (New or Endogenous Growth Theory, Knowledge-based Production, Behavioral and Evolutionary Economics, New Theory of the Firm), Urban Studies and Planning (New Urbanism and Urban Environmentalism), Geography (Human Geography, Knowledge Flows and Territoriality), Neuroscience (including the Artificial Intelligence and Nanotechnology convergence), Psychology of Science and Technology (from social cognition through accelerated innovation), Anthropology and Sociology of Knowledge (e.g., Identity and Cohesion), Social Studies of Science, Political Economy of Knowledge and Technology, Innovation Management, ICTs and of course, Knowledge Management. A major purpose of the annual special issue has been to bridge these tributary fields through interdisciplinary approaches. How these fields interrelate and what new development perspectives may emerge out of their best integrations is still early to determine.
The following example may provide some clues as to the direction that the integration of multiple disciplines contributing to KBD may take. In a recent attempt to visualize the overlaps between several fields related to Collective Intellectual Capital, a rather messy picture emerged describing actual instances of programs, publications and events (fig. 1).

![Figure 1. KBD and Intellectual Capital: descriptive view](image)

**LEGEND.** KBD/KCs: Knowledge Based Development / Knowledge Cities; OL: Organizational Learning, KM: Knowledge Management, IC: Intellectual Capital; BI: Business Intelligence, ICTs: Information and Communication Technologies.

In trying to organize these instances into some fundamental scheme, a simplified picture emerged along three dimensions of knowledge-based value creation: individual, organizational and social (fig. 2). The arbitrary selection of these three dimensions and the central positioning of Intellectual Capital (IC) to organize the correspondence between events from other disciplines happening at each of these levels, helped categorize multiple and diverse KBD research studies. For instance, a field study on rural development through mobile computing programs focusing on farmers competencies and motivations would involve mostly personal-level intellectual capital. A comparison of intra-organizational collaboration in medium size companies within an industrial sector would hit organizational-level IC. A research on regional capabilities for social innovation would correspond to social-level IC. This simplification is consistent with the radical approach to KBD mentioned earlier.
Through several such exercises it is possible to eventually arrive at a simple and fundamental set of dimensions, even if at an exploratory, pre-empirical stage. The question, with regard to KBD, being ¿what are the fundamental dimensions in the field? If we are trying to understand and leverage knowledge-based value creation ¿what are the fundamental coordinates?\)

According to a characterization of scientific fields of study\textsuperscript{y}, there are three major breaking points in selecting levels of analysis and analytical units: discreteness, duration and extension. While duration and extension obviously refer to space and time continua, discreteness refers to aggregation level of events. The extent to which these generic dimensions apply to the categorization of knowledge-based events might be arguable. On the other hand, KBD has a rather prominent spatial or territorial dimension.

In trying to build a working taxonomy of KBD events, able to characterize all development initiatives, policies, programs, reports, publications, conferences, etc., related to the field, the following generic continua seem to work adequately: Geopolitical, Social, and Cultural/Economic. Figure 3 represents the intersection of KBD events across these three domains or continua.
The Geopolitical continuum scales territorial and political demarcation. It provides KBD events with a spatial reference involving units going from the local (neighborhood, small village) through districts, counties, sub-national regions, states, nations, supranational regions and continents, to the planetary level (The Earth). Geography, Political Science, Regional and Urban Studies share a major involvement in KBD spatial framing.

The Social continuum indicates the relative aggregation or discreteness of human collectives. Beyond the human pair demarcating Social Psychology and the organizational level corresponding to Management Science (and therefore KM), KBD starts at the inter-organizational level, to go through medium (urban), large (metropolitan, regional) and very large (country, cross-country) communities, ending up at the maximum human aggregation, i.e., mankind or the global community. Social Psychology, Sociology and Anthropology are of particular relevance throughout this continuum.

Finally, the Knowledge Intensity continuum provides a more distinctive dimension to KBD. This dimension involves processes of collective or social response to represented realities (ideas, emotions and subsequent cultural objects). Such processes can be approached from a meaning perspective (Culture) or value
perspective (Economics). In fact, these perspectives tend to merge in the Radical Approach to KBD mentioned above. Knowledge Intensity begins at low quantity an quality (analyzing a single knowledge process at a basic level of expression, such as cross-company standardized IP transactions), continues through medium-level of intensity such as multi-process initiatives (most of KBD programs/studies), ending at the maximum expression of all collective knowledge-meaning or value (e.g. a utopian World IC Program). In dealing with this dimension, Knowledge Management, Economics and Semiotics become prominent.

The following table instantiates several aspects for each of these continua and their corresponding dimensions.

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<th>Three basic KBD continua and corresponding dimensions</th>
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<td>Territoriality &amp; Political demarcation</td>
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<td>OBJECT</td>
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<td>QUESTION</td>
<td>Where?</td>
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<tr>
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<td>Neighborhood / district</td>
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<tr>
<td>INTERMEDIATE UNIT</td>
<td>City / Region / Country</td>
</tr>
<tr>
<td>MAXIMUM UNIT</td>
<td>The Earth / All nations</td>
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<tr>
<td>SOURCE DISCIPLINES</td>
<td>Geography, Political Science, Regional and Urban Studies</td>
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The descriptive capacity and usability of this analytical framework has yet to be tested. Refinements or entirely new frameworks are bound to emerge as progress is made in KBD models and techniques. For the time being, this distinction may help manage policies, programs, conferences and editorial practices. To an extent, it is a response to the need for demarcation criteria in several KBD applied and research initiatives. ¿Are reputed KBD urban or national policies actually knowledge-based ones? ¿Is this or is not a Knowledge City? ¿What range of projects are eligible to a KBD fund? ¿Does a particular paper belong into a given KBD publication? ¿Should categories be set for a KBD award and if so which ones? ¿How could contributions to a conference be systematically grouped?

By using both the KBD synthetic demarcation criterion (either transitional or radical) discussed above and the analytic demarcation continua later introduced, most of these questions can be reasonably and practically settled. Yet, the
current momentum in KBD and Knowledge Cities applied and conceptual production will increasingly demand sharper and more effective categorizations.

The papers.

This year’s selection of papers provides a case in point in KBD diversity and depth. To begin with, a couple of papers contribute a state-of-the-art perspective on perhaps the most distinctive KBD category of analysis: Knowledge Cities (KCs). First, Ergazakis et al—who have previously identified a number of key KCs factors—introduce an updated framework incorporating further cases and hypotheses. Next, Yigitcanlar—who also builds on a number of prior contributions to the KBD literature—examines global best practices in knowledge-based urban development, identifying success patterns. These two papers together provide an updated review of the literature and a comparative framework of models and practices for KCs design and development.

In the following block, three papers analyze diverse organizational-level knowledge processes having an impact on social-level value dynamics. Zapata et al look at two distinct moments—generation and transfer of knowledge—in information technology-related SMEs in Barcelona, while Rivera et al assess cultural barriers for innovation and knowledge sharing in Puerto Rico. Next, Mohamed et al empirically substantiate the role of Knowledge Management for innovation, prioritization and efficient use of resources in developing countries. Interdependencies between economic, social and cultural aspects of knowledge-based business performance become apparent through these studies.

From a territorial standpoint, two studies on European knowledge regions provide complementary perspectives. Firstly, Lerro and Schiuma analyze the knowledge dimensions grounding regional development dynamics in the case of the Basilicata region, Secondly, Messeni et al look at how external competencies and capabilities are reached and acquired by means of organizational and cognitive proximity in the technology districts of Toulouse and Castel Romano. Both studies converge in emphasizing the role of knowledge capital dimensions in regional development.

Moving on to a national/sector level, Sharma and Goswami look at the absorptive capacity of companies in Indian pharmaceutical industry and the importance of their reaching for tacit knowledge and enhancing the knowledge stock by absorbing and assimilating external R&D. Next, Chou and Passerini take us to an international perspective of a particular knowledge process by analyzing the collaborative and competitive dynamics of Intellectual Property Rights across countries.

Further on, at the level of whole national and international KBD policies, Batra examines recent initiatives to revitalize the national education and skill development systems in India, while Dang and Umemoto undertake a
generalized national capability approach to KBD. Finally, Sharma et al look at the design of KBD Policy Analysis for overcoming the Digital Divide.

Overall, this selection of papers provides an good sample of the multiple levels involved in KBD, from the interorganizational to the multinational, from the local to the global, from single value dimensions to systemic models. Further research elicited by these studies might lead to a sharper demarcation of KBD and to continually improved analytical constructs.

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[i] There has been an obvious overlap between the “physical” and the “knowledge” economies ever since the invention of money through the sophisticated and now distrusted n-order financial instruments such as futures and derivatives. But the bulk of production throughout all prior history—and consequently management and accountancy practices—was based on operations and experiences defined by physical dimensions such as force and volume.


