Meta-KM: A Program and A Plea

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Abstract

Opportunities for the Knowledge Management movement to undertake the direction of its own development process are explored from different perspectives. The potential of reflexive knowledge (i.e. knowledge about knowledge) as a prerequisite for that undertaking is examined. Some historical instances where knowledge users studied their own knowing practices are recalled. From the metaknowledge standpoint, a self-examination of the KM movement or Meta-KM is introduced. First, a general framework for establishing the epistemological and scientific foundations of KM is laid out, with key examples. Second, a reference is made to contemporary efforts to further innovation practices through a similar reflexive pattern. Third, some conditions for the social evolution of the KM profession are discussed. Finally, the potential impact of a community of reflexive knowledge professionals upon the emergence of a global consciousness is assessed.

Introduction: *Déja Vu*

I hope that the title of this paper has rung a bell for some readers. It paraphrases the title of Stevan Dedijer's 1966 seminal paper [1] on the Science of Science Movement, where he urged us to apply the scientific method to the understanding of science. In other words, he was advocating a reflexive act of creating knowledge about knowledge. I believe that by looking at his proposal we understand several dimensions of Meta-KM.

"The first program for the science of science was outlined by Lord Francis Bacon, who was the first man to take for his province not just all substantive knowledge but also all the problems of the promotion and use of knowledge" [1, P. 489]. In the Baconian tradition, Dedijer [*idem*] reestablished a continuity in the process by which Natural Science grows conscious of itself as a human endeavor. He was part of a plenitude of brilliant and passionate science researchers such as Conant [2], Bernal [3], Barber [4], de Solla Price [5], Merton [6] and Goldsmith [7], to cite only some of the most prominent. Dedijer stressed the extent to which Bacon's program was in force:

> When Bacon identified and proposed solutions to the problem of science policy of his time, he also for the first time identified what may now be regarded as the three

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> major tasks of the science of science: first, the study of the factors –including social factors– involved in the art of discovery; second, the study of the social impact of discoveries, and third, the study of the art of promoting the sciences and their use. *[*Ibid. *]*

Thus, when Dedijer declares: "The model which I present here is based on earlier programs. The first was produced 350 years ago and the second during the past five years", he is acknowledging the roots of the Science of Science movement in Bacon's foundation of modern scientific method and meta-method. These two moments, in turn, are parts of continuous human efforts to understand humanity's own way of knowing as a means to improve the fruits of its understanding. This reflexive potential of knowledge about knowledge can be traced back to the origins of documented philosophical thinking. We can distinguish the ancient tradition of philosophical inquiry on the nature of human knowledge from its modern counterpart of applying scientific method to the understanding of science. This is the subtle distinction between traditional Epistemology as the "Science of the Sciences" [8] and contemporary studies of science as the "Sciences of Science" [9].

If Knowledge Management claims in any way to be the supreme human practice in understanding knowledge and capitalizing on it, it would be doing itself a poor service if it ignored major human efforts in the past to achieve the very same generic goal, their successes as well as failures. One of the aims of this paper is to exemplify how the development process of the KM profession may benefit from some lessons learned in earlier, but similar, moments of human intellectual history.

If we interpret Dedijer's summary of Bacon's program from the above quotation, we can identify three major tasks for Meta-knowledge:

- to understand the conditions under which knowledge occurs (scientific dimension)
- to apply the prior understanding to the creation of social value (technological dimension)
- to leverage the potential of society to capitalize on the scientific and technological dimensions (political dimension).

If we relate the three generic tasks of a scientific metaprogram with a more recent formulation of the Science of Science ideal, we can realize how much Bacon's Program still prevails. In 1985, John Ziman in his report "Science Studies and Science Policy" [10] proposed the following categories to organize the issues for study (table One).

Table One -- "Issues for Study" in Science Studies (From Ziman [10])

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- What are the **objectives** to be achieved? What are the practical or intellectual questions for which scientific answers might be sought? How urgently are these answers needed?
- What **resources** are available? How much is known about these questions already? Do we have the skilled people and specialized facilities to make further progress? What will it cost?
- What **structures** are appropriate, for formulating policy and for carrying it out? How should science be organized and managed, at various levels, for various purposes?
- What are the **processes** by which science makes progress? How are the objectives of policy turned into research problems? What do scientists put into their jobs –and get out of them?
- What are the **outcomes**? How should the results of a research project or the output of a scientific enterprise be evaluated? By what criteria can a science policy be judged effective and efficient?

It does not take much to translate those issues into KM relevant issues. Even if a specific meta-knowledge program for KM has to be made explicit in its own terms, capitalizing on reflexive knowledge in the history of human ideas would constitute good KM practice. Ziman's program echoes other mid 80's reports on Science Studies [11], [12], which indicate how ripe the international intellectual milieu at the turn of the century has been to meta-knowledge.

The Science of Science movement is alive and well today and the KM profession could gain in self-understanding by establishing links with its contemporary siblings: the European Association for the Study of Science and Technology (EASST) and the Society for Social Studies of Science (4S). A glimpse of recent issues in Science of Science can be obtained from the web site of the joint 4S/EASST Conference 2000, *Worlds in Transition: Technoscience, Citizenship and Culture in the 21st Century* held in Vienna, September 27-30 [13].

So far, current efforts to provide Knowledge Management with its own framework and articulate its scientific, technical and political foundations as a discipline have not capitalized on this inheritance. This intellectual inheritance is even richer since there are several other reflective traditions and contemporary counterparts of meta-knowledge. More important than selecting or advocating specific programs, I want to stress that the KM profession needs to become aware of its legacy with regard to reflective human understanding. Once conscious about the conditions that can either enhance or prevent its own development, it can take the actions necessary to master its destiny.

Program components

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For the specific sake of KM development, we may ask: What are the major issues of self-understanding? What is the most critical KM meta-knowledge? That depends of course, on whose interests and what interests are served. Natural stakeholders are the constituencies KM professionals might be serving: the business community, governmental organizations and non-governmental organizations (NGO's), such as national and regional societies, and maybe even the global ecosystem. Other stakeholders are KM professionals themselves, as the first interested parties in improving KM practices.

There have been some previous attempts to lay down a program for the development of KM as a discipline. Rather than write a comprehensive overview, I want to articulate the signs of a perceived need for self-understanding and self-direction of the KM community. Whereas a development program for the KM movement may be inferred from numerous contributions in the KM literature, I want to focus on a couple of explicit statements which come closer to a Meta-KM program. In the first case, Shariq [14] envisaged a KM professional society with three distinctive functions (See Table Two)

Table Two -- Shariq's [14] Program for a KM Professional Society

Academic education: An experiential learning-based academic environment
Research: A collaborative research community dedicated to life-long knowledge-based learning
Advanced technology: A multimedia and information technology-based knowledge era tools development program for supporting the performance of the knowledge professionals and organizations

In the second case, Concieçao *et al* [15] laid down a research agenda: "…to inform policy making and management decisions in the emerging knowledge-based economies" as follows (Table Three).

Table Three -- Research Agenda for Knowledge Policies and Management (From Conceiçao et al [15])

The development of a better **conceptual understanding** of the mechanisms that give knowledge its contemporary relevance
The construction of **indicators** associated with the immaterial aspects of the knowledge-based economy
The study of the **opportunities and threats faced by developing nations**

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While the first example focuses on the meta-professional aspects, the second one emphasizes meta-political ones. By integrating these proposals with similar meta-knowledge programs from the past, I suggest the following as generic categories for a Meta-KM program:

I. **Scientific dimension or meta-knowledge.** It involves the application of the best of resources of human understanding to KM as an object of explanation. It is widely recognized that different knowledge platforms yield different meta-knowledge practices. Yet, some major choices may be confronted by most, if not all knowledge platforms. The next section is devoted to the construction of a general meta-knowledge framework, based on a number of explicit knowledge assumptions. Even if these assumptions prove questionable, they ought to be substituted by alternative assumptions of which we are explicitly aware. These assumptions include the axiological base, since value awareness is considered within this framework as a primordial knowing act. Such a framework will be exemplified by an exercise of a specific Meta-KM system. The purpose of that exercise, rather than affirming such a system, is to encourage similar exercises until consensus is progressively built within the KM community.

II. **Technical dimension or meta-innovation.** It involves, in turn, the application of the best knowledge management technologies available for the purpose of producing the best possible knowledge management. A later section looks at some meta-methodological traditions which have been aware of the extent to which the method of knowing can itself be improved by applying the best of existing knowledge. It also looks at some contemporary approaches to meta-innovation.

III. **Social dimension or meta-profession.** How should KM professionals organize themselves as a knowledge community? Again, KM practitioners could capitalize on a wealth of contributions from different disciplines and moments in which reflexive knowledge has been exercised. A later section describes some related contributions and examines several lines of development.

IV. **Political dimension or meta-consciousness.** Is it possible that mankind may organize itself on the basis of its realization of a common destiny? Can KM contribute to help local communities, countries, and regions pursue more effectively their most cherished goals? The final section looks at some likely scenarios and asks: What attractors might exist that in ultimately influence outcomes in one direction or another?

Altogether, these four dimensions constitute a general Meta-KM program. By further refining the relevant questions within each dimension and by capitalizing

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on all identifiable inputs past and present, it should be possible to advance systematically in the self-understanding and self-direction of the KM movement.

Scientific Program: Meta-knowledge.

Some of the most lucid moments of philosophy are related to the human effort to lay down sound foundations for building knowledge. From the ideal of identifying a reference for certainty to the search for heuristic guidelines for discovery, paradigms of knowledge and knowledge-making have been a cornerstone of major philosophical systems.

In the Introduction, reference was made to the contemporary relevance of Bacon's programme. His legacy (the formalization of scientific method) laid the foundations for the contemporary application of scientific disciplines to the understanding and improvement of science as a human practice. That brief account, by all means incomplete and partial, was meant only as an invitation to conduct a more thorough integration of historical contributions to meta-knowledge for the purpose of understanding KM as yet another practice with reflexive potential.

What I will attempt in this section is an exercise of more direct significance to KM. It is an attempt to lay down a general framework for KM meta-knowledge in the scientific or explanatory as well as technical dimensions. In doing so, I will make explicit each of the meta-decisions and meta-criteria, so that each can be assessed, confirmed or revoked in its own terms, including the whole framework. This exercise has been conducted extensively in a separate work which develops extensively the technical side in a structure of KM processes [16]. After describing the basis of the framework, I will exemplify it in a current KM approach, which in turn can be assessed in terms of how well it satisfies the framework's criteria.

This framework may help the formalization of diverse KM models by making explicit the conceptual foundations of any given model. Also, it may facilitate the interplay of theory and practice, by developing rationalizations for successful practices and developing applications for sound theories. The framework allows for alternative models to be described and compared.

The basic foundational sequence is given in the following table.

Table Four -- Foundational Sequence for a Generic KM Framework

i. *Meta-method*: axiomatic assumptions
ii. *Method*: axiological, theoretical and epistemological foundations

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iii. *Theory*: sciences of knowledge

iv. *Technology*: structural foundations of knowledge systems

v. *Social KM processes*: knowledge systems design for holistic social development

vi. *Organizational KM processes*: knowledge systems design for integrated organizational development

A brief description of each of these elements follows. After this description, the framework will be exemplified by applying it to the foundational structure of a specific KM model.

A. Axiomatic assumptions. These constitute choices about meta-methodological requirements, for instrumenting the heuristic process (i.e., the method for choosing a method of discovery). Since attempts throughout the history of philosophy to establish an absolute reference for human knowledge have proven futile, each knowledge system needs to determine its own references. These assumptions may be explicitely defended or may be justified solely on the basis of preferred initial conditions for anchoring the discovery process.

B. Axiological, theoretical and epistemological foundations. These are the most general conceptual foundations within the system. By making explicit (i) the value framework that determines choices through selection of alternative discovery paths, (ii) the received conceptual background on the basis of which discovery categories are conceived, and (iii) the rules which will guide the process, the possibility to examine and improve each is opened.

C. Sciences of Knowledge. These scientific disciplines provide explanations to the natural phenomena underlying social and individual knowledge processes. This implies capitalization on the most significant fields of science contributing to the understanding of knowledge as a natural phenomenon by KM.

D. **Structural foundations of Knowledge Systems.** This level provides the logic in terms of which knowledge factors of production combine to maximize value. Once the process of discovery is served in response to its own foundations, a utility criterion needs to be introduced to maximize the potential of knowledge for the generation of social value.

E. Knowledge Systems Design for Holistic Social Development. These constitute KM processes at a social level, i.e., aiming at regional, national or

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community development. Based on the structural foundations of knowledge systems, sequences of action are established to accomplish the best results for a given social order, under its own value structure.

F. Knowledge Systems Design for Integrated Organizational Development. These are KM processes at an organizational level: the level of everyday KM practice. These are technically parallel to **(E)**, but applicable to specific organizations, such as companies, governments and Non-Governmental Organizations.

In order to exemplify the application of this heuristic framework, we will apply it to a particular KM model: Knowledge-based Value Systems (see table five), which has been practiced and redefined since 1994 [17, 18]. Departing from the most fundamental basis (axiomatic assumptions), this model gives rise to a set of processes for organizational KM strategy [16] —the primary concern of most KM professionals.

Table Five -- An Instantiation of the Heuristic Framework : Sample Model: Knowledge-Based Value Systems

	Axiomatic assumptions
A.1	*A systems perspective***.** The first self-validated assumption is that the Systems Movement provides a generic conceptual framework for representing human thinking and action. It is such capacity to organize human intellectual artifacts in general what makes it the entry choice as a meta-method. While it does not carry an explanatory function by itself, it constitutes a general discipline for structuring comprehensive conceptual frameworks. Hence, the claim is not about a specific systems theory amongst the several ones available, but about the service provided by systems approaches to mapping the interdisciplinary elements and relations involved in a knowledge-based value system. In fact, this very claim involves a bias amongst systems approaches for what Jaros, in emphasizing the process character of natural systems, calls Systemicity [19]. This emphasis is critical in regarding knowledge-systems components primordially as arrays of associations amongst knowledge subjects and knowledge objects rather than as objects in themselves.
A.2	*Holistic Natural Philosophy*. The second self-validated assumption is the dimensional continuity of all natural phenomena (a claim rooted in philosophical monism). Such

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assumption provides an interpretation of the Natural Universe as a dimensional continuum. It also establishes a link between Jaros' emphasis on process-systems and Von Bertalanffy's principle of Unity in Science [20] without resorting to teleology. This is a deliberate stand on a historically controversial epistemological issue. It derives from the belief that the very notion of knowledge manageability —implies a dimensional interrelation in the natural world between objects and represented objects as experiences of knowing agents.

Axiological, theoretical and epistemological foundations

B.1 *Integrated Value Theory*. Provides a homogeneous solution to ethical, epistemological and aesthetic value functions. It is a basic stand of the Knowledge-based Value Systems Approach [16, 17], by which all forms of knowledge are value-laden. Hence, the universe of collective preferences could be operationalized into systems of capital insofar as the value base of that universe and the forms of knowledge that are instrumental to it, are made explicit.

B.2 *Natural Philosophy of Knowledge*. Provides an Empirical Epistemology of the Natural Universe. This is a logical derivation of A2 insofar it allows one to inscribe the concept of Knowledge-based Value System within the continuum of natural phenomena. Hence, it becomes a particular case of a Unity of Knowledge claim: the assumption that all statements within a Knowledge-based value System can be reduced, sooner or later, to an expression that can be enunciated in the language of empirical science. This fundamental stand allows all elements of human experience to be recovered as knowledge acts.

B.3 *Measurement Theory.* Provides canons to the metrics of formal value systems. Once knowledge is formally integrated to a value theory, the requirement emerges for framing such theory within formal requirements of measurement theory.

Sciences of Knowledge

C.1 *Biology of Knowledge*. Provides the ontogenetic and phylogenetic bases for individual and social behavior. The systems perspective would allow for a connection with

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Evolution as a major scientific framework for living systems and the emergence of knowledge acts

C.2 *Psychology of Knowledge*. Provides general principles of learning, motivation and cognition. It is on the empirical basis of experimental psychology that the continuity between physical and represented realities is established. This is arguably the most distinctive element of a contemporary Theory of Knowledge.

C.3 *Economy of Knowledge*. Provides general principles of knowledge-based production. A major challenge is to determine the distinctive dynamics of value creation in knowledge-intensive production and the new ways in which factors such as work and capital interact.

C.4 *Sociology of Knowledge*. Provides an account of both existing and new patterns of organization in knowledge societies, as well as those emerging in parallel with global and distributed communities.

C.5 *Semiotics*. Provides general principles of sign structure and function and its relation with knowledge economies and knowledge societies.

C.6 *Computation Theory and Artificial Intelli*gence. Provide the conceptual and technical bases for the modeling and understanding of Artificial Knowledge Systems.

C.7 *Anthropology of Knowledge*. Provides an account of cultural factors involved in the construction of knowledge-based value systems.

C.7 *History of Knowledge*. Provides the record and explanation of the evolution of human representations.

Structural Foundations of Knowledge Systems

D.1 *Economy and Culture of Knowledge*. Study of value dynamics in knowledge societies, culture and production.

D.2 *Knowledge-based Value Systems*. Postulation of the New Theory of Development and the New Theory of the Firm, — through the logic of knowledge-based value creation.

D.3 *Systems of Capital*. Consists of the universe of operational capital of an entity (from small groups to whole nations or regions), founding The New Theory of Social and Organizational Capital.

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— Foundational or theoretical components end —
— Technical or applied components follow —

Knowledge Systems Design for Holistic Social Development. (Political KM Processes)

E.1 *Theory of Holistic Social Development*. Based on contributions like those of Amartya Sen and Francis Fukuyama, it sets the empirical bases for the functional relationships between economic and social development. It provides a systems perspective of all value dimensions required for the growth of society as a whole.

E.2 *Endogenous Growth Theory*. Based on Paul Romer's and other economists' work, it sets the conceptual bases for determining the internal value base of a given society..

E.3 *Theory of (Social) Human Capital*. Based on the works of Gary Becker and others, it provides the empirical bases for establishing functional relationships between knowledge capital (e.g.: educational/technological) and economic development.

Knowledge Systems Design for Integrated Organizational Development (Organizational KM Processes). This is familiar day-to-day KM. For a detailed description of these processes, see [16].

F.1 *Value-based Knowledge Management Strategy*. Corresponds to holistic intellectual capital systems. Derives a homogeneous and consistent system of indicators of the Value or Capital base of an organization on the basis of which the current state and an optimum strategy can be drawn.

F.2 *(Organizational) Human Capital Development*. Covers the design and implementation of Natural Knowledge Systems. Provides the alignment and development of the competencies and practices of individuals and groups, as well as those of the whole learning organization

F.3 *Instrumental Capital Development*. Covers the design and implementation of Artificial Knowledge Systems. Provides the tools, methods and information for knowledge agents (human capital) to maximize organizational value.

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Technical Program: Meta-Innovation

Before becoming familiar with meta-knowledge and the Science of Science movement, I had a personal experience with a different type of reflexive knowledge. While working for a Master's degree in Experimental Analysis of Behavior, I became deeply involved with the methodological aspects of experimental psychology. That led me to realize that the converse was just as relevant, although far less studied, i.e.: the psychological aspects of scientific practice in general. The pursuit of that line of study led to the publication in 1982 of *Scientific Behaviour*, where a descriptive account of scientific work as an object of behavioral analysis was provided [21].

The very possibility of reinterpreting demarcation (what is distinctive about science) and induction (generalizing from experiential instances) as empirical phenomena proved very promising. These two –(which Karl Popper considered to be the most important problems of the Philosophy of Science) had so far remained in the realm of prescriptive epistemology. For example, the experimental paradigm of *superstitious behavior* [22] as accidental attribution of causality by live organisms could be applied to describing the responses to all falsified scientific claims. Hence, a door was open for looking at the way in which scientific knowledge is generated from a General Theory of Learning standpoint, and being able to reformulate this as an empirical question [20]. In fact, it was easier to conceive *scientific methods* as progressively complex arrays of logic and empirical instruments determining in turn the outcomes of discovery.

If the attribution of causality could be regarded as a class of behavior and made subject to empirical analysis, the core question would become: under which conditions is causality attributed by live organisms to natural phenomena? This seems an inevitable follow-up to Hume's dissection of causality as a human response. Hence, attributing causality in psychological terms is equivalent to *reordering one's own behavior as environmental conditions get reordered* [21]. The *explanans* became an *explanandum:* what was meant to provide an explanation became in itself a phenomenon to be explained. In other words, causal explanation could now be regarded as a functional relationship between environmental and behavioral patterns. The problems of demarcation and induction became the single problem of characterizing scientific and superstitious patterns of behavior.

From Bacon [24 —*Aphorism LXXXIX, Book one*] to Carnap [25], superstition was regarded as the counterpart of discovery. Perhaps the most striking realization of 20th Century Philosophy of Science in its search for a universal methodological canon is the inevitable need to establish a conscious meta-methodological reference [23]. By systematically making explicit the rules of discovery as well as discoveries themselves, we construct what Ziman called *Public Knowledge* [26]. Hence, a virtuous circle for the self-redemption of fallible human knowledge is re-

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established. The possibility of evolving our patterns for interpreting nature paradoxically emerges out of the impossibility of anchoring on any certainty. We come back to the origins of the Baconian Program, where such a virtuous circle of evolutionary *meta-knowledge* was chosen as the engine of scientific progress. As Bacon wrote [22 —*Aphorism CXXX, Book one*]:

> "Nor Again do I mean that no improvement can be made upon these (methodological precepts). On the contrary, I regard that the mind, not only in its own faculties, but in connection with things, must needs hold that the art of discovery may advance as discoveries advance"

The distinctiveness of scientific practice is then not only in the placement of a meta-methodological perspective above knowing actions and knowing agents. It is mainly the dynamic character of that second-order feedback that distinguishes scientific practice. In other words, the *innovative character of scientific meta-knowledge* is what redeems scientific practice from self-contempt. Thereby, one wonders - if the hallmark of scientific method is the capacity to innovate the means of discovery - then why should not KM meta-innovation consist of the systematic innovation of the methods and practices to foster innovation?

Meta-knowledge processes are common practice in applied fields such as behavior therapy [27], librarianship [28], software design [29] and artificial intelligence [30]. Beyond the actual use of meta-knowledge practices, the analysis of the conditions for implementing them has been addressed. Robertson [29] addresses the challenge of process improvement by introducing the use of a meta-process as a way of managing, in the best Baconian tradition, "inconsistencies between real world and modeled world, providing users with a means of adapting the process model during enaction to eradicate inconsistencies as they arise." Hence, he advocates the *Process for Process Evolution* or P^2E , seeking "enactability" of meta-process principles, i.e., that a meta-process is capable of being represented and executed by some IT system. Whereas systematic attention to the explicit design of IT meta-processes can be traced back to 1970 [31], Robertson claims that the practical exploitation of implementable meta-processes has yet to occur.

We may now return to KM practice, to capitalize on the lessons of meta-method and meta-process analysis. To begin with, the systematic innovation of KM processes becomes a natural object of KM strategy. In further analyzing the major KM processes through which the heuristic framework suggested earlier is exemplified (see Table Four, letter F), we find that the instantiation "F.1 Value based Knowledge Management Strategy" may contain in turn the following main processes:

F.1.1 Strategic capital system alignment and consolidation
F.1.2 Knowledge-based business generation and development

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F.1.3 Quality assurance and innovation in KM processes.

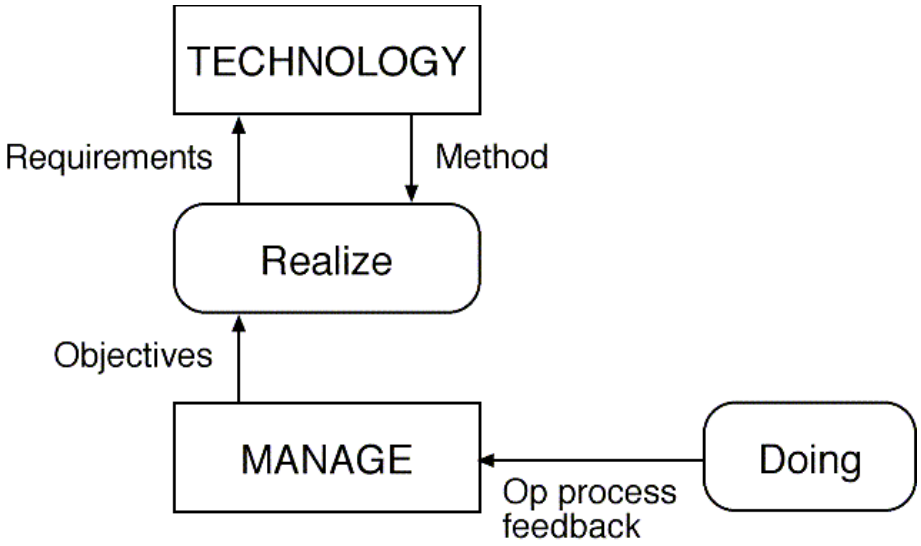

Figure One -- The Process for Process Evolution (P2E)
(From Robertson [29, fig. 3])

The last process, in turn, is decomposable into the following sub-processes (see [16]):

F.1.3.1 Value alignment
F.1.3.2 KM process mapping
F.1.3.3 KM process control
F.1.3.4 KM process auditing
F.1.3.5 KM process optimization
F.1.3.6 KM process transfer and franchising
F.1.3.7 Second-order value alignment
F.1.3.8 KM meta-process development

The closest approach to a synthesis of meta-method, theory of learning, and management innovation is Chris Argyris's influential model of "double-loop learning" [32]. According to his model, Single-loop learning occurs when matches are created, or when mismatches are corrected by changing actions. Double-loop learning, in turn, occurs when mismatches are corrected by first examining and altering the governing variables and then the actions (see Figure Two). Governing variables are the preferred states that can be inferred from the behavior of individuals acting as agents for the organization, to direct its behavior [33].

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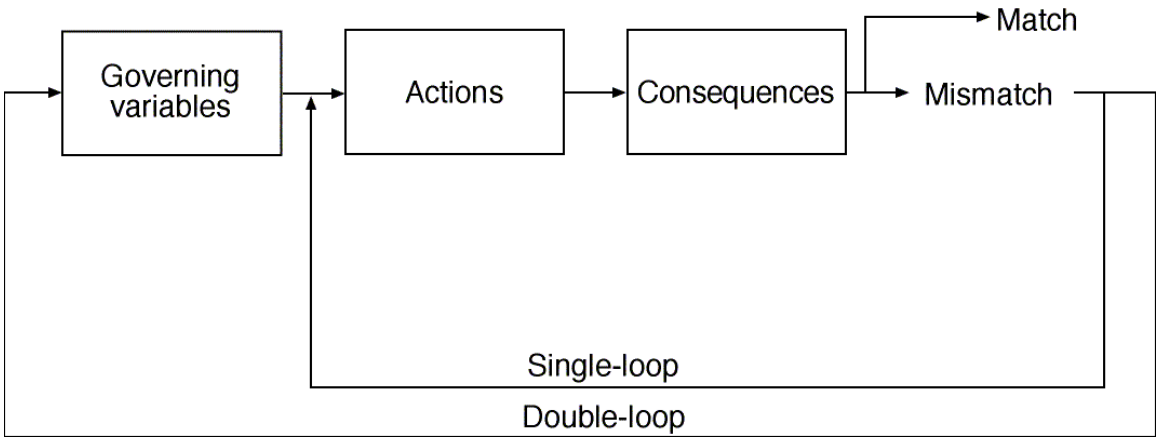

Figure Two -- Single-Loop and Double-Loop Learning (From Argyris, [32, p.68])

Over the past years, Argyris became aware of the implications of this model for research, consultancy and innovation, from a behavioral perspective [34]. I suspect that his work may hold some clues as to how the missing link between KM and behavioral science could be reestablished. While this is a line of inquiry deserving attention of its own, some of the connections between Argyris's seminal work and the development of KM as a discipline are strongly suggested by the following questions that he addresses to all "agents for managing human beings" [*idem*]. They constitute by themselves a meta-innovation program quite convergent with the aim of this paper.

Table Six -- Argyris' Five Questions for Agents of Management [33]

1. How do they know that they are producing the actions that they intended?
2. How do they know that the actions that they produced are having the intended effect?
3. How do they know that the answers that they are providing to the first two questions are not wrong?
4. How much confidence do they have that the answers they provided for the three questions above are not unrealizingly distorted?
5. To what extent are they acting in accordance with these questions in ways that permit and encourage other individuals (or larger social units) to answer the same questions?

Similar questions are beginning to emerge within the KM community. Amongst frequent and sensible claims about the relative immaturity and dispersion of the discipline, there are some initial signs of an emerging consciousness within the KM community about its own practices. Storey and Barnett [35], for example,

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recently review some of the lessons learnt from failures to implement KM systems. From such perspective, one may well wonder whether we are coming from a level of unconscious incompetence to one in which we are becoming aware of just how much we need to learn and articulate in order to achieve a truly professional status. McElroy and others have introduced an explicit distinction between First-Generation (supply-side) and Second-Generation (demand-side) KM [36]. In a follow-up White Paper [37], McElroy provides a more clear connection with the topic of this section (KM meta-innovation), by extending Argyiris's ideas to the concept of Double-Loop KM and establishing some principles for KM practice.

In the latest issue of the *Journal of Knowledge Management,* three contributions consist of meta-KM exercises. Martensson [38] carries out a review of the field, which concludes by urging to differentiate the value contribution that KM is bringing to the business world and to society at large. In the early years of KM, this requirement (or sometimes chimera) was often referred to as *the business case for KM)*. In turn, Bailey and Clark [39] provide a framework to assess the potential or actual contribution of a KM initiative to the business environment it is seeking to improve. Such a framework emerges in response to the 'enactability' requirement for meta-process mentioned above, specified by Bailey and Clark in terms of three criteria: currency, actionability and relevance. Finally, Liebowitz [40] reports on a survey of KM receptivity attitudes. In all, current reflections upon KM theory and practice seem to be moving towards a specification of the terms of evolution for a first meta-KM cycle.

Contributions to the premier issue of *Knowledge and Innovation: Journal of the KMCI (K & I),* the sister publication of the *JKM,* build upon some of the later realizations - which are currently pervading the field - to launch new KM platforms on the basis of a critical appraisal of the early years of the discipline. In the editorial, K & I's editor-in-chief, Joseph M. Firestone, sets the goals of the first issue as beginning to discuss the "big questions" in KM in a rigorous way and sketching the parameters of "second generation KM".

Three of the articles refer explicitly to the new KM generation. Alex and David Bennet characterize the *Next Generation Knowledge Organization* in terms of an Intelligent Complex Adaptive System (ICAS) and draws four processes for actionability: creativity, problem-solving, decision-making and implementation [41]. McElroy introduces *The New Knowledge Management:* a process model for sustainable innovation based on the Knowledge Life Cycle (KLC) Model [42]. Murray [43] sets up a Knowledge Systems Research agenda for a transition of KM to the *Next Level,* focused on (a) improved knowledge representation and inference mechanisms and (b) advanced visualization techniques. What is distinctive about Murray's agenda and symptomatic of the current transition, is the deliberate attempt to bridge computational and non-computational methods in

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response to the recognition that knowledge systems are primordially *wetware*, *i.e.,* natural systems where all elements of human experience come into play.

Also, the articles by Cavaleri and Reed [44], Courtney, Chae and Hall [45] and Firestone [46] are consistent with second generation KM insofar as they are concerned with both the supply and demand sides of the knowledge life cycle (KLC). There are a number of other developments converging in the new KM generation and involving Meta-KM [47]. Looking at recent developments including some just mentioned, Skyrme [48] concludes that … "The broad consensus is that knowledge management is evolving into a second generation".

These trends are in various ways convergent with recent developments in related fields. Using a CAS approach, Losada [44] identifies *connectivity* – a distinctively cognitive/emotional dimension- as a core parameter of what in KM we might call *actionable knowledge.* He suggests that "high performance teams will most likely show chaotic attractors, since they provide the type of nonlinear interactive dynamics leading to learning, adaptation and innovation". One of his principal findings at EDS's Center For Advanced Research's Capture Lab "… was that the degree of connectivity of the team, measured by the number and strength of cross-correlations among time series of the participants, was an excellent predictor of team performance" (*ibidem,* p.1). Looking at current challenges of collective learning, given the formal difficulties involved in determining improved observations, De Zeeuw [50] introduces the concept of 'third phase' science as a means to allow change agents "to learn collectively, and to develop the resources needed to improve on their own development"

Altogether, there seem to be some preliminary signs that the KM community is beginning to gain awareness not only of its own practice but also of the new level of sophistication needed to enhance the quality of second-level augmentation of all classes of resources needed to improve their own development. These signs include a realization:

- of the need to articulate the KM value proposition in a way that is meaningful to current managers;
- that the profession is only now just getting to the level of knowing what it doesn't know as a necessary phase towards conscious competence;
- of the wealth of human knowledge that it could capitalize on, both from other disciplines and from other moments in intellectual and scientific history;
- of the need to critically examine the outcomes of KM initiatives and to learn from implementation failures as well as successes;
- above all, of the importance of understanding, constructing and evolving meta-innovation mechanisms to systematically improve current practices.

Social Program

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Amongst the many shocking realizations that contemporary science had to endure in its evolution to post-modernity, has been the transition from prescriptive to descriptive accounts of scientific activity. Rather than individuals devoted to the pursuit of truth through a commitment to method, a reality emerged of humans whose discovery practices were as vulnerable to economic and political interests as any other human practice. The description of how scientists actually behave did not match with what the canons of formal logic, the prescriptions of philosophy of science, and the strict pursuit of empirical and logical testing required. While formal and experimental procedures were omnipresent in everyday science, so were contingencies associated with fame, fortune, politics and other mundane circumstances of scientific work.

The susceptibility of human knowledge to values other than those commanding the optimization of the knowing act, was also anticipated by Bacon. In his famous Theory of Idols, he identified four major influences that mislead human understanding:

- *Idols of the Tribe,* referring to structural constraints of human understanding and to their anthropocentric tendency;

- *Idols of the Cave,* which are the particular intellectual biases of each individual due to its constitution, cultural background and personal experience;

- *Idols of the Market Place*, which consist of misrepresentations – falsified or unfalsifiable concepts in contemporary terms – pervading understanding;

- *Idols of the Theater,* which are preconceptions or received paradigms which handicap the opportunities for discovery.

A transcendental aspect of Bacon's analysis is his relentless effort to identify the major sources of human fallibility and consequently, to design conditions for preventing and minimizing error. Although there is a whole tradition in German thinking (from Feuerbach to Marx and Engels, to Althusser) on the concept of *ideology*, drawing out the significance of such a tradition for KM goes beyond the programmatic character of this exercise. That in itself would be a formidable intellectual undertaking.

What I want to call attention to here is a more humble and perhaps more urgent task. It is the understanding and deliberate management of the course that the KM profession is taking. By this, I do not mean that this course should be *controlled.* Nor do I mean that the best possible course of action for the profession and for its contribution to global development is a form of total reduction in which all future knowledge would fit the same system of explanation. What I mean is that an elementary meta-KM program involves a self-awareness

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and self-determination of the community or communities of KM practitioners. Self-awareness should come in the form of understanding the status and likely scenarios that could emerge or develop in the growth of the profession. Self-determination would involve the establishment of conditions for the evolution of the profession in the most benefitial way to all KM constituencies.

Elements of self-awareness of the profession would be:

- What characterizes a KM practitioner? What are the main types?
- How many are there? How are they distributed? Who are they?
- What is their most common background? What are the most common patterns of professional evolution?

Aspects of self-determination would include:

- What are the KM constituencies? What is the KM value offer to each?
- How and by whom are KM competencies going to be normalized, developed and certified?
- Is some form of international coordination desirable and if so, how is this going to be achieved?
- What second-level framework will the KM profession use to assess its own progress and promote the innovative character of scientific meta-knowledge?

At this early stage, it should not be surprising that the KM movement lacks a basic unity in terms of concepts, processes and competencies. It has been noted [17] that this is not a movement coming from academia, where an internal conceptual consistency and an articulate technological proposal could have been developed. This fact, together with its extremely fast expansion due to a number of business drivers [18] and to its early age (compared with, say, the over half-century of the Quality Movement), justifies qualifying KM as *adolescent:* as young, vital, and immature. Nonetheless, there is substantial evidence [*ibid*.] that the movement may be evolving from an initial phase of dispersion and rapid growth to one of professional identity and consolidation.

Contrary to the early days of KM, when an ill-defined *practice* rather than a *discipline* (a systematic interplay of theory and practice) was the dominant public perception of it; today there are clear signs that a dialogue is being established between systematic practice and high-level academic programs. KM curricula, refereed journals and increasingly critical conferences and forums constitute concrete platforms for alternative KM models to be subject to scrutiny and deliver the best that each one has to offer.

Progression towards integrated curricula, competencies, models and finally, industry standards, is on the way. Current diversity and dispersion, rather than a

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weakness, could be seen as a wealth of inputs from practice which may contribute to current and continuing emergence of more robust models. A challenge for standarization exercises (concepts, processes, etc.) is to take into account the multiple contributions from around the world. The more these exercises manage to capture and integrate diverse quality inputs into the fundamentals of alternative models, the more they will contribute to consolidate the emerging discipline. We may soon see the emergence of "families" of models, where inputs converge around alternative theoretical and methodological foundations.

The question of how to enhance best the evolution of the profession remains an open one. Recently, Skyrme [45] provided a glimpse at some KM groups and associations, identifying the following actual or potential constraints of professional KM associations,

- **Knowledge cartels:** a concentration of power that would "effectively regulate who may practice in the profession"
- **Changing boundaries** between different areas of interest for professional development
- **Globalization (lack of):** or limited capacity of current organizations to offer a truly international perspective
- **Limited resources** to sustain continued programs and substantial services to its members
- **Competition,** rather than cooperation, between alternative associations.

Actually, some of the groups mentioned by Skyrme fall more within the category of "knowledge networks." Those are informal, non-membership, often vigorous groups which associate naturally around a common interest to constitute what are now called "communities of practice" [52]. In fact, such communities have played a significant role in shaping and developing the KM community throughout the "dispersion phase" [18]. Knowledge networks (both generic and KM-focused) are a phenomenon that deserves –and has received- attention on its own in the specialized KM literature, (see, *e.g.:* the special issue of the *Journal of Knowledge Management* Vol. 3, No. 4, 1999].

In keeping with the introductory and programmatic nature of this exercise, I will conclude this section by identifying ten attributes which might constitute design specifications for an ideal KM professional organization. These are:

- **Purpose of design.** In order to achieve professional credibility, the organization should constitute a deliberate and effective act of KM, a model of best KM practice. Hence, it should at least: i) make explicit and operationalize a value base that allows for the maximal effect of the other nine attributes, by drawing a strategy from it, ii) establish a human capital program for developing the competency base of its members and of professionals at

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large; iii) establish an instrumental capital program to leverage the potential of its members.

- **Accountability.** This goes beyond full individual accountability to membership, which I take for granted. A professional KM association should have open agendas to all internal and external constituencies. Once the value base is explicit and operationalized, all policies, practices and individual agendas can be openly assessed against such a value base. If this is duly taken care of, than internal and external trust should develop and be maintained.

- **Driven by Membership.** It should be clear who belongs, what he/she represents and how she/he relates to the association value base. This means explicit individual alignment. Conversely, each member should have full access to all relevant policy issues and have the opportunity to take part in decision-making processes according to statutory rules.

- **Collaborativity.** As the result of deliberate acts of KM, the association's design would establish an arrangement of cooperative conditions such that it would be in the best interest of members to engage in collaborative exchanges, bringing as much knowledge value to the community as they take. This attribute involves some of the most creative KM practices.

- **Inclusivity.** A professional KM association should be open to all KM professionals, regardless of any consideration other than those established explicitly in the value base. Whereas it does not necessarily have to be global it should be inclusive within its area of influence. Such an association should be universalist in terms of gender, race, religion, ideology, culture and country inclusiveness. Above all, openness to diverse KM models and methods should be encouraged within some basic quality standards. Membership criteria should be explicit in the value base and applied rigorously. It should be active and creative in opening access to any minorities which, for whatever reason, become misrepresented or do not have the same access opportunities as others do.

- **Networked.** Whereas it is conceivable that a truly global KM professional association may emerge, it is also possible that one or more international associations covering some areas of the world may coexist. It should follow from the "accountable" attribute that both cooperative and healthy competitive transactions with other existing associations, whether at a local or international level, should develop.

- **Virtual.** One of the worst things that may happen to professional associations is that they become too corporate and bureaucratic, resulting in inflexible rules and programs alien to membership needs. In light of the accountability

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requirement, a true KM professional association should incorporate the best of virtual organizational design, such as agility, minimalism, and quick response time [53]. This also means an effective distributed design that would deliver any time/any place value to KM practitioners in its area of influence.

- **Scientific.** In terms of disciplinary content and validation methods, a KM professional association should capitalize on scientific intellectual capital, including post-modern scientific approaches like Complex Systems and Chaos Theory. It should facilitate the integration and/or active interaction with all those disciplines from which KM can benefit, particularly the Sciences of Knowledge.

- **Sustainability.** A KM professional association that contributed with its full potential to the KM community and the global community at large, should be a vehicle for sustainable individual, organizational, regional and global development. In its most powerful expression, it should be instrumental to the emergence of a planetary consciousness.

- **Wisdom-based**. This means both that it would exercise the best intelligence to the attainment of its value charter, and that it would exercise the best organizational learning practices. Above all, a professional KM association should constitute the most advanced human organization in developing and applying meta-KM.

Conclusion: Political Program and "Déjà vu All over Again"

In the end, all knowledge is instrumental to a value system, whether explicit or tacit, conscious or unconscious, plausible or disgraceful. The bottom line question for a comprehensive Meta-KM program is: who should benefit from KM and who actually does? The answer to the first part (normative) is by no means predetermined and requires, again, exercising the primordial knowledge act for whoever attempts to answer it: the explication and operationalization of the value base to which the imperative will respond. The answer to the second part (descriptive) is mere Meta-KM maintenance, *i.e.:* a systematic alignment of rules and behaviors.

It will be up to the KM Community, assuming such an entity will actually materialize, to articulate the value base which it will choose as an attractor. Whatever that value base becomes, it must be explicit and accountable if sound KM practices are to follow.

It will be up to the KM Community to set the right conditions for the evolution of the KM Movement. It could become anything from a managerial trend that provides fresh business opportunities to consultants, to effective methods and standards for optimizing human action in organizations, to the means for fulfilling

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a level of global consciousness about the state and direction of life on Earth, to even more transcendental roles.

Before the KM Community is in a position to remotely influence even the most immediate of those domains, it must acquire consciousness of itself. It must be able to assert its identity through a documented answer to the self-awareness and self-determination questions posed above. Meanwhile, it can continue to nurture the sort of realizations about its own practices recollected at the end of the Technical Program: Meta-Innovation section.

If KM has a long-term future as a human practice (despite the specific forms which it may undertake or into which it may evolve), and if current KM practitioners are going somehow to influence that possibility, then Meta-KM is the way to produce that influence. Perhaps the whole program outlined here seems utopian and unrealistic. Maybe it is. But then, again, maybe it's not. That is a question to be settled by how history is written every day by every KM practitioner, by the values she responds to, by the competencies he develops. The road of Meta-KM, the road of conscious evolution and leverage over the practices that lead to new knowledge, can be undertaken even at this early stage of the discipline. In fact, unless it is undertaken at this stage, chances are that the KM movement may slowly vanish into oblivion.

Learning the lessons from the past is elementary KM. Let us finish by recollecting what Steven Dedijer concluded 35 years ago, when reflecting on a very similar situation by the Science of Science Movement. If we simply substitute Science of Science by KM in the following paragraphs, we may experience an intriguing *déjà vu*.

> It would be a mistake to insist that in the present state the science of science can supply firm answers to the questions – and only a few of those questions are visible even today - raised in the foregoing pages. The science of science is only an aspiration arising out of scattered achievements and plausible convictions that concerted efforts will produce better achievements. The fact that it is still inchoate and has fewer results than ambitions should not, however, be regarded as an argument for neglecting it …
>
> The science of science is probably in the same condition today as economics was just before Adam Smith. But nowadays we live in a situation in which research methods and interpretative theories in the other social sciences – the auxiliary disciplines of the science of science- have reached a high level of development. Many persons who are trained in these auxiliary disciplines are interested and

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> available. Furthermore there is now a genuine demand for the kind of knowledge which the science of science could furnish … The present vertiginous rates of scientific development and the present impact of science on science –which seems at present so powerful- will appear as slow and weak as those of Bacon's time appear to us today. Present trends and future prospects will inevitably press those who take upon themselves the responsibility for the guidance and management of society to address to science the command and plea: Science, know thyself. *[1, pp. 503-504].*

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