

# Managing Knowledge-based Value Systems

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Has Knowledge Management (KM) an identity and a future? The process of differentiating KM both as a business practice and a discipline is in a reflexive situation: it is happening amidst a major transformation of established criteria for the social recognition of a knowledge field. Awareness of this fact by stakeholders in the systematic and sustainable evolution of KM may lead to a conscious management of its current and future identity. An attempt to develop a systemic perspective of the field of Knowledge-based Value Systems at the Center for Knowledge Systems (CKS), an R&D unit at Instituto Tecnológico de Monterrey in Mexico, is introduced. The CKS operates mostly through contracted projects in the areas of organizational learning, intellectual capital and value-based management.

## **KM AS A FIELD OF KNOWLEDGE**

### **Is KM Here to Stay?**

There seem to be two public perceptions about the continuance of the Knowledge Management movement. One is that KM constitutes a major redefinition of the very nature of organizational and personal transactions in the context of knowledge societies. The other is that KM is just another managerial fashion which will fade away as the century ends.

I started by referring to KM as a movement because that at least is self-evident. Even for those who believe KM constitutes a mere fad, the increasing quality and quantity of events, projects and organizations related to KM should be apparent. According to the Bain & Co. annual report on management trends, KM is at the top of the trends identified in the survey [1]. At the time of writing, there were more than a hundred web-pages including "KM" in their title and plenty more with a direct link to it. At the macroeconomic level, major organizations like the World Bank and the OECD are explicitly addressing KM as a most prominent challenge. At the microeconomic level, an increasing number of companies are engaging in serious efforts to capitalize on their knowledge base.

Nevertheless, a common sense of identity and purpose has yet to take shape among professionals seriously interested in KM. One can often find the most diverse labels applied to KM, some of which imply that this movement is already giving way to a new managerial platform. There are also those who believe the term to be inconsistent because, they say, knowledge as such cannot be managed.

I contend that the Knowledge Management movement exhibits the properties of a differentiated field of theory and practice and that, if it finds its way through current revolution in knowledge practices, it might play an important role in the understanding and organization of knowledge societies.

### **Does KM Constitute a Discipline?**

Distinguishing the institutionalization of a new area of knowledge is an issue that has been addressed in the past [2]. During the last three centuries, the proliferation of distinctive scientific fields made it necessary to formalize the coming of age of new disciplines. I am referring exclusively to the institutionalization process of new bodies of knowledge (not to the epistemological problem of scientific demarcation). As indicated by practice, recognition has been granted on the basis of the appearance of time-honoured scientific conventions such as:

1. Establishing dedicated societies
2. Publishing specialized journals
3. Conducting thematic conferences [3]

On these grounds, the fairly young field of KM should be granted the status of discipline, for all three are well substantiated.

Yet 'discipline' might not be the term which best describes the nature of the field for two reasons. First, because the advent of virtual digital communication processes is opening the door to brand-new ways of knowledge socialization. In that regard, KM would do itself a favor by taking the lead in understanding and applying new, effective ways of creating and disseminating public knowledge. Rather than a discipline in the traditional sense, it could become a self-conscious and dynamic field of collective wisdom.

Second and more important, it might be improper to regard KM as a discipline-in the extended use of the word- because KM has not been born in the sterilized clinics of academic institutions. It is not a discipline insofar as it is not confined to academic categories. As a matter of fact, the very emergence of KM exhibits the challenge that the whole educational and scientific establishment faces in order to cope with the new demands of knowledge societies [4].

Rather, the emergence of KM has been business driven. It exemplifies how a paradigm of knowledge creation flowing from universities and research centers to industry is rather partial. Original knowledge may flow back and forth throughout all the components of an innovation chain. In the case of KM, more contributions to the development of the field have come from corporations, development organizations and consultancy practitioners than from universities. More attention was given to the

emergence of KM in business magazines than in established management journals. In fact, business schools are in general lagging well behind this movement, for they are like much of the educational and scientific establishment- stuck in a model designed for the professionalization of a relatively stable knowledge base.

### **Becoming a Community of Practice and Understanding**

In a contemporary sense, KM might be regarded more as a "field of design" [5] than an scientific discipline. It entails a direct integration of reflection and practice. KM's evolution at the pace of experimental research is as unlikely as its survival as a mere collection of tools and practices. The powerful engine of business innovation needs to be linked to the model building and testing which might help the field transcend.

The challenge of balancing applicability and rigour in design has been addressed by Argyris [6]. He pointed out the difference between a program for action and action itself when introducing the purpose of Action Science: "to produce knowledge that helps people in their face-to-face relationships to discover, invent, and produce actions under on-line conditions" (italics original). Since then, action research has gone a long way, by exploring a number of alternative avenues [7]. While lessons have been learnt, the fundamental challenge remains the same: understanding and modelling the object of a systematic and collective practice.

The trend towards recognizing business networks as value communities (i.e.: sets of interdependent stakeholders within a value generating system) has led to the identification of clusters of professional practitioners as communities of practice. In the case of KM practitioners, such community is integrated mostly by professional consultants (both internal and external) confronting similar problems with similar descriptions and procedures.

In view of the continuance of the KM field, the KM community should constitute a Community of Practice as much as a Community of Understanding. Besides sharing the fertile grounds of practice for exchanging the experiences and tools of the trade, this community needs to build an innovative base to provide the explanations, models, policies and strategies which are desperately needed to make sense of this deep change. As it has been pointed out, it is a paradox that "what is scarce in the new economy is the ability to understand and use knowledge" [8]. Even more scarce is consciousness about the sense and purpose of the KM movement. While delivering value to current business practice is essential to gain credibility and momentum, developing an understanding of the new economy as well as the strategies for co-evolving with it becomes the sustainable purpose of KM.

Achieving the latter involves some fundamental community-design. A high-end KM is required to design an environment which fosters effectiveness as much as systemic consciousness. In order to achieve such an environment, issues like recognition,

collaboration/competition and intellectual property should be imaginatively dealt with. The ultimate challenge is to evolve into a self-conscious "community of value", namely, a group of professionals contributing to the explanation and design of knowledge-based values systems which are themselves a model in sustainable value creation and distribution.

Nearly twenty years ago, Argyris suggested that progress in confronting the challenge of knowledge-in-action methodology would be "to generate models of social universes that are different from the present models". On the same issue of designing a new Organon for managing the knowledge wealth of nations, Dash [9] concludes that the challenge is "to generate knowledge/awareness which is of a higher quality than what already exists".

Those who currently recognize themselves as professionals in the field of KM face the extraordinary challenge and opportunity of building an effective community of practice and understanding . Such a community might be a condition for and a result of imagining and implementing an unprecedented social system for value generation and distribution. Otherwise, KM professionals might be relegated in a couple of years to the gallery of managerial fads which did more for the consultants' short-term profit than for the value of companies and of society at large.

### **Back to Origins: Value Dynamics**

As I mentioned earlier, knowledge itself might not be the direct object of management. Actually, the object of economic explanation and managerial practice has always been value dynamics. Value here refers to the universe of objects of human preference, i.e.: everything we choose or would choose given the opportunity. Hence, value dynamics refers to the processes by which value is created, quantified, owned, stored, retrieved, transferred, etc., within a given production system.

It just happens that economic value have been constrained mostly to the material base of agricultural and industrial production, as well as to the capital for intermediation . But capital is an economic object insofar as it represents and facilitates the exchange of value. The knowledge revolution-as the industrial revolution once was-is about shifting the means of production. This time, shifting from a material base to a knowledge base and, hence, disrupting value dynamics in the formal economy. In the following section I will try to substantiate this view.

## **VALUE DYNAMICS IN KNOWLEDGE-BASED ECONOMIES**

### **In the Beginning was Value**

Economics as a discipline deals with the material base of agricultural and industrial production, as well as with the capital base through which it is represented [10]. Therefore, economics as a discipline is concerned with the descriptive and normative principles through which modern societies have come to terms with the physical constraints determining scarcity.

But long before governments struggled with economic reasoning, basic economic facts happened-and still do-in the forms of barter and interpersonal trust (where balance could be in the process as much as in the product). In these cases, as in formal economies, some form of value is traded between two or more agents. Hence, the basic economic act is a value transaction, not just a capital transaction.

As a basic economic unit, money is a representation of a value domain, i.e.: what that currency can be exchanged for. As mentioned earlier, the universe of values is that of human preferences. Hence, it applies to anything we make choices about: from our most cherished relationships and principles to our most practical decisions.

One of the most challenging and promising facts of the emergence of the Knowledge Economy is the collateral effect of widening the value content of business activities. As long as the labour factor in production was mainly muscle and repetitive action, there was little room for minds and hearts. Now that innovation capacity is the main indicator of business vitality, competencies such as creativity and self-determination are becoming extremely valuable, both as output and as process. To instantiate this, consider those knowledge-based value systems that have been proposed on balancing trust [11] loyalty [12] and fairness [13]. These systems are operational business platforms committed to sustainable outcomes, not vague principles lacking administrative consequences.

Hence, the Knowledge Economy is about the value differentials of knowledge operations. If KM aims at propitiating a new economic order, it should deliver an innovative way to describe and organize the flow of value in knowledge societies.

## **A Rationale for Knowledge Management**

A sufficient reason for KM is that right now a major and increasing part of the world's wealth is being generated from represented objects, rather than objects themselves [14]. As these representations are different in nature from the goods they represent, it seems quite worthwhile to understand and master the mechanisms of knowledge identification, generation, and capitalization. If over 70% of a car's value is attributed to represented inputs (i.e.: some form of information), it is obvious why managing appropriately that portion of the business becomes vital.

Many point out correctly that the notion of the supreme value of knowledge is not new. The intuitive idea that education is the best legacy for new generations can be traced back to ancient wisdom. But there are two major differences that today justify talking about the emergence of a Knowledge Economy. One is the grounds on which that idea is founded and the other, the scale of change.

Until very recently, the common-sense appreciation of knowledge was a romantic one, i.e., based on intuition but lacking factual support. Policy makers could resort to appealing ideologies or generic cultural references, but to little evidence. Francis Bacon founded the program of modern science on the basis of the power of knowledge, but this he took for granted.

In recent years, the idea of a link between knowledge and social value has been consistently gathering empirical support. First, there are Gary Becker's seminal studies beginning in the 1960s, that led to the Theory of Human Capital developed by him and others [15]. Building on an unprecedented economic analysis of the effects of education on earnings, occupation, employment and unemployment of men and women of diverse social contexts and nations, this theory gave empirical and conceptual support to the relationship between investment in human capital and social progress. Partly based on that theory, The World Bank has been systematically shifting its development funding policies from hard infrastructure to knowledge investment. This goes to the extent that by the turn of century fund allocation will be aimed almost entirely at programs with a high impact on the social knowledge base (noticeably, in the education of poor women). And besides this reorientation in the development of funding strategies, the WB has recently taken an aggressive stance by using KB as a base for restructuring its own processes [16].

Second, recent studies on Growth in The Knowledge Economy compiled by the OECD tend to indicate that during the second half of the century "there has been a clear trend in the OECD countries towards an economy where the share of the labour force handling tangible goods is becoming much smaller than the share engaged in the production, distribution and use of information" [17]. Consequently, this agency is giving increasing weight to developmental policies which draw on the realities of the Knowledge Economy.

Finally, at the individual company level, there are multiple and diverse indicators of a business value differential which can be attributed to an increased knowledge base. Although KM's impact in individual companies can be extensively cited [18], a technical foundation for normalizing and certifying aggregate organizational competence (i.e.: a currency and accountancy base for knowledge-based capital) is still needed. But this is also one of the busiest lines of development in KM.

To sum up, the rationale for KM is straightforward: a) knowledge accounts for an increasing part of the wealth being created and b) knowledge behaves differently

from previous means of production. Therefore, it is worth understanding and mastering how value is created through knowledge. I have referred to (a), and will now discuss (b).

### **Ce c'est pa une Pipe**

It is obvious that economic transactions are determined by the natural properties of the objects involved. Regardless of the value we assign to a glass of water in a given context of supply and demand, our trading opportunities are constrained by the very fact that we are dealing with a fluid in an open container and that its suitability for human consumption can be degraded.

Not surprisingly, the objects of agricultural and industrial economies are subject to physical, chemical and biological principles. It is therefore inevitable that value transactions based on agricultural and manufacturing goods are subject to classic mechanics and thermodynamics. In this sense, conventional economics describes value transactions confined to the domain of physical phenomena. 'Physical Economy' is bound up with scarcity (materially constrained goods or capital), diminishing returns (a consequence of waste produced by work), and exclusive property (access limited to a given space and time). Attempts to characterize the Knowledge Economy as opposed to the traditional "Physical Economy", have been conducted by Romer [19] and others.

In knowledge domains, value objects and transactions constitute representations, rather than physical, chemical or organic entities. Represented objects are as much in the natural domain, as is all human experience. Biological phenomena are at a different level of causation than chemical ones, which in turn are different than physical phenomena. So is different the level of causation to which represented objects belong. Their occurrence is determined mostly at the psychological and social level, i.e., the level of individual and collective ideas. Representations belong to just another domain of natural phenomena.

I must stress that being non-physical does not mean "supernatural" (as often implied by the agnostic use of the term "intangible assets"). The very *raison d'être* of KM is to treat as tangible what has so far been untaged, hence making it manageable.

Ideas and knowledge are not intangible in any essentially different form than other natural phenomena which we do not experience through a direct sensation. Nobody would think of many industrial processes (e.g.: electronic and biochemical ones) as intangible. Yet, we have only instrumental access to most of the natural properties which enable us to manage those processes. There is no reason why knowledge, in that specific regard, should be treated differently.

True, I started by emphasizing the different nature of knowledge production vis à vis the familiar principles regulating physical, chemical and biochemical production. Knowledge is as different from chemistry as chemistry is from physics. But all of these are instances of natural phenomena which express themselves in dimensions to which we may find instrumental access. Once we do, we can explore their behavior and, to the extent that we understand it, we will be able to manage them.

The objects of the Knowledge Economy are ideas and KM's task is to make them accountable and amenable to purposive design. Since ideas are not the objects themselves, they happen to behave differently than the objects they represent. Hence, value flows differently in idea transactions. This is another fundamental tenant of KM. One that calls for an entire redefinition of Economics, as well as for new management and accountancy practices. In the end, it calls for an integrated Theory of Knowledge, one that deals with its psychological and social foundations as much as with its economic and administrative implications.

The arguable nature of all these issues confronts us with another reflexive condition of KM: we should be conscious about the assumptions upon which we build any particular approach to KM. From the records of ancient civilizations to modern scientific views, the understanding of ideas as a natural phenomenon- the building block of the Knowledge Economy- has yet to develop a comprehensive and testable explanation of how human groups construct knowledge and give them economic significance.

A view consistent with the approach described here is that knowledge constitutes basically the integration of experience, either directly sensed or represented. Hence, direct experience constitutes a sensation. Represented experience is a physiologically mediated association or connection between two sensations. Our total experience is a system of associations of 2nd through Nth order, including all combinations of sensation and representation [20].

Whereas that system of associations can be characterized as a non-linear, complex one, a functional continuum underlies the processes determining its manifestations. In other words, however complex the array of experiences integrated into a knowing act, some interdependence remains between that act and its constituent sensations and representations. It is this epistemological position that sustains a rationality assumption in KM, the same that sustains rationality in generic design [21].

## **A Characterization of the KM Domain**



Once the object of KM is differentiated from conventional 'Physical Economics', the huge task becomes apparent. To begin with, economic science needs to be restructured so as to be able to explain value dynamics in transactions amongst represented objects.

On the practice field, accountancy needs to be reformulated in order to identify, classify, value and record those transactions. Finally, management theory and practice needs to be reoriented towards optimizing value addition in knowledge transactions.

Constructing an integrated Theory of Knowledge is such a monumental undertaking that it will require a major collaborative effort amongst several fields of formal explanation and social application. A major challenge for the newborn KM community is to propitiate the articulation of a network of knowledge designers ready for such undertaking.

Meanwhile, we need to advance on a preliminary characterizations of the field. One such characterization is the following: Knowledge management is about understanding and dealing effectively with knowledge-based value systems. A (sustainable) value system, in turn, is a network in which balance is maintained in overall transactions amongst its constituents. The specific aim of KM is to achieve and maintain such balance in those production systems which are based on represented objects.

In this sense, KM as a business activity has two major tasks:

1. To establish the dimensions of the judgment which determines the end user's decision to vest value.
2. To establish the values and competencies which enable the organization to deliver those earlier dimensions.

These are two subjective events which can be mediated through objective operations. Linking a deep intelligence of target markets with the proper competency base is a concrete challenge for knowledge managers.

### **A Knowledge-Based Value System in Practice**

The Monterrey Institute of Technology is a private university system of 26 campuses spread along Mexico's territory. Each campus is ruled by a board of local businesspeople, giving ITESM a close link with industry. The Institute's reach is growing across the continent thanks to its satellite-based Virtual University Program and the establishment of campuses in major Latin American cities. During the last years, an effort has been made to consolidate an internal R&D capability through the creation of specialized centers. In 1992, the Center for Knowledge Systems was

created with the mission to empower the value-creating capacity of individuals and organizations through the design and implementation of knowledge systems. Thanks to continuous and diverse experiences with national and international companies, the CKS has been exposed to a rich learnign environment.

Work at the CKS has been organized around three core competencies. The first deals with the function of renewing the knowledge base of a company or business unit. This area we identified as the Management of Organizational Learning. In general, our aim has been to help each member of the value system to identify the competencies required by business processes, acquire and apply those competencies, and produce evidence of their impact upon business results. Common projects have included customized learning systems, competency-development programs, virtual corporate universities, on-the-job training programs, etc.

The second core competency has to do with capitalizing on a company's knowledge-based value stock (Management of Intellectual Capital ). In general, we have developed systems for helping organizations identify, structure, secure, store, retrieve and-above all-exploit their live wisdom.

Identifying and sharing best practices, building and managing organizational memory, structuring and transferring a technology base, franchising successful business operations, developing a market and technological intelligence, and valuing and developing intellectual assets have been the kinds of challenges faced here.

The third competency deals with visualizing and balancing the value system which drives a knowledge production base. This area we characterized as Management of Value Addition. In general, we have tried to help organizations redesign themselves as virtual businesses (i.e.: to minimize their fixed-cost base, transform expense operations into revenue operations, benefit from intersourcing and outsourcing, establish and manage an alliance strategy, manage distributed value alignment and production, etc.). Some common technical challenges here (often in our own operation) have been: value-based accounting and retribution, virtual design and operation, and co-evolutionary design of value communities.

To support these three areas, the CKS counts on a fourth unit, the Advanced Learning Lab, dedicated to exploring how digital technologies can leverage the design and operation of KM processes. Some of the problems with which the ALL deals are virtual environments, distributed learning networks, knowledge visualization, digital archives, multimedia knowledge bases, electronic commerce, intellectual capital accountancy, virtual teamworking, etc.

Currently, the three original areas of competency as well as the ALL, are being redrawn into a more dynamic map of KM processes. The purpose to introduce that

earlier convention was to help identify and develop different aspects of the general process. We now tend to find that most KM problems could be approached from any of these angles and eventually get to the other two.

Perhaps as meaningful as its content for the CKS community, has been its process. Since its creation, th CKS has pursued a virtual network design as an ideal. Since then, a small core of collaborators, whose main role is to provide alignment in both process and result, has been surrounded by a growing network of associates, both individuals and organizations, that now extends the CKS's scope throughout the Americas.

### **Towards a Community of Value**

The increasing number and variety of alliances sustained by CKS, led to the realization of the need for a mechanism to overcome the structural constraints of university administration. As a result, work began on a strategic initiative code-named Wide System. The situation which this initiative has been addressing is well described by the 'Core-and-Cloud' situation identified by The Economist when surveying the evolution of current universities towards 'Knowledge Factories': "Even the great American research universities that have come closest to creating the core-and-cloud university of the future find it difficult to define the core and to manage relations with the cloud" [22].

The Wide System is a value environment whose purpose is to search, retrieve and put in place production factors for the creation of knowledge-based businesses. As a first step toward developing the Wide System, the CKS has founded its first entity: ADESO (Alliances for Sustainable Development, Inc.). ADESO is a company which retrieves knowledge (and traditional) production factors from individuals and organizations, that they are willing to invest and then brokers and manages alliances to capitalize on those investments.

ADESO has already launched several small spinoffs and is entering into wider alliance brokerage. By allowing many individuals and organizations wealthy in talent or initiative but without access to conventional financial credit to become active economic agents, the Wide System is nurturing the value system for which the CKS provides a sense of purpose and a growing consciousness. The CKS community is actively seeking to widen the base on which it operates, as well as the consciousness about the significance of the Knowledge Economy and its potential for a better balanced creation and distribution of value.

## References

- [1] Chase, Rory, "KM: Fad or fact," *The International Knowledge Management Newsletter*, November 1997, p. 4.
- [2] Ben-David, Joseph, *The Scientist's Role in Society: a comparative study*, Prentice Hall: Englewoog Cliffs, NJ., 1971.
- [3] Carrillo, Francisco J., *El Comportamiento Científico*, Limusa-Wiley, Mexico, 1980.
- [4] Drucker, Peter R. and Isao Nakauchi, *Drucker on Asia: A Dialogue between Peter Drucker and Isao Nakauchi*, Intercultural Networking, New York, 1997.
- [5] Simon, Herbert A., *The Sciences of the Artificial*, The MIT Press, Cambridge, Massachusetts, 1996.
- [6] Argyris, Chris, *Inner contradictions of rigorous research*, Academic Press, New York, 1980.
- [7] Dash, D.P., "Problems of Action Research -As I See It", Lincoln School of Management, *Working Paper*, No.14, 1997.
- [8] The Economist, "An acknowledged trend", *The World Economic Survey*, September 28th, 1996, pp.43-46
- [9] Dash, *op.cit.*
- [10] Fischer, Stanley; Rudiger Dornbusch, Richard Schmalensee, *Economics*, 2nd. Edition. McGraw-Hill, New York, 1989.
- [11] Handy, Charles, "Trust and the Virtual Organization", *Harvard Business Review*, May-June 1995, pp.40-50.
- [12] Reichheld, Frederick, *The Loyalty Effect* , Harvard Business School Press, Boston, 1996.
- [13] Chan Kim, W. and Renee Mauborgne, "Fair Process: Managing in The Knowledge Economy", *Harvard Business Review*, July-August 1997, pp. 65-75.
- [14] OECD, *The Knowledge-based Economy*, OECD, Paris, 1996. Also see "The growing Strenght of Services" by Andrew Wyckoff. OECD Observer No. 200, June 1996.

- [15] Becker, Gary S., *Human Capital -A theoretical and Empirical Analysis with Special Reference to Education (Third Edition)*, The University of Chicago Press, Chicago, 1993.
- [16] Denning, Stephen, "Moving Towards a 21st Century Knowledge Economy", *Knowledge Management 97 Conference*, London, 1997.
- [17] OECD, *Employment and Growth in the Knowledge-based Economy*, OECD Secretariat, Paris, 1996.
- [18] Skyrme, David and Debra Amidon, *Creating the Knowledge-based Business*, Business Intelligence, London, 1987.
- [19] Romer, Paul M., "Increasing Returns and Long-Run Growth", *Journal of Political Economy*, Vol.28, No. 5, 1985, pp. 1002-1037.
- [20] Mazur, James E., "Simple ideas, simple associations and simple cells", Chapter 2 from *Learning and Behavior*, Prentice-Hall, Englewood Cliffs, N.J., 1986, pp.18-35.
- [21] Simon, *op.cit.*
- [22] The Economist, "The Knowledge Factory" -A survey of Universities, *The Economist*, October 4-10, 1997.

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