

DATA-INFORMATION-KNOWLEDGE-WISDOM-ENLIGHTENMENT Towards the Strategy of Systems Integration

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ABSTRACT. In Human Systems (encompassing Human Resources and Human Resources Information Systems) there is emerging a need for *integrating* the essential aspects of human decision making and effective action – the *DIKWE cycle* of data, information, knowledge, wisdom, and enlightenment – into a unified and coherent integrated management support system (IMSS). Pursuing the components of DIKWE in separation, or overemphasizing their hierarchical nature, has led to isolated work, competition for resources, and non-synergic pursuits within the functional “silos” which are increasingly ill fitted to modern, knowledge-based global enterprise. In this keynote we propose an integrative hypercycle which would link data, information, knowledge, wisdom and enlightenment as collaborating, mutually strengthening activities directed towards improving the performance of business.

Meanwhile, we do not even have complete theoretical clarity on what are the roles of an “HR-” and “-IS” parts in HRIS, and how to implement them in organizations. Should we develop special theoretical understanding for HRIS with inclusion of the characteristics of HR processes, or we should treat HRIS as ‘traditional’ EIS?
From HRIS Call for Papers 2007

Introductory remarks

Is IS a profession? Is it based on knowledge rather than information? Not in treating knowledge as information, but knowledge as knowledge - because HR is dependent on human knowledge and not on information. Only then can the integration into HRIS become fruitful.

Does IT matter [3, 4]? This should be widely debated because the exhaustion of competitive advantage is a serious matter in any field. According to R. Dawson, most *information is now commoditized, often available for free*. Making every business an information-intensive or IT-intensive enterprise implies that information and IT have become *commodities* (like electricity or any other utility) and cease to generate competitive advantage.

Is IS program focusing on the broader role of IT-enabled transformation of information into knowledge, as used in business action and processes? Does the perspective on “information technology” emphasize information, and views technology as an instrument to enable the discovery, processing and distribution of necessary information? In other words, are not our concerns focused only on phenomena that surround computers? Shouldn’t it be the other way around: the computers surrounding the phenomena of our focus and concerns?

Is IT posing its own questions to others? Or is it just seeking answers to the questions posed by others? Isn’t IT just an enabler, while IS aspires to become a business partner [9]?

Fields that have more answers than questions are running out of gas. A healthy field should always generate more questions than answers. Otherwise IT (and IS) could go the way of OR (Operations Research).

Does IS examine just the technological system, or just the business problem, or even the two combined, like HRIS... or should it investigate the phenomena that *emerge* when the two interact? That appears to be the calling of HRIS. Isn't the mission of IS field *not to* use IT, but to realize the calling of IS? Shouldn't IS evolve into *profession-focused, integrated knowledge* framework for partnering a good business?

Bacon and Fitzgerald [1], for example, developed an integrating framework for five main areas: 1. IS Development Acquisition and Support, 2. People and Organization, 3. Information and Communications Technology, 4. Operations and Network Management, and 5. Information for Knowledge, Customer Satisfaction and Business Performance. The last one is of course crucial, if not pivotal, area.

The role of IT is often perceived as to implement and to make operational business models. In this function it helps to fix and stabilize existing models rather than search for new and better models. Michael Dell use to say: "If you put a bad system on the internet, you will have a bad system on the internet." To paraphrase: If you implement a bad system with the help of IT, you have got the bad system implemented.

The application of IS must clearly be rooted in *systems* - their nature, design and functioning – i.e. in *human systems* [8], not just technical systems. IS purpose is to help to generate and adjust business model in order to maximize *added value* of IT to business.

What is a profession?

It is being realized globally that business should be a *profession* and business schools *professional schools*, like schools of medicine and law. Professions are always more about knowledge and wisdom, less about information, always more about doing and less about describing.

It is challenging to contemplate why business schools model themselves more on physics, chemistry and economics and less on medicine and law.

Professions work with 1. *Accepted body of knowledge* (not information), 2. *Certification and guarantee* of acceptable practices, 3. Commitment to the *public good*, and 4. Reliance on an enforceable *code of ethics*.

Professions integrate knowledge and practice in a wise and ethical way, serving the public and focusing on clients' needs.

Bennis and O'Toole [2] wrote: "*The problem is not that business schools have embraced scientific rigor but that they have forsaken other forms of knowledge.*"

The same problem is facing IS and IT. *Knowledge has become lost in information.*

What is knowledge?

Knowledge is a purposeful coordination of action [8]. Achieving its purpose is also its sole proof or demonstration. Its quality can be judged from the quality of the attainment (its product) or even from the quality of the coordination (its process).

Coordinated action is the test of possessing knowledge. *All doing is knowing, and all knowing is doing.*

Every act of knowing brings forth a world. *Bringing forth a world of coordinated action is human knowledge.*

Bringing forth a world manifests itself in all our action and all our being. Knowing is *effective* [i.e., coordinated and “successful”] *action*.

Information is symbolic description of action. Or, in R. Dawson’s version: *Information is anything that can be digitized.*

This clear distinction is needed in order to avoid ambiguity and fuzziness in our pursuits. Let us heed A. Einstein’s warning: *Information is not knowledge.* In fact, a new taxonomy of knowledge is needed:

	Technology	Analogy (Baking Bread)	Effect	Purpose (Metaphor)
Data	EDP	<i>Elements:</i> H2O, yeast, bacteria, starch molecules	Muddling through	Know-Nothing
Information	MIS	<i>Ingredients:</i> flour, water, sugar, spices + recipe	Efficiency	Know-That
Knowledge	DSS, ES, AI	Coordination of the baking process → result, product	Effectiveness	Know-How
Wisdom	WS, MSS	Why bread? Why this way?	Explicability	Know-Why
Enlightenment	Personal BSC	This bread, for sure	Truth, insight	Know-Yourself

Table 1. DIKWE Chain or Taxonomy of Knowledge

While information allows us to do things right (efficiency), knowledge already aspires to also do the right things (effectiveness). Doing the right thing, especially in business, requires not only knowing how, but also knowing why. *Explicability* of purpose is an essential ingredient of its effectiveness in attainment. *Wisdom is about explicability and ethics* of our doing.

It does not matter what you say, the only thing that matters is what you do [7, 11]. It was G. Ryle who taught us that the capacity to act is more fundamental than propositional knowledge: *Knowing how* [knowledge] *is more fundamental than knowing that* [information].

Many informed people know what to do, quite a few knowledgeable experts know how to do it, but only a few *wise persons* know why it should (or should not) be done. There can be no *knowledge overload*. To paraphrase Thoreau: *To know that we know what we know, and that we do not know what we do not know, that is true knowledge.* Or, one could add: that, my son, is wisdom.

What is Knowledge-Information cycle?

In order to pursue action effectively, we have to integrate knowledge and information flows into a *unified system of transformations*. It is insufficient, although necessary, to manage, manipulate, mine and make do with data and information. It is incomplete and inadequate to manage knowledge without managing its descriptions (information). It is both necessary and sufficient to manage integrated and interdependent flows of knowledge and information.

Purpose of knowledge is more knowledge, not more information.

Useful knowledge can be *externalized* and codified into its recordings or descriptions. Obtained information is *combined* and adjusted to yield actionable information. Actionable information is *internalized* as input into effective coordination of action (knowledge). Effective knowledge is then socialized and shared, i.e. transformed into usefully distributed knowledge. In short, the cycle (Knowledge → Information → Knowledge) can be broken into its constituent transformations:

- Externalization: knowledge → information
- Combination: information → information
- Internalization: information → knowledge
- Socialization: knowledge → knowledge

These labels are due to Nonaka [6] who explores the transitions of “knowledge”: tacit to explicit => Externalization; explicit to explicit => Combination; explicit to tacit => Internalization; and tacit to tacit => Socialization. But these are not separate dimensions and should not be separately treated. In fact, *there is no explicit knowledge, only information* [10]. Remember M. Polanyi’s All knowledge is tacit.

The above sequence E-C-I-S of knowledge and information flows is continually repeated in a circular organization of *knowledge production*, see Figure 1:

Knowledge*(K*)	→ Information (I)	(Externalization)
Information (I)	→ Information* (I*)	(Combination)
Information*(I*)	→ Knowledge (K)	(Internalization)
Knowledge (K)	→ Knowledge* (K*)	(Socialization)

The Knowledge Improvement Cycle (E-C-I-S Cycle):

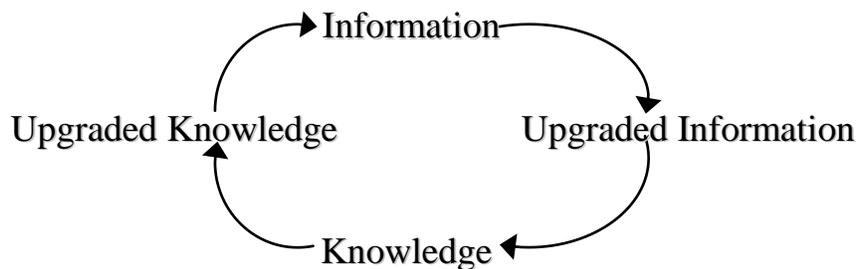


Figure 1. The Knowledge-Information Cycle

The E-C-I-S cycle is continually repeated and renewed on an improved and more effective level at each iteration. All phases, not just the traditional *combination* of IT, have to be managed and coordinated *as a human system*.

What is added value?

Knowledge is very *real* and very *tangible*. What can be more tangible than an automobile we have produced, bread that we have baked or milk that she has brought from the stable? Knowledge *produces* very tangible things and very tangible things are the measuring rods of human knowledge.

The value of information is intangible, *unless* it is translated into knowledge and thus into measurable action.

Because knowledge, wisdom and ethics are so intimately related to action and are the products of action, they are eminently *measurable*.

Knowledge is measured by the value our coordination of effort, action and process adds to materials, technology, energy, services, information, time and other inputs used or consumed in the process. *Knowledge is measured by added value* [11].

In any business (and human) transaction, value has to be *added to both* participants or sides: the provider *and* the customer. Adding value is what makes the transaction satisfactory and sustainable [5].

There are two kinds of value to be created: *value for the business* and *value for the customer*. Both parties must benefit: the business – in order to make it; the customer – in order to buy it. In the global age it is precisely this business-customer *value competition* that is emerging as the hardest and the busiest battleground.

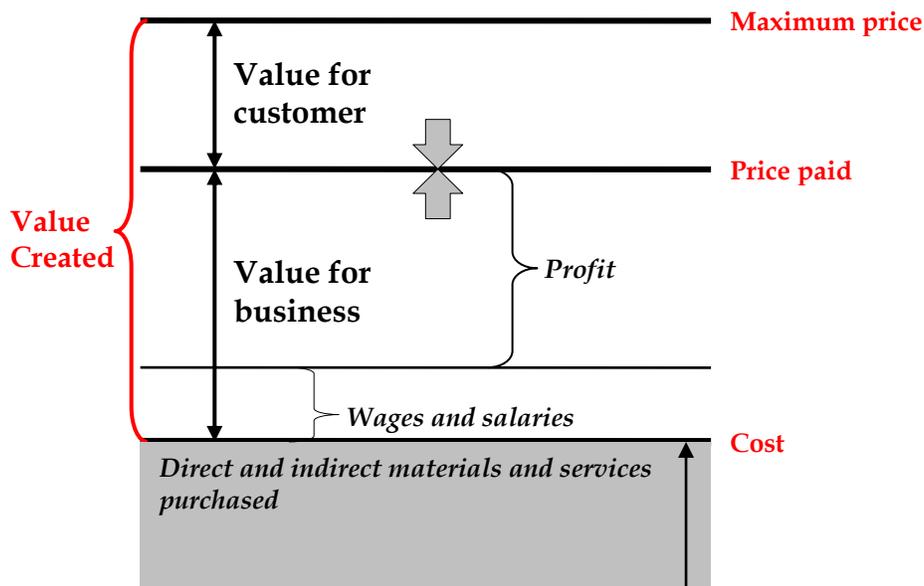


Figure 2. Adding Value for the Customer

In Figure 2 we attempt to explain the process of creating added value.

First, the customer pays for the service or product: the *price paid*. The producer subtracts the *cost incurred*, including all direct and indirect materials and services purchased. The difference is the *added value* for the business. This added value can also be interpreted as the *value of knowledge* engaged in producing the service or product. Added value is the only source of corporate wages and salaries and profits.

The customer, of course, must be willing and ready to pay more for the service/product than he actually paid. The *maximum price* the customer would be willing to pay must exceed the price the producer has asked for. The difference is the *added value for customer*.

DIKWE Integration Model

The Chinese at least have a *declaration* of information strategy: *Use "informatization" [i.e. informatics] to promote industrialization*. They do not *do* it, but at least they *say* it. It's a start.

The strategy to be pursued by global leaders, even in China, can be related to the *Integration of Five Sources*: data → information → knowledge → wisdom → enlightenment - across the entire DIKWE value chain. Rather than integration, the specialized, isolated pursuit of component functions has dominated business and economics for most of their history. Not only China is still deeply embedded in the *data* stage. Yet, DIKWE represents an ever ascending, integrated whole, balancing symbolic descriptions, action and value explications towards synergies which we have not started to tap or realize. The synergic effect of DIKWE integration is worthy of pursuit and more in harmony with natural world, biological systems and ancient philosophical wisdom than the tendencies towards specialization and atomization of work, science and business prior to the global era.

A new strategy of systems integration is needed. A *strategy of re-integration* of what should not have been separated and pursued in a specialized way in the first place: namely Data (D), Information (I), Knowledge (K), Wisdom (W) and Enlightenment (E). These are all inputs or resources in successful business action and decision making. All such inputs into a value-adding process must *work together*, in an integrated fashion, in order to effectively bring to fruition their dependencies and synergy potentials.

Separate, non-interacting or only loosely connected pursuits of vital business functions lead to a competition for resources and unbalanced development of component functions. Only in a *hypercycle of cooperation* can the competition of separate cycles of individual functions be alleviated.

In Figure 3 we sketch the basic outline of *Integrated Management Support System* (IMSS). Modern business management needs support from an integrated system, not from separate and increasingly isolated parts. For example, database management and

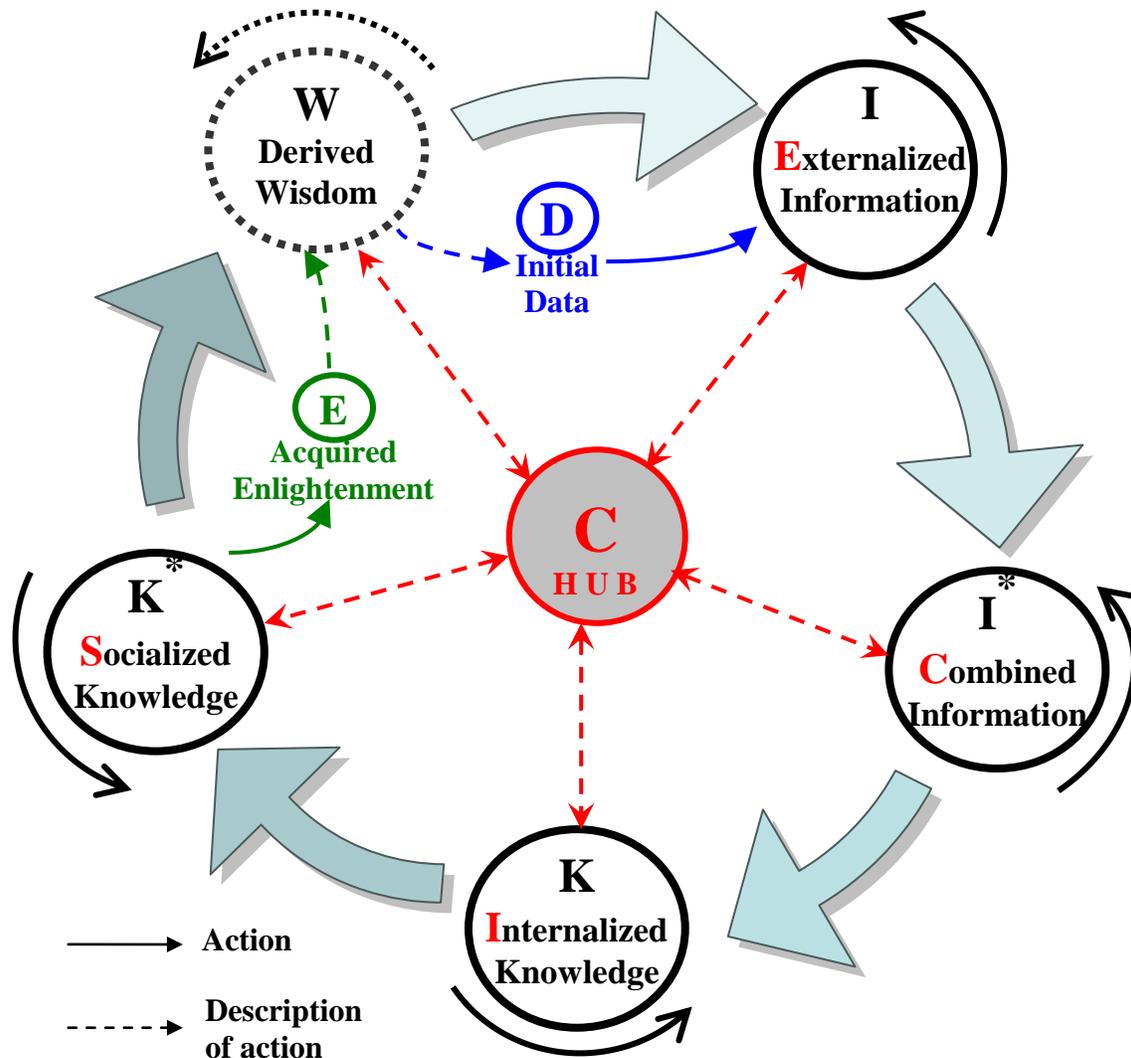


Figure 3. Integrated DIKWE Coordination System

data mining make hidden information explicit and store it in data warehouses: this is only a small part of the whole. It should not be pursued *per se*, disconnected from the rest of the enterprise. Information has to be combined and internalized into knowledge. Knowledge has to be socialized and shared. From the experience of action new information has to be externalized and processed as input for the next cycle.

Can any of these activities “stand alone”, isolated and separate, and still be useful to the enterprise? It is difficult to imagine.

It continues. The newly produced knowledge is circulated and it purposes explicated into wisdom: knowing why to do or not to do something. Wisdom is derived from experiencing action. New initiatives can be justified and initial data collected at a start of a new or parallel cycle. D is a semi-autonomous point of entry, an input from environmental scanning. Finally, after several iterations of cycling experiences, enlightenment can be acquired to strengthen self-confidence in the wisdom acquired and in the pursuit of new ventures. That should not be carried out as separate activities of

disconnected teams of experts. E is a semi-autonomous point of exit, an output into individual (and corporate) self-understanding.

Circular knowledge and information flows are stimulated, coordinated, maintained and removed by the *catalytic function* of *Coordination Hub* (C-Hub). The C-Hub functions are performed under the supervision of IMSS Coordinator who is responsible for maintaining all necessary transformations of the E-C-I-S cycle.

What is the purpose of IMSS? Why does it have to function as an integrated whole? Because it *supports* the most important functions and challenges of business enterprise: *Innovation cycle*, *Process management*, *Customer satisfaction* and *Capital appreciation*. These functions cannot be pursued separately because they are fundamentally interdependent and influencing one another.

Clearly, *data mining* does not stand alone but must be directed towards better *information processing*. Information and knowledge are interconnected through mutual externalization and internalization in a self-reinforcing cycle of *knowledge management*: production, maintenance and degradation of knowledge. *Wisdom systems*, as explication of corporate values and experience, provide justification and ethical anchoring for human action. Finally, *enlightenment* directs our efforts towards human life and its purpose in social action in civilized society; not just towards technology, science and economics. In the end, it is how we live, not just how we work, produce and consume, that is the ultimate value of *enlightened business – and enlightened life*.

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