

THE SYSTEM DYNAMICS OF KNOWLEDGE MANAGEMENT

MICHAEL STANKOSKY, D.SC.
ASSOCIATE PROFESSOR, DEPARTMENT OF ENGINEERING MANAGEMENT & SYSTEMS ENGINEERING
THE GEORGE WASHINGTON UNIVERSITY, GELMAN 704
WASHINGTON, D.C. 20052
E-MAIL: MSTANKO@SEAS.GWU.EDU
TEL: 202.994.7518; FAX: 202.994.4606

ABSTRACT

We are a knowledge economy, where the majority of our factors of production—i.e., our inputs, processes, and outputs—are intellectual assets, often dubbed intangible assets. These assets were given recognition in a recent Fortune magazine, when it ranked the top 500 by annual revenues as well as the 50 smartest companies in America, based on their knowledge assets and knowledge capital. Peter Drucker foresaw the beginnings of this new economy when he referred to “knowledge workers” as the next wave of employees. The importance of leveraging these assets, both codified and personalized, has given rise to a distinct body of concepts and practices known as knowledge management (KM). A definition of KM, in use at The George Washington University is: “leveraging relevant intellectual assets to improve organizational performance.” Though it is one of the many definitions found today, it is the one that hits at the heart of why organizations must institute KM—i.e., to improve organizational performance. To date, there is no accepted body of knowledge for KM. However, universities have not only started serious research in KM in a multitude of areas, but also have recently inaugurated degree-granting programs, with a concentration in KM.

The George Washington University (GWU) was the first to offer a Master’s and Doctorate in KM. The curriculum is comprehensive, based on systems thinking, systems approach, systems engineering, and systems management constructs. The curriculum answers three core questions: 1) What is the essence of a KM system; 2) How does one engineer a KM system; and 3) How does one implement and manage that system?

The essence or DNA of a KM system was constructed from the KM best practices and writings over many years. Numerous elements were noted and catalogued under four pillars, noting the key elements of a KM system (see Figure 1). In 2000, these elements were validated using accepted research methods.

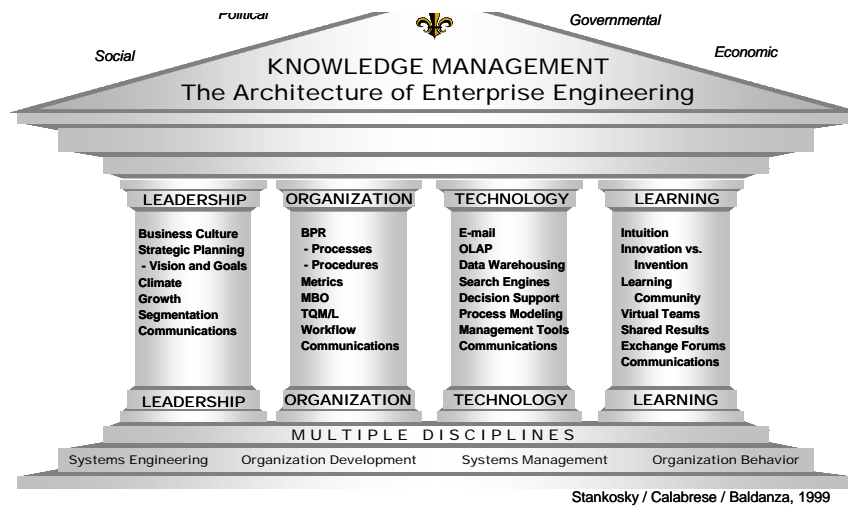


Figure 1: KM Pillars

The next step was to come up with ways to engineer, implement, and manage these elements in a KM system. Rather than create new models, Dr. Michael Stankosky, Associate Professor and KM Program Director at GWU, customized systems' concepts from systems engineering and systems management, and integrated them into a single model (see Figure 2).

The Model

Outputs: The output of the model is improved organizational performance (for private enterprises: measurable improvements in efficiency, effectiveness, and innovation) by leveraging the enterprise's intellectual assets.

Inputs: The inputs to the model starts with a basic, but thorough, description of the enterprise, followed by the value proposition and critical strategic objectives in measurable terms (templates are provided to assist in answering these questions). The next steps are to identify the core intellectual assets to: 1) accomplish these objectives, and 2) where to get them.

Process: The following three steps are then taken: 1) list the functions and processes needed to operationalize the strategic objectives; 2) create the formal and informal organizational structures to accomplish the functions and processes; and 3) choose the informational technologies to support the functions, processes, and organizational structures. Part of this area also takes into consideration the knowledge functions necessary to secure, identify, analyze, store, retrieve, visualize, and use the relevant intellectual assets of the system.

Implementing and managing the system: Three management control areas are highlighted: the specifications/performance; cost, and schedule. These three critical program management areas (though typical) preeminent the traditional management functions of planning, organizing, staffing, and controlling.

System dynamics: Given the constantly changing environment, management indicators and economic assessments are put in place at the enterprise definition area. It is through the management indicators and assessments that determine the value proposition and strategic objectives—focus combined with flexibility to change is critical. This, in turn,

will determine whether the functions, processes, organizational structures, and technologies need to be modified to accommodate these environmental changes. *This is a critical aspect of the model; else the enterprise collects and manages “irrelevant” intellectual assets.* One other point: iteration is an essential dynamic of the model. As new elements enter the model and impact on it, the process must facilitate and accommodate change.

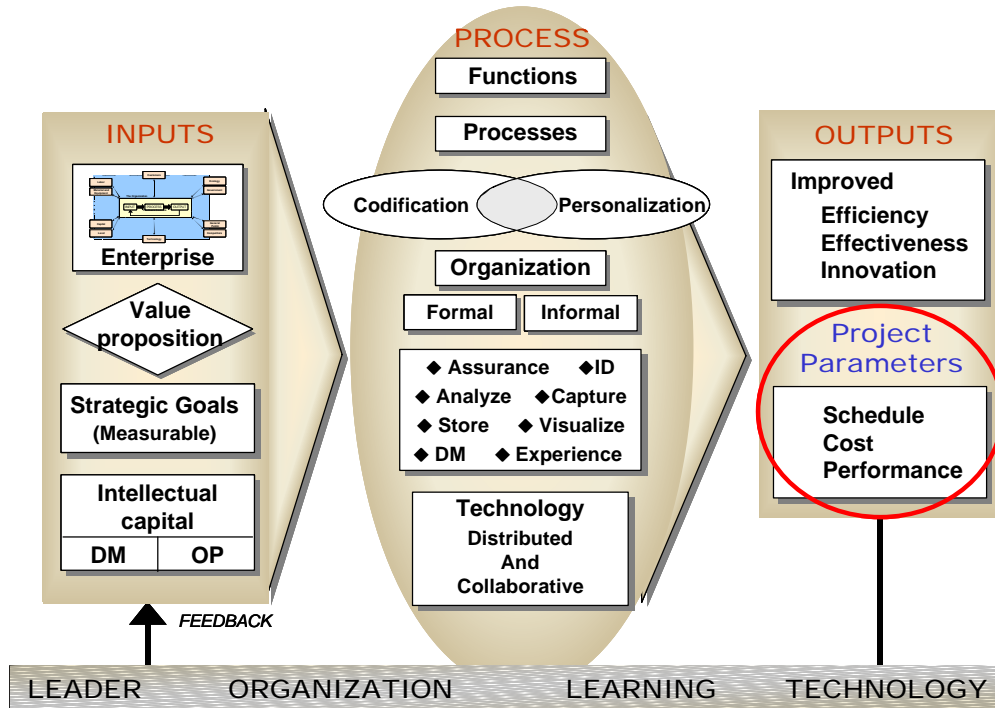


Figure 2: KMS Systems Approach

Systems Thinking and Engineering Design

The model borrows heavily on system sciences. Figure 3 is an overview of these system sciences and how they facilitate an “integrative” system. What is apparent, after studying the success and failures of many Knowledge Management Systems, is the fact that many of these elements are already in place at the enterprise, but no one has recognized them, their dependencies, and finally “stitched them” together. Many organizations muddle along, and try new fads, but seldom do they integrate them into legacy elements, such a strategic planning, organizational structures, cultures, technologies, and processes. Consequently, system management concepts, tools, and technologies such as Business Process Reengineering, Management by Objectives, Total Quality Management, and Enterprise Resource Planning software are discarded as failures, intrusive, and not of value.

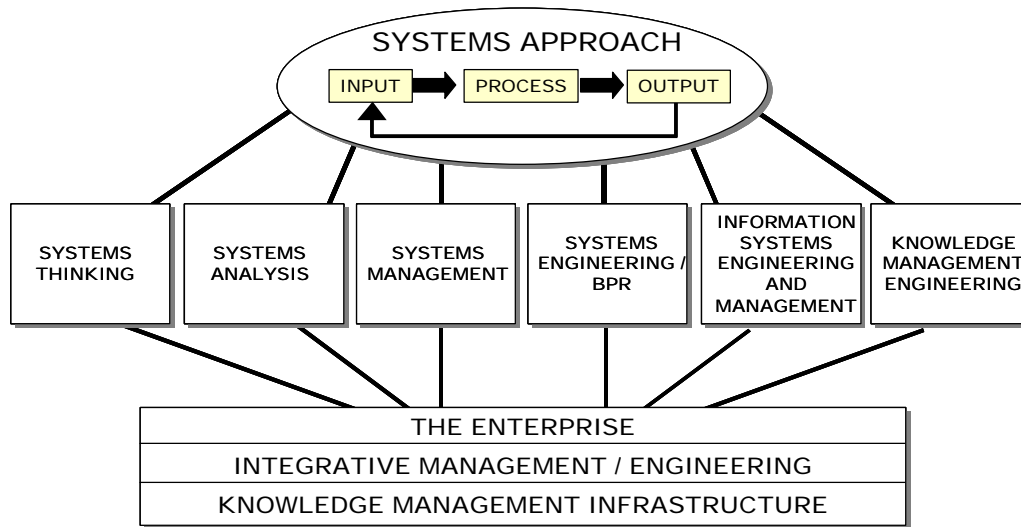


Figure 3: System Sciences—Engineering a KMS

The model starts off with an attempt to describe the enterprise environment, which includes the stakeholders, partners, customers, competitors, government, and other impacts on the enterprise. It is precisely here that system dynamics is most useful, because if any of these change, the impact on the rest of the model must be assessed and accommodated. The major issue is either adaptability or non-adaptability.

Systems Management

The model incorporates systems implementation and management practices, centered on the tenants of project management and integrative management. Project management focuses on the deliverable, cost and schedule; while integrative management is facilitated by: plan, teamwork, etc.

Summary

Knowledge Management and its tenants are important to leveraging relevant intellectual assets in today's knowledge economy. Principles and a body of knowledge are the focus of intense research at GWU. Some of the results are: (1) elements comprising the essence of KM, based on many disciplines, (2) an integrative model based on systems concepts, and (3) incorporating system dynamics to capture the changing environment and iterative aspects of the system processes.

[Note: Case studies will be incorporated to illustrate theory in practice.]