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# Knowledge management in public administration

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## Abstract

Knowledge management (KM) plays important roles in public administration (PA). Each role serves specific constituencies and purposes and is implemented differently. Jointly, they build society's intellectual capital (IC) to improve the effectiveness of public and private decision making and situation handling. Four public administration KM areas are considered: enhance decision making within public services; aid the public to participate effectively in public decision making; build competitive societal IC capabilities; and develop a knowledge-competitive work force. Numerous KM approaches are adopted to serve these purposes. Most efforts address specific needs. Only few pursue broad, deliberate, and systematic KM. Examples of these approaches and perspectives are discussed. The premise for KM is that, among many factors, effective and intelligent behavior depends on having appropriate understanding in addition to being informed.

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## Introduction

The viability and success of any society is largely a function of how its resources can be leveraged. They include natural resources, geographic location, capability of people, and resources like intellectual capital (IC)[1]. Public administration (PA) in any society is important and complex. It affects most aspects of society. Its approach and effectiveness determine the society's culture, quality of life, success, and viability. It also acts as pace setter, planner, implementer, educator, peacemaker, and disciplinarian, all with different emphases depending on the society's culture and agendas. A competent PA with sufficient capacity and influence can provide for a great society. An incompetent or dysfunctional one can lead the society into severe decline, even ruin.

To be successful in fulfilling its functions in a democracy, the citizenry must cooperate in many ways and have confidence in the society's capabilities, directions, and actions. Successful citizen participation and confidence depend largely on a broad understanding of and agreement with actions by public entities, and acceptance of implications of those actions. An ignorant citizenry is a poor public policy partner. A vital aspect of the society's success is the knowledge that its citizens possess, is made available to its public servants, and is embedded in structural and other intellectual capital assets that can be leveraged internally and in the global market.

PA shares responsibility to assure that its society provides the quality of life intended for its citizens. From a societal knowledge or IC perspective, this implies participation in building and leveraging society's IC to obtain the necessary economic foundation. It also implies long-term responsibilities to foster development of a competitive work force that can compete in regional and global economies. These issues are well known to public administrators (PAs). However, the past has not offered opportunities to address them with powerful and systematic approaches. This is changing. The broad field of knowledge management (KM) introduces new options, capabilities, and practices to assist PA to great advantage. It becomes a

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new responsibility to manage knowledge to strengthen public service effectiveness and improve the society it serves.

KM goals are to improve the effectiveness and sustained viability of any enterprise – be it a commercial corporation, a part of society, a country, or a single individual. KM must be fully aligned to the enterprise's central objectives. The KM objectives for PA in a democracy may be expressed as the intent to provide:

- Effective PA services and functions to implement the public agenda. Public services must address issues and requirements relevantly, competently, and in a timely manner, and consume minimal resources. They should also deal appropriately and expeditiously with unexpected challenges and disasters.
- A stable, just, orderly, and secure society. This includes preparing citizens, organizations, and public agencies to be effective policy partners – to create sound public opinions – to engage in public debates and policy formation – to participate in processes to conceptualize, plan, decide, and implement public actions – to observe society policies – and to provide support for the administration.
- Acceptable level of quality of life, particularly through building, maintaining, and leveraging commercial and public intellectual capital.
- A prosperous society by developing its citizens to become competent knowledge workers and its institutions to be competitive.

### **Comprehensive knowledge management**

Recently, the roles of knowledge and understanding for organizational performance have become clearer. Early on, managerial emphasis was placed on observable work. Later it included the role of information. Now, focus is shifting to include knowledge. It has always been understood that know-how and expertise influence quality of work. However, the knowledge focus has tended to be on the individual and not on systematic considerations of broader work processes or knowledge mechanisms within organizations[2]. There has been little focus on invisible work, particularly on how workers

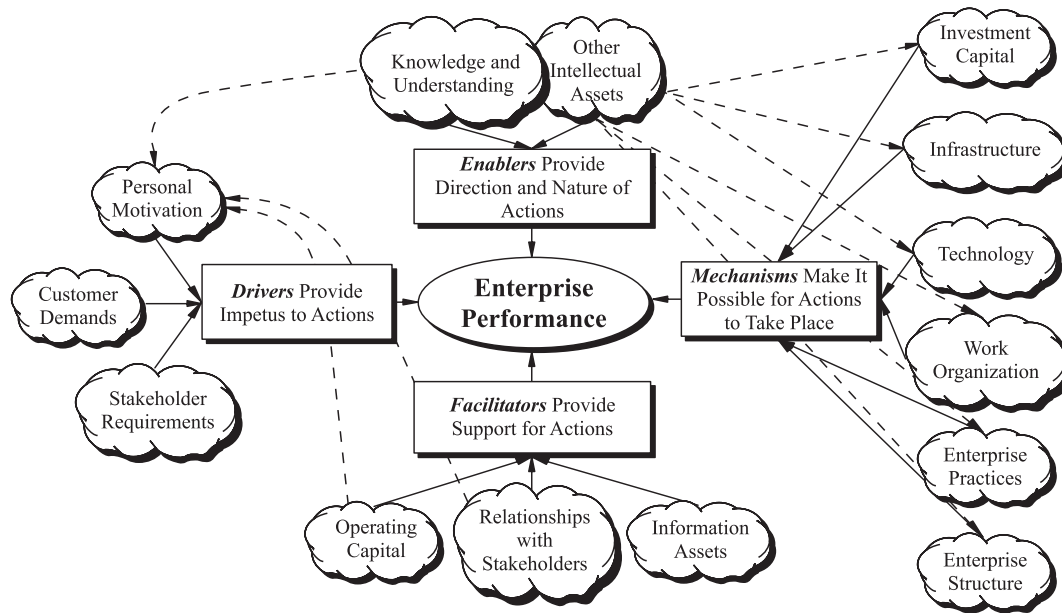
think and utilize knowledge when performing tasks.

Recent changes in business emphasis are driven by many factors. They include an increasingly sophisticated and demanding market place, deeper insights into business functions, and greater understanding of knowledge intensive work and how people think, learn, and use knowledge – i.e. cognitive sciences (Brown and Duguid, 2000; Damasio, 1994, 1999; Halpern, 1989; Nonaka and Takeuchi, 1995; Klein, 1998; Schön, 1983; Wiig, 1994). Gradually, leaders start to focus on managing knowledge deliberately and systematically. Knowledge management has emerged to create and leverage IC into the business equation and into public management (Allee, 1998; Böhme and Stehr, 1986; OECD, 2000; Reich, 1991; Wiig, 1994, 1997). IT is used extensively to support KM although many information management tools are marketed as being “knowledge management” tools, which they arguably are not. Knowledge, it must be realized, is distinctly different from information, and KM and information management are not the same.

Figure 1 provides a perspective – a dynamic model – of the role that IC assets play in enterprise performance. Four principal factors are indicated: enablers; drivers; facilitators; and mechanisms. Solid arrows indicate performance-influencing relationships. Broken arrows indicate dominant relationships between factors. Knowledge and other ICs are the principal enablers of performance. They provide means to establish the proper course, content, and quality of actions. Drivers provide energy and impetus to act. Facilitators provide “lubricants” to reduce friction that work against actions. Mechanisms consist of the functional elements that are manipulated – the processes that operate to produce actions. Traditionally, principal attention has been focused on mechanisms – the components of the system that implement actions determined by the drivers, enablers and facilitators. The knowledge perspective makes it possible to shift the focus to components that determine the effectiveness of “what” the actions should be, i.e. what should be implemented.

Knowledge has often been managed implicitly and without specific focus. Deliberate and systematic

Figure 1 A perspective of the role of knowledge in enterprise performance



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KM – comprehensive KM – pursues explicit, systematic, and enterprise priority-driven approaches to develop a distributed, non-bureaucratic enterprise-wide practice that is part of each person’s work life.

Comprehensive KM practices include deliberate efforts to:

- Identify which IC needs to be created and maintained – including the IC desired for market exploitation and expertise that needs to be available at points-of-action for delivery of desired competitive work products and service paradigms.
- Create, transform, and provide (learn and deploy) the required knowledge and ascertain that it is continually renewed.
- Ascertain that all available IC assets are diligently leveraged wherever appropriate through use or exploitation.
- Govern knowledge management-related processes and relationships by providing enterprise-wide support, infrastructure, and leadership.

Incremental KM, in contrast, tends to arbitrarily identify and pursue a knowledge-related action as extensions of occurring activities – incremental improvements on “business-as-usual” without focus on ascertaining that the knowledge assets are applied.

Enterprises that pursue comprehensive KM pursue sub-practices that in combination contribute to the overall success. They focus

vigilantly on making knowledge work effectively as chief enabler of enterprise performance. These sub-practices include efforts to:

- Focus the KM vision and practice to align with enterprise direction.
- Provide effective governance for the KM practice.
- Promote integrative management culture by fostering a knowledge-supportive culture – including safe environment, ethical and mutually respectful behavior, minimal politicking, collaboration, and a common focus on delivering quality work without delay – i.e. “getting the right thing done quickly and with as little fuss as possible!”
- Provide shared understanding – of enterprise mission, current direction, and individual roles to support the enterprise’s and individual’s own interest.
- Practice accelerated learning – by pursuing a broad range of knowledge transfer activities to ascertain that valuable IC is captured, organized and structured, deployed widely, and used and leveraged. The impetus is on making important IC flow rapidly, in proper quantities, in well-represented and effective ways, and to all valuable destinations.
- Educate employees – by providing opportunities to learn professional, craft, and navigational knowledge and

metaknowledge, and by providing information and other resources necessary to deliver quality work products that satisfy work requirements and service paradigms.

- Provide opportunities – by placing employees in situations where they can use their capabilities.
- Give permission – by providing employees with safe environments in which to do their work and have understanding of how far they can improvise enterprise guidelines and policies to serve individual situations and customers.
- Foster motivation – by motivating employees to act intelligently – “to do the right thing” – and providing understanding and emotional acceptance of how actions will be of value to stakeholders, the enterprise and, most importantly, to themselves.
- Create supportive infrastructure capabilities – by including extensive IT applications.

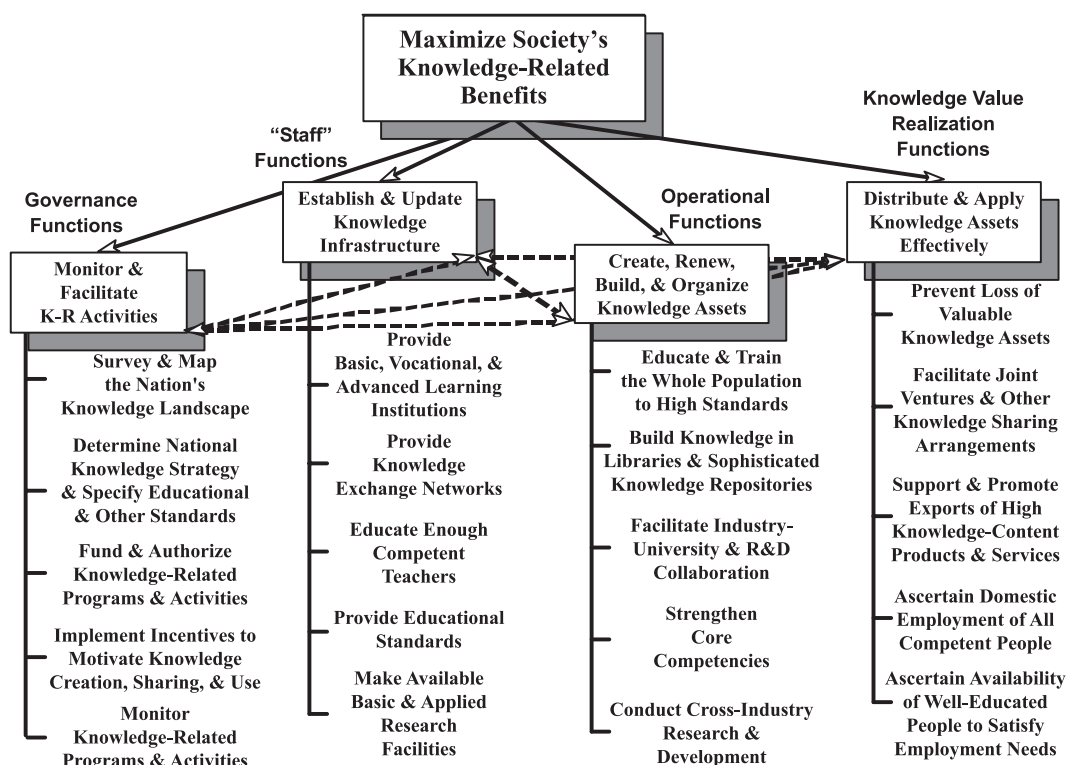
Comprehensive KM can be pursued with any of many potential activities. Figure 2 provides examples of a few such activities with

indications of how they fall into four main functional areas:

- (1) Governance functions to direct and support KM-related efforts throughout the enterprise from enterprise perspective and goals.
- (2) Staff or infrastructure functions that support KM objectives and individual activities of many kinds including supporting capabilities like special expertise teams, institutions, and technological facilities.
- (3) Operational functions to obtain and create knowledge and to capture, organize, distribute, and manipulate it.
- (4) Functions to realize the value of knowledge-related investments through understanding how to leverage knowledge in use, in products and services, in patents and technology, or in other kinds of structural knowledge such as systems and procedures.

Comprehensive KM recognizes that enterprise strategy is decided in the boardroom or by legislatures by deliberate “decisions-in-the-large”. However, strategy implementation frequently is achieved through the minute “decisions-in-the-small”

Figure 2 Examples of knowledge management activities in four functional areas



that public servants and other people make as part of their daily work. Strategy and business direction is most often implemented in the field and on the factory floor, and depends on comprehensive KM to build shared understanding of enterprise direction and intents.

When pursuing comprehensive KM, a constant requirement is to identify the expected benefits and work to achieve them. This is particularly important since “managing knowledge” itself in reality is impossible – only knowledge-related actions and processes can be managed.

### **Public administrators’ role in societal knowledge management**

PA functions in the modern, democratic society are complex. Ideally, but unrealistically, civil servants should possess the best expertise and collaborate with experts with the most advanced state-of-the-art understanding. While at times being experts, they should also be lead facilitators and KM moderators. However, communication difficulties in societal KM may make it difficult to walk the narrow line between:

- having deep and special insights into how to proceed; and
- involving the public and special needs groups in a collaborating process.

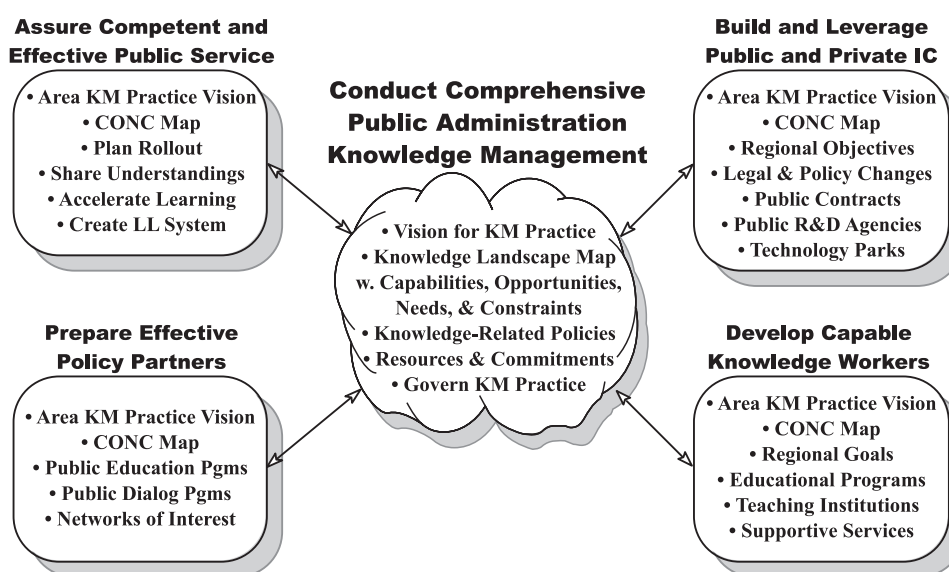
PAs must provide initiatives, leadership, and coordination to implement the most effective approaches and to ascertain that society as a whole is served appropriately.

The role of guiding and governing society’s agendas for public IC falls to PAs. The conceptual leadership for KM must in part reside with PA but must also be shared with all stakeholders. Broad KM practice must ultimately be the responsibility of each public agency and each civil servant. Without broad agreement on concepts KM will not be effective. A separate but small PA entity or office should be created to support the KM practice. Its function must be supportive, innovative, and collaborative. It must avoid being prescriptive and needs to operate on several levels. Part of its work needs to be on the policy level with responsibility to coordinate KM activities in accordance with society goals and objectives. It must also communicate with legislatures and public

agencies to secure resources required to pursue the knowledge agenda. It must collaborate with citizen groups and the business community to facilitate joint programs, determine capabilities, opportunities, needs, and constraints (CONC) analysis[3]. The office must maintain the broad vision for comprehensive KM and facilitate its adoption across all society’s entities. It must secure shared resources that individual agencies cannot justify and provide methodological leadership with ensured common standards to allow interoperability, uniform access, collaboration, and knowledge sharing. These demands lead to needs for specialized expertise in several areas and the KM office staff should have considerable expertise in areas like public policy. In addition they should have – or have access to – KM expertise such as knowledge engineering, management sciences, cognitive sciences, social sciences, library sciences, philology or linguistics, artificial intelligence, and advanced computer sciences.

PA entities have broad responsibilities in pursuit of societal objectives. PA governs and facilitates public aspects of operations and life of public and private organizations and individual citizens. When considering knowledge-related issues, such responsibilities cover not only knowledge-related functions within PA. Responsibilities extend to govern and facilitate other knowledge-related and affected areas, particularly preparing effective policy partners, building and leveraging societal IC, and building and maintaining a capable and competitive work force. Figure 3 indicates examples of KM actions in the four areas. Furthermore, the responsibility also includes creating and governing the overall vision, perspective, and strategy for the society’s general KM practice.

Starting any new practice – and a comprehensive KM practice is no different – needs to be well thought out, deliberate, and small and targeted beginning with clear understandings of expected benefits. However, it is also important to have a flexible blueprint of the broad vision to guide the efforts. Initial and later KM activities should serve as building blocks and contribute to creating the larger KM practice. It therefore is important to identify the desired path of activities and resulting benefits that are

**Figure 3** Elements of public administration knowledge management practice

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planned to build a broad and comprehensive KM practice that reaches all intended areas and parties and produces the capabilities and results that are envisioned. Some KM potential governing steps to start a broad KM practice include:

- (1) Identify people who are conceptual drivers for comprehensive KM and rely on them for guidance.
- (2) Develop vision for the public KM practice within the region.
- (3) Create the KM office function.
- (4) Create knowledge landscape map for the region covering the overall responsibility area of PA with special emphases on delivery of public services, preparation of the public as effective policy partners, building and leveraging public and private IC, and development of citizens as capable knowledge workers – all considering capabilities, opportunities, needs, and constraints.
- (5) Develop IC-related policies and obtain legislative commitments and fundings for the overall program.
- (6) Govern the overall IC-related practice.

As the KM vision is built, it is important to keep a clear overview of which activities need to be undertaken for which purpose and which ones may serve many purposes as indicated in this figure. Beyond the general KM activities, IT-related support activities and infrastructures are important. They serve vital functions, are complex, costly, and often

take time to design and implement.

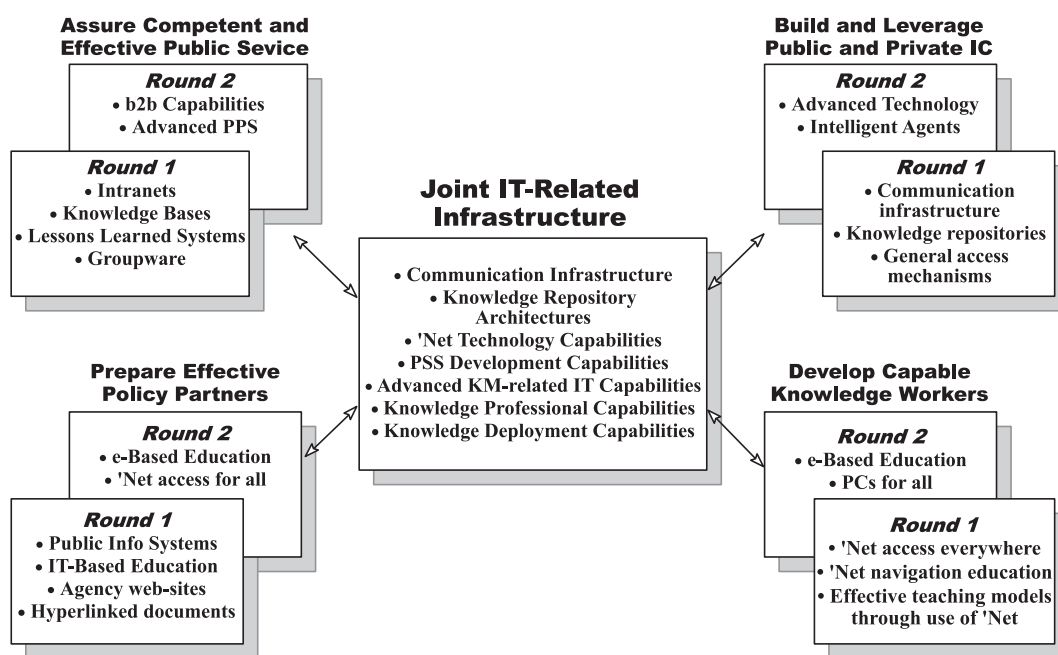
Therefore, they require separate considerations and some may be illustrated as in Figure 4 where the joint infrastructure activities are separated from activities that serve particular purposes. In addition, it may be desired to identify implementation sequences such as those that should be considered for implementation in round 1, round 2, and so on.

Building the infrastructure for a KM practice within PA requires extensive effort. In addition, technology advances rapidly in many areas and new approaches and capabilities appear regularly. In this environment, it is important to create a flexible IT architecture and maintain an adaptable plan to provide desired versatility. This often requires creating infrastructure elements that will serve most desired purposes but may require replacement within the overall planning horizon.

### **Assure competent and effective public service**

The success and viability of any society depend upon how well its public services are provided. Quality and effectiveness of PA services are influenced by many factors. Organizational structures, responsibilities, capacities, information, civil servant personal expertise, and otherwise available IC are

Figure 4 IT-related elements of public administration KM practice



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factors that affect the performance desired from the enterprise. Among these, IC assets are primary enablers as indicated in Figure 1. They are the basic resources that govern the nature and directions of actions. Without adequate ICs, even when given the best information, actions will be based on ignorance – lack of understanding – and will be arbitrary and ineffective. Consequently, it is of importance to manage knowledge to make public services act knowledgeably. However, IC alone is not sufficient. Other primary factors are indicated in Figure 5 with examples of the active KM activities they support to deliver the desired resulting effects.

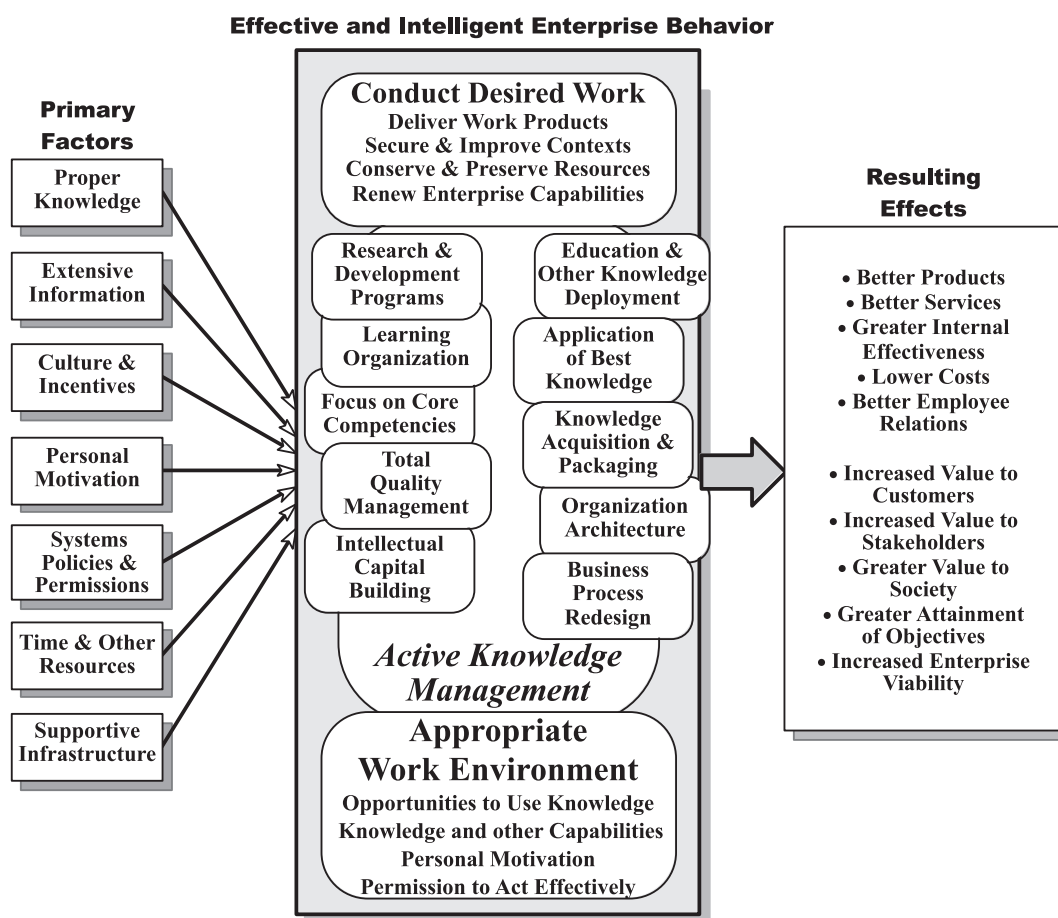
Creating and maintaining competent public services is not simple. As for other organizations, as indicated in Figure 3, the overall effectiveness of public agencies depends on individual effectiveness based on intelligent behavior by its people, their motivation, and freedom to act appropriately. It also depends on the suitability of policies, support systems and infrastructure, and organization of work, to name some aspects. Again, the enabling factor is IC. That includes the expertise and understanding that individuals can command to perform immediate work. It also includes knowledge embedded in policies, procedures, organization of work, work aids, and infrastructure. Comprehensive KM provides

approaches to improve and leverage most of these aspects. For example, KM methods are used to build expertise in people and to influence their motivation through increased understanding of the value of their own roles to society – and to themselves. In general, KM approaches developed for private organizations are highly relevant for public service organizations.

Managing knowledge to provide effective PA is not new. Building personal expertise in public servants is traditional. Training programs, qualification examinations, certifications, and other approaches have long been used successfully. They help to develop and control competence, ascertain that the public will be served well, and that public interests and agendas are pursued appropriately. However, there is room for improvement. Modern, comprehensive KM builds upon established practices by adding capabilities and approaches.

Different KM approaches may be implemented to support effective performance. Which options to implement and when become functions of expectations for performance changes, available resources, support of the overall KM practice, broader enterprise needs, and other factors. A number of KM approaches are open to PAs to manage knowledge or to create comprehensive KM practices.

Figure 5 Primary factors needed to deliver desired work



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### Prepare effective policy partners

PAs help the public understand the needs and direction of public activities, programs, and projects. They inform the public about planned or proposed actions through hearings, town meetings, and informative news programs. Unfortunately, these may be marginally effective. Often, they do not provide in-depth dialog to correct wrongful understandings that many citizens have of proposed actions. Citizens are faced with being engaged in “informed decision making” while having limited understanding of implications. They are not prepared to participate as knowledgeable decision makers on their own behalf. Much resistance against public actions has resulted from public ignorance or misunderstanding. Also, inappropriate public actions may be approved by a public that does not understand the negative sides. Effective and efficient transfer of deep knowledge and understanding can

improve the public’s insight by use of KM methods.

Public governance is more effective when citizens have understanding of directions, options, issues, and opportunities. It is particularly of value if value systems and “models of the world” are shared with PAs[4]. That, however, does not mean that everyone should agree! No society can expect all its citizens to build deep and shared insights. Nowhere will the complete citizenry be fully educated or of one mind. There will always be legitimately different opinions, knowledge-sparse misunderstandings, and value-based disagreements. To have the desired results, communications must be knowledge-effective and preferably closed loop with feedback through dialog (Wiig, 1995, pp. 327-34).

In dealings with the public, many problems are caused by the wide difference in mental models and resulting understandings that exist in the general population. The public’s insights often are different from those of PAs.

PAs may have developed an extensive knowledge of proposed actions, although at times from narrower perspectives than those available in the public-at-large which will be aware of circumstances not known to PA. The administration's views are not always right. In a democracy, special interests may pursue undesirable public actions which rightfully should be modified extensively or defeated by the citizenry as better understandings are developed.

KM methods provide opportunities to prepare the citizenry to be more effective policy partners – for conceptualizing, planning, deciding, and implementing public actions as well as for providing general support. To be effective policy partners, citizens need to have a breadth of knowledge and understanding of consequences. Among KM approaches that are available to PAs to assist the public to become more effective policy partners, the following factors should be indicated.

### **Build and leverage public and private intellectual capital**

A country's viable success depends upon its leveragable resources. Public and private IC of all kinds create significant opportunities for success, and PA influences both the creation and leveraging of IC. Also, in today's global economy technology is important. Hence, public support of creation technology, and research parks and knowledge flow clusters is important for building environments where world class expertise can congregate and provide environments of synergy. In addition, knowledge-related actions often are complemented with other actions to facilitate the desired results. For example, tax or import-export restrictions may have to be eased to attract external industry that can benefit from a well educated domestic work force.

On a national level, PA influences knowledge-related mechanisms for building and leveraging IC assets in many ways. These include patent policies and legal support for value realization and protection enforcement of IC. Other interventions include international trade agreements and targeted support of individual export or import contracts. On both national and local levels public projects provide direct support to

create and leverage public and private IC. Societies benefit from knowledge-related activities in several ways. Some result in increased trade and economic activity. In particular, developments of IC assets such as world-competitive expertise and knowledge-based products can result in valuable economic and trade changes.

Larger economic activity leads to increased employment, trade, and area payroll with associated positive economic impacts. However, as for other societal developments, many of these impacts take time to realize. Numerous mechanisms are available to PAs to create IC assets directly or to facilitate their creation in the private sector. In the private sector, public KM needs to be governed by the desired national or regional strategy. IC asset development must be related to available resources and current conditions. Governments frequently allocate resources to create capabilities to obtain specific results. While providing the desired primary results, such actions often also develop highly valuable secondary IC assets and capabilities.

### **Develop capable knowledge workers**

Societies depend upon the capability of their work forces. An uneducated or unmotivated work force obliges society to rely on natural resources to be successful, and even that is questionable. In today's global economy where ICs determine competitiveness, a major objective is to develop and maintain the ability of citizens to perform skilled and knowledge-intensive tasks. From the societal knowledge perspective, PA needs to play an active role also in this area. To be effective, its role must be based on clear and flexible visions of what should be achieved, which societal results should be obtained, and how it should be done.

Developing a competent work force requires decades. Several perspectives should be kept in mind when considering how to envision and manage work force development:

- Transverse perspectives consider work force requirements and developments across industries and societal functions. They cover developing citizens with competitive expertise – in all disciplines and industries required. These perspectives consider the breadth of areas

such as: agriculture and fisheries; tangible goods industries; service industries; educational functions; research institutions; civil services; and defense functions.

- Longitudinal perspectives start with infants throughout childhood, schooling, and preparation of trade workers and professionals. These perspectives consider all stages of personal development such as: prenatal conditions; infant rearing; kindergarten impacts; grade, middle, and high school education; trade school preparation; associate degrees; university education; post-graduate work; industry training; and life-long learning programs and opportunities.
- Political process and resource allocation perspectives consider society's objectives, public opinions, interest group influences, and the time, communication, and other realities of political processes. Also considered are societal priorities, funding capabilities, and availabilities of public and private resources.
- Methodological perspectives consider knowledge-related practices, methods, and activities that can be undertaken to achieve the desired goals.

PA has many options available for developing the work force. Some options provide relatively quick results without great investments. Others, such as public education, can require extensive financing over one or two decades before results are obtained. PAs must provide initiatives, leadership, and coordination to bring about the most effective approaches and ascertain that society as a whole is served appropriately.

### **Knowledge management activities and benefits**

KM can be approached in numerous ways to serve particular needs and conditions. Successful KM practices typically need to be supported by complementary efforts in different domains. It therefore is helpful to consider the activities needed for governance and infrastructure in addition to the operational activities that normally are the center of attention. Examples of activities in the three domains are presented in Tables I-III.

Effective KM is expected to provide many benefits. Some are short term and most often influence performance directly. Others have longer term effects and may develop capabilities that allow new strategies or different ways of operating. Table IV provides a few examples of benefits that can be expected.

### **Concluding comments**

Knowledge management is in its infancy and under constant development. We do not have good insight into how knowledge – associations, mental models, understanding, and thinking – is used by people to perform work. Nor do we understand how to transfer cognitive skills effectively from one person to another or how to transfer conceptual and tacit knowledge from personal domains to structural IC within organizations. Technology-based KM tools are immature and narrow but in rapid development. Nevertheless, existing KM practices, approaches, methods, and tools are useful and valuable and have assisted organizations to benefit through improved effectiveness. New advancements make implementation of KM practices more focused, less resource intensive, and more effective. These developments are expected to continue.

In the modern society, applications of KM practices supported by KM methods, including IT-based tools, have become important to pursue societal goals with success. PAs in most nations and regions have started to implement approaches to achieve well-defined objectives and this trend is accelerating as experience is gained and new insights of valuable applications of KM are shared. There is an emerging understanding that for KM to reach its potential, KM practices need to be broad and comprehensive – each agency, department, and individual need to incorporate KM considerations into their daily work life, yet it is important to start small and target clear goals.

Societies consist of entities whose behaviors are determined by personal knowledge or ICs embedded in systems, procedures, technologies, and computer-based systems, to name a few. Knowledge-related entities include knowledge producers (sources), knowledge holders, knowledge transfer agents, knowledge and information

Table 1 Examples of governance activities

| Activity focal point                                                        | Assure competent and effective public services                                   | Prepare public to become effective policy partners                           | Build and leverage public and private IC                                                   | Develop capable knowledge workers                                                                      |
|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| Create a vision for what KM will do for the region's PA                     | Focus on benefits and impacts that might be expected from the KM practice        | Focus on how KM can assist making the public effective policy partners       | Focus on building and leveraging public intellectual capital – approaches, results         | Focus on long-term work force development program                                                      |
| Survey and map current state of knowledge with associated CONC analysis     | Focus on critical agencies and functional priority areas                         | Focus on functions of priority that the general public must engage in        | Focus on societal knowledge sources, transfer agents and consumers                         | Focus on relevant age levels and existing and future areas of specialization                           |
| Make strategy, tactics, and short-term plans for building and leveraging IC | Create plans for strengthening public services by developing new knowledge flows | Prepare plans for widespread and effective interactive public communications | Develop plans that address present and future public objectives for viable competitiveness | Develop public policy to build knowledgeable work force for all expected industrial and business areas |
| Provide KM-related incentives, guidelines and policies                      | Reflect desirable KM practices in employee evaluations                           | Provide guidelines and funding for public dialog                             | Implement trade and business policies and agreements                                       | Develop educational guidelines and standards                                                           |
| Create "integrative management cultures"                                    | Change work practices and culture drivers within agencies                        | Build broad public knowledge awareness and vigilance                         | Promote IC building and leveraging mentalities                                             | Infuse understanding of the value of competence and how to achieve it                                  |
| Identify and implement knowledge-related steps                              | Initiate educational and other steps based on contingency and disaster plans     | Develop collaborative relations with media and other communications channels | Foster industry/ government/ educational collaborations in support of IC programs          | Collaborate with business and industry to address future needs with targeted programs                  |
| Provide legislative and financial supports                                  | Require quality public services                                                  | Support public dialog and communication                                      | Obtain grants and tax incentive supports                                                   | Fund public education programs and facilities                                                          |
| Monitor and govern                                                          | Maximize effectiveness of KM practices in PA                                     | Obtain public policy partnering to oversee processes                         | Govern IC building processes from public interest perspective                              | Coordinate public and private educational efforts                                                      |

Table II Examples of infrastructure activities

| Assure competent and effective public services                                                                                                                                       | Prepare public to become effective policy partners                                                                                                                    | Build and leverage public and private IC                                                                                                                                                                            | Develop capable knowledge workers                                                                                                                              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Build extensive IT infrastructure to support effective KM such as collaboration, automated reasoning, knowledge discovery, etc.                                                      | Create Web sites for public actions to provide information and in-depth descriptions of proposed and ongoing actions                                                  | Build tailored technical infrastructure capabilities including specialized architectures for knowledge bases and other repositories, knowledge acquisition systems, intelligent access to knowledge and information | Provide IT infrastructures for schools, colleges, and universities and integrate it with Internet, scientific institutions, and relevant business and industry |
| Build communities of practice within agencies and networks of practice between agencies and with the public to strengthen collaboration, knowledge sharing, learning, and innovation | Create state-of-the-art interfaces (portals) for public information and knowledge repositories to facilitate effective access and use by citizens and interest groups | Build public R&D facilities – defense laboratories, fishery institutes, agricultural research stations                                                                                                              | Educate and re-educate teachers and educational administrators to implement the public education contents and paradigms                                        |
| Build PA educational capabilities                                                                                                                                                    | Build capabilities to create effective education and information materials                                                                                            | Build public educational institutions – universities, trade schools                                                                                                                                                 | Develop and operate e-based public education for targeted and life-long learning                                                                               |
| Build an office for knowledge administration and create KM professional core staff                                                                                                   | Create publicly accessible and well organized information repositories and libraries                                                                                  | Build industry-specific and specialized libraries and knowledge repositories                                                                                                                                        | Build needed educational capacities – new and expanded institutions                                                                                            |
| Develop and apply knowledge sharing practices                                                                                                                                        | Provide citizens who do not have computers with public facilities for all to have access to public intranets                                                          | Build technology innovation parks and educational institutions and programs                                                                                                                                         | Provide students at all levels with personal computers or equivalents                                                                                          |

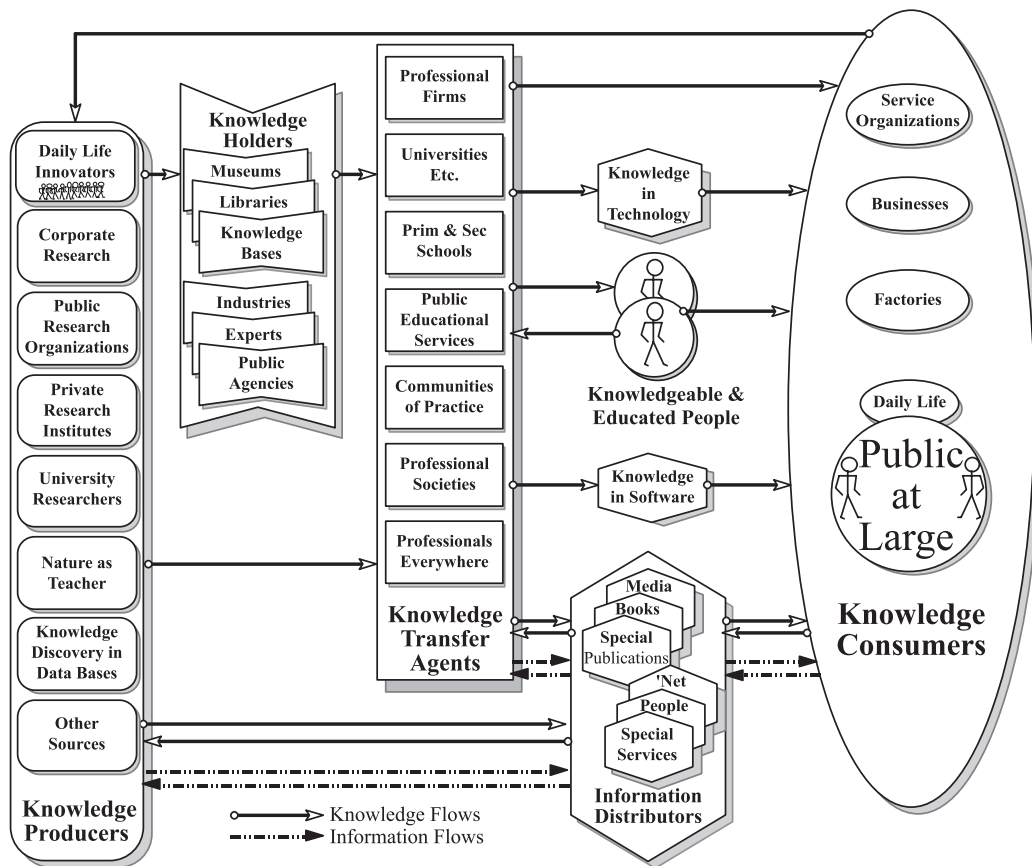
Table III Examples of operational activities

| Assure competent and effective public services                                                                                                                                                        | Prepare public to become effective policy partners                                                                                                                                                                              | Build and leverage public and private IC                                                                                                                        | Develop capable knowledge workers                                                                                                                                                       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Educate public servants in functional topic knowledge and metaknowledge such as critical thinking and enterprise navigational knowledge                                                               | Provide deep communications of proposed actions to explain principles and expected implications to the public                                                                                                                   | Award contracts and conduct public R&D to learning organizations, private institutions, and public laboratories                                                 | Develop and deploy educational materials such as books, advanced technology-based materials                                                                                             |
| Capture innovations, lessons learned, and other knowledge, transform the captured knowledge into suitable formats, and deploy it                                                                      | Utilize all media channels to provide frequent and reliable communications about public activities and related effects that concern the community                                                                               | Facilitate transfer of emerging knowledge to proprietary and competitive IC through R&D, patent procedures and regulatory processes                             | Develop curricula, tests and proficiency requirements, text book content requirements, and models (role models) for effective teaching                                                  |
| Transfer expertise from exceptional performers to other knowledge workers and transfer tacit knowledge into structural knowledge                                                                      | Facilitate networks of common interest throughout the community for the purpose of building joint understanding as well as to be able to conduct dialogs                                                                        | Undertake publicly supported benchmarking programs within the local society and worldwide to ascertain that "best knowledge" is available and is used           | Develop mechanisms to communicate expectations for future employment needs to the public                                                                                                |
| Form collaborative liaisons with private entities and public agencies in preparation for dealing with problems like earthquakes, typhoons, floods, draughts, epidemics, social unrests, and terrorism | Maintain publicly accessible databases on all non-restricted PA aspects. Equip systems with search facilities and automatic reasoning such as natural language understanding                                                    | Promote creation and operation of professional societies and other knowledge-creating, exchanging and refining bodies and networks                              | Educate the public in theoretical and practical topic knowledge for daily life and craft and professional functions, metaknowledge, critical thinking, and broad navigational knowledge |
| Motivate and reward public servants for sharing knowledge and for using others' ideas and expertise to improve their work                                                                             | Distribute learning materials to provide understanding of public issues ranging from health and environmental issues to communications about potential future work force needs – to make possible public decision participation | Publish or facilitate private publishing of scientific and trade journals, and technical and scientific reports using conventional and high-technology channels | Develop and deploy educational and behavioral role models for classroom teachers, students, and the home                                                                                |

Table IV Examples of potential knowledge management benefits

| Assure competent and effective public services                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Prepare public to become effective policy partners                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Build and leverage public and private IC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Develop capable knowledge workers                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Competent and secure public servants with broad understandings leads to:</p> <p>Proposing and pursuing public projects that fulfill national and regional strategies and support public interests</p> <p>Competent and effective public service will lead to:</p> <p>Quicker public actions and lower costs of public services</p> <p>Extensive collaboration within and between agencies, members of the public, industrial and business partners, and special interest groups will lead to:</p> <p>Effective public actions that address real societal needs</p> <p>"Always use best knowledge" mentality supported by incentives, guidelines and policies, and reflected in employee evaluations and placing public servants in positions where they can use their expertise will lead to:</p> <p>Consistently high quality and reliable public decisions and actions</p> | <p>Knowledgeable people who participate in public decision making leads to:</p> <p>Setting societal priorities that reflect the public opinion and a society with greater public acceptability</p> <p>Engaging citizens and interest groups in creative collaboration for potential and new public actions will lead to:</p> <p>Public support and active influence in shaping society-wide actions</p> <p>A public that is an effective policy partner will lead to:</p> <p>Less friction and public unrest, less cost of maintaining order and operating the judicial system</p> <p>A public that is an effective policy partner will lead to:</p> <p>Greater efficiency of public service and greater satisfaction among public servants with greater personnel retention and knowledge building</p> | <p>Well developed and organized public and private IC will lead to:</p> <p>Pursuing priority initiatives that improve performance and competitiveness</p> <p>Regional IC that provides successful products and services will lead to:</p> <p>Improved exports; it also will make the emerging work force seek areas of potential professional success</p> <p>Commerce expertise will lead to:</p> <p>Increased trading with existing and new partners</p> <p>Scientific expertise in areas such as agriculture will lead to:</p> <p>Increased food production and export of agricultural products</p> <p>Financial expertise leads to:</p> <p>Local enterprises proper world players; external institutions are attracted to fund and form regional financial centers</p> <p>Medical expertise leads to:</p> <p>Attracting outsiders to conduct business within the region and to a healthy and able work force</p> | <p>Competent and capable work force will lead to:</p> <p>Ability for nation or region to pursue strategies that depend upon competitive knowledge industries</p> <p>Nationally competent people will lead to:</p> <p>All "doing the right thing first time", resulting in lower costs and improved performance</p> <p>Providing educated and skilled people in suitable numbers leads to:</p> <p>Satisfying employment requirements for greater competitiveness</p> <p>Providing a competent population leads to:</p> <p>Low unemployment and improved quality of life</p> <p>Industries operated with world-class expertise will lead to:</p> <p>Regional ripple effects that spread capabilities and increase innovation and effectiveness and reduce operating costs. with resulting increases in global competitiveness</p> |

Figure 6 Examples of societal knowledge entities and related flows



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distributors, and knowledge consumers. Pathways connect these entities through knowledge flows such as those illustrated in Figure 6. The “societal knowledge system” operates as a living organism with multiple goals, resources, information exchanges, flows of many kinds, and self-regulating mechanisms. Unfortunately, some, such as the market mechanisms may too often be inefficient. The knowledge system changes and adapts to economic and social demands and it therefore is important to maintain the vision and overview for the overall system and how it might operate in the modern, competitive society.

In particular, the need for comprehensive KM within and in support of PA is important. KM plays a central role to make PA function more effectively. More importantly, comprehensive KM governed by PAs in support of societal goals can provide broad benefits that allow the society to prosper and increase its viability by making its people and institutions work smarter and thereby increase the quality of life for its citizens.

**Notes**

- 1 Intellectual capital (IC) is used to denote all aspects of personal tacit and explicit knowledge as well as structural intellectual capital, be it explicit, embedded in technology, or in other forms.
- 2 Systematic approaches, when applied to societal processes, emphasize applying systems theory to deal with interconnectedness, effects over time, parallelisms, and nonlinear behaviors.
- 3 Capabilities, opportunities, needs, and constraints (CONC) analysis is similar to threats, opportunities, weaknesses, strengths (TOWS) analysis but includes knowledge that provides a perspectives difference.
- 4 Mental simulations and evaluations of outcomes are based on projections of expectations for behaviors using mental models of processes in the world (“models of the world”) and values held by individuals or groups of individuals. Agreements such as public support for official projects are often based on shared mental models between the public and administration. Misunderstandings between two parties often result from significant differences in the models of the world that the parties hold in their minds.

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## Further reading