



Handbook on Enterprise Content and Knowledge Management



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Handbook on Enterprise Content And Knowledge
Management For
Jabatan Kerja Raya

Cawangan Pengurusan Projek Kompleks (PROKOM)

Aras 27&28, Menara PJD,
No.59 Jalan Tun Razak
50400 Kuala Lumpur
Malaysia



Executive Summary

Knowledge management efforts can get bogged down due to different understanding of knowledge management. This handbook aims to help us understand what it is so that we can focus on what to do.

The essence of ECKM is to capture the abundant knowledge assets that are available either in form of experience, learning from failure or mistakes, insights, etc (tacit knowledge) or reports, failure analysis, manuals, etc.(explicit knowledge), to organize and transform the captured knowledge and to facilitate its usage at right place and at the right time.

Among the benefits of ECKM are: it helps to reduce cost, increase focus to our customers, offer consistent quality in our projects, contribute towards earned value and improve communication with our external and internal customers.

ECKM activities involve:

- Governance function
- Staff or infrastructure function
- Operational function
- Function to realize the value of knowledge-related investments

The success of ECKM implementation hinges on the following-

- A champion - a leader - to push the idea of knowledge management
- A sharing culture need to be institutionalized
- ECKM initiative has to be synchronized with JKR Strategic Framework

With the awareness and understanding of ECKM principles and the implementation of ECKM initiatives, it is hoped that the employees will be well prepared for the ECKM journey.



FOREWORD

JKR is embarking on a formal Enterprise Content and Knowledge Management (ECKM) programme in JKR to systematically & formally share and transfer knowledge. The emphasis on knowledge management was clearly demonstrated in JKR's new vision statement. JKR must embrace knowledge management principles to facilitate teamwork and sharing of knowledge and best practices.

With this awareness and a need to fulfill the changing expectations of stakeholders, the ECKM initiatives aim at formalising the collection of valuable knowledge gained and organising knowledge in ways that benefit the entire organization, necessary to achieve the corporate vision. If JKR does not embark on these initiatives, more resources will be wasted by re-inventing knowledge, spending time locating knowledge and trying to understand and use the growing volumes of new knowledge flowing into and within the organization every day.

This handbook is prepared to kick start the ECKM journey and serves to promote awareness and understanding among JKR employees on:

- ✓ The concepts of knowledge management
- ✓ JKR ECKM initiatives and the meaning
- ✓ What needs to be done to make this initiative a success for the benefit of JKR and stakeholders

A brief introduction to knowledge management is introduced to serve as a foundation to appreciate ECKM initiatives. However, it is by no means exhaustive; for a more in-depth understanding of knowledge management and its related topics, other resources will be made available. This handbook presents an overview of some effective ways of planning and implementing ECKM in JKR. Like many other processes, there is no "one way" to implement content and



knowledge management because content and knowledge management is a combination of technology, culture and practices.

We wish to thank all the participants who have contributed valuable ideas and input in the preparation of this handbook.

For any enquiries, please contact:-

Sr. Roznita Othman

roznita@jkr.gov.my

CAWANGAN PENGURUSAN PROJEK KOMPLEKS,

Ibu Pejabat JKR Malaysia



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1 ENTERPRISE CONTENT AND KNOWLEDGE MANAGEMENT

Pioneering organizations have been creating knowledge management systems to harness intellectual capital and create value. Peter Robertson, for example, is the executive vice president of the Chevron USA Production Co., who described the benefits of knowledge management:

“The fact [knowledge management and best practice sharing] is good for business. The faster and more effectively we can share ideas, the better we can make our product, the better we can serve our customers, the better we can build a committed team of employees, and—bottom line—the better we can earn profits for our shareholders.”

JKR is responsible for building and maintaining our nation’s infrastructure, it is imperative that we are able to better execute our projects for the benefit of our stakeholders; the external and internal customers.

At the outset, the challenges of knowledge management may sound daunting and perhaps esoteric. Tom Davenport, director of the Information Management Program at the University of Texas at Austin, believes that knowledge management is a costly, political, and ceaseless process—but a process that corporations cannot afford to avoid. He asks a practical question regarding knowledge management: “How much does it cost an organization to forget what key employees know, to be unable to answer customer questions quickly or at all, or to make poor decisions based on faulty knowledge?”

Finally, knowledge management is not an academic exercise. Knowledge management techniques are being adopted at a quickening pace, as global 2,000 organizations such as the following have combined cultural and process changes with enabling technology to realize hard results:



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- ✓ Dow Chemical increases annual licensing revenues by \$100 million by managing its intellectual assets
 - ✓ Silicon Graphics manages its product information communications processes and reduces sales training costs from \$3 million to \$200,000
 - ✓ Skandia Insurance's knowledge management efforts reduced the startup time for opening a corporate office in Mexico from seven years to six months
 - ✓ Steelcase realized an upswing in patent applications and a threefold increase in productivity after implementing knowledge sharing processes across multi-disciplinary customer teams
 - ✓ Texas Instruments avoided the cost of building a \$500 million wafer fabrication plant by leveraging internal knowledge and best practices
 - ✓ Chevron realizes \$150 million annual savings in power and fuel expenses from knowledge sharing in energy-use management.
 - ✓ Booz-Allen & Hamilton saves over \$7 million a year by reducing the time needed to find and access accurate employee and collaborative information.

1.1 Introduction to Knowledge Management

Under increasing competitive pressure, many companies are examining how they can better manage the intellectual capital or knowledge assets they possess. The emerging field of knowledge management addresses the broad process of locating, organizing, transferring, and more efficiently using the information and expertise within an organization. As the pace of global competition quickens, Chief Executive Officers (CEOs), Chief Information Officers (CIOs), and Chief Knowledge Officers (CKOs) are asking how they can help workers to follow Woodrow Wilson's advice and "not only use all the brains I have, but all I can borrow."

Why are organizations increasingly interested in knowledge management? Several factors underlying this interest can be loosely grouped into two



categories: market forces and infrastructure changes. Market forces include a re-emphasis on corporate growth *and* efficiency, the ongoing need for cycle time reduction, and the strains placed on sharing knowledge due to increased globalization. Recent infrastructure changes have also significantly impacted organizations' ability and desire to manage knowledge. For instance, the Internet/intranet revolution has dramatically lowered the barriers to sharing information by providing easier access to knowledge assets and facilitating electronic communication. In addition, after a decade of downsizing and restructuring, many organizations realize that they have lost both knowledge assets and knowledge transfer mechanisms by eliminating layers of middle management.

As the level of hype surrounding knowledge management continues to accelerate, the question for JKR is how to revolutionize the way our knowledge workers, that is you, create, communicate and collaborate and process knowledge. To help answer that question, JKR is embarking on the ECKM initiatives to implement the practical aspects of knowledge management and continuously evaluate how various information technologies can be used to create a "knowledge management system," a set of technologies for enabling knowledge management processes.

Traditions survive because they have passed the test of time. All knowledge is a form of tradition, whether ingrained in its structure, content, or the value that people attribute to it. Civilized societies have great traditions of knowledge, and the post modern era which discovered print and digitalization gave leverage to the value of those traditions not only in transforming them into intellectual assets but also as the means by which they can systematically improve the way society live, work and continue to change in creative and dynamic ways. Societies whose traditions still are largely tacit and embedded in people's memory rather than print will find



themselves more isolated and less able to rationalize their past and future goals in the increasingly complex world.

Today, rationalization exists in many forms: accountability, consumer rights, cost justifications; expected and real returns of investments, even community responsibility are some of them. Each drives a different kind of rationalization, and *that* can only begin from the kinds of information and knowledge communities within an organization have access to. In this sense, knowledge management is an essential business strategy: it is the main pulse of dynamic organizations whose goals and core business are closely linked to the use and development of resources and consumer needs. Efficiency is the key word, which translated encapsulates customer's demand for sound economical sense, timeliness, accuracy, relevancy, and return of investments. In the view of organizations, efficiency is the final gain as a result of much reduced margins of error, hidden costs, and uncalculated or overlooked risks. Most of all, gain is possible when the organization successfully blends knowledge management with capacity building as a strategic business blueprint for the organization.

1.2 What is knowledge management?

A knowledge management system manages data, information and knowledge. The definition of each entity is as follows:

Data is a set of discrete and objective facts about events. On its own, data does not make much sense. Examples of data are a series of telephone numbers in the directory and a list of engineers' names in the HR record. However, data becomes meaningful chunks of information once we have organized and categorized the data, and corrected and condensed it. Data is thus transformed into information by adding value through categorization, calculations, corrections and condensation. This



transformation may be summed up with the observation that a piece of data only becomes information or knowledge when it is interpreted by its receiver.

Information is the building block in constructing knowledge. Initially, when a user queries a database, he or she gets back useful information. A simple example is how a database of engineers working in JKR can yield useful specific information such as sex, race, and place of residence and academic and project experience of the engineers. The information gives the user new points of view or perspectives that either help to acquire, improve or restructure knowledge. In our daily life, we use chunks of information to create meaning out of phenomena that we observe or experience. At all times in our consciousness we are constantly organizing and grouping inputs from our experience and senses so that they become relevant information that explains situations in our environment.

Knowledge is the result of the inter-phase between information and human insight, experience, intuition, critical and creative thinking. Thus, knowledge is a body of information that has acquired meaning and context as a result of human inquiry, analysis and synthesis of disparate information or data in problem solving or decision-making situations. The quality of knowledge output is influenced by the quality of professional expertise and experience available in an organization. It is hardly surprising therefore those organizations that are serious in knowledge work are willing to invest in the best of professionals and experts.

Types of Knowledge. Michael Polanyi first distinguished *tacit knowledge* from *explicit knowledge*. Information technology has traditionally focused on explicit knowledge, or that knowledge which is codified or can be transmitted in a form such as a document. Tacit knowledge is personal, context-specific and derived from experiences, and therefore can be hard



to transmit. Types of tacit knowledge include hands-on skills, special know-how, intuitions, and the like. As Polanyi stated, “We can know more than we can tell,” and understanding both types of knowledge is often required for getting a job done effectively.

Knowledge Conversion. The organization can gain only limited benefit from knowledge isolated within an individual; to realize the full value of a knowledge asset it must be transferred from one individual to another. Ikujiro Nonaka describes four different modes of knowledge conversion in *The Knowledge Creating Company*. Socialization is the process of sharing experiences and is often done through observation, imitation and practice. It takes place in apprenticeships and conferences, as well as at the water cooler. Capture is concerned with articulating tacit knowledge and turning it into an explicit form, for example; writing a report on what was learned at a workshop. When the report is copied and distributed, knowledge is converted from one explicit form to another and dissemination takes place. Internalization is the process of ‘experiencing’ through an explicit source. An example is reading the report on the workshop and mentally imagining being in the situation and combining it with previous experiences. These knowledge transfer processes are shown in Figure 1.

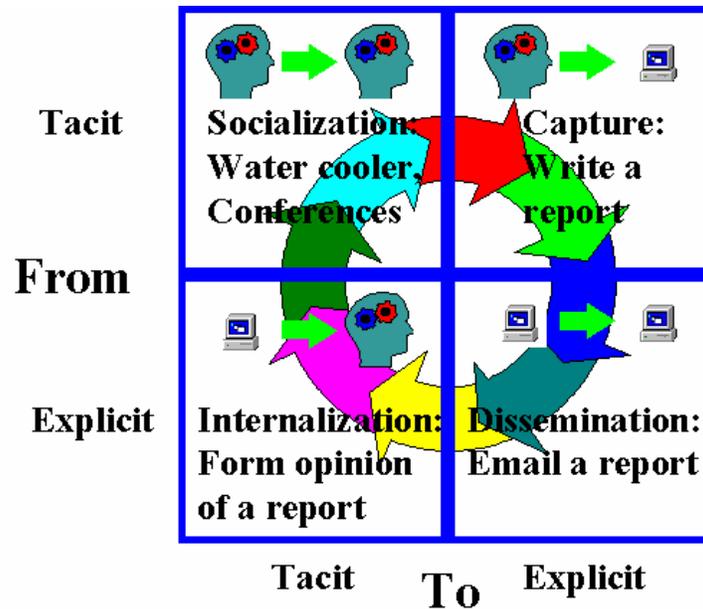


Figure 1 - Knowledge transfer processes

There are various definitions of knowledge management such as:

- ✓ Natarajan and Shekar (2000) define knowledge management as any structured activity that improves an organization's capacity to acquire, share, and utilize knowledge to enhance its survival and success.
- ✓ David Skyrme and Associate (1997) defined knowledge management as the explicit and systematic process of managing vital knowledge and its associated processes of creating, gathering, organizing, diffusion, use and exploitation.
- ✓ Denham Grey (1999) defined knowledge management as a process involving identification of critical information, sharing of information, protecting and enhancing the value of information, and leveraging knowledge utility in major organizational level decisions.

In all these definitions, knowledge management is described as a system that enables organizations not only to quickly sift through information to find critical information but also enable them to manipulate, use, and re-



use that information in creative ways so that new understandings and new knowledge emerge.

Technologically speaking, knowledge management system is an advanced information management system that incorporates analysis *and* synthesis functions to the traditional synthesis function of the older generation information management systems. Through flexible query and mining tools in the knowledge management systems, people can now make data ‘talk sense and meaning’ while other various contextual variables are manipulated in addition to being refined or changed. Knowledge management systems enable the ‘seeing’ of abstract projections based on hard data, thereby helping us to focus our sights on relevant indicators. The knowledge management system is to organizational thinking, as the telescope was to astronomy.

As a sociological tool, the knowledge management system is an invisible infrastructure that connects people’s minds, experiences, insights and creativity in a collective effort at making sense of phenomena occurring in overlapping social circles. Our business partners are our clients, as are our employees, but they also can become our competitors. In the same manner of speaking, our customers are at the same time our important stakeholders as well as members of pressure groups who lobby against some of the policies or processes JKR may use in our projects. The knowledge system provides a comprehensive link to information and knowledge from various walks of contributors, practitioners, lobbyists, etc., thus enabling people to use information in a broadly informed way to achieve their specific objectives. Since all businesses are social institutions, they cannot but seek for sound information and knowledge that has been synthesized from the real contexts of various clients, users and stakeholders.

1.3 Capacity building through knowledge management

Today, our capacity to transform knowledge into valuable assets defines our present and future. The capacity to transform knowledge is yet another tradition. It is a tradition which demands active mobilization and use of knowledge. Today the competitive edge lies in how well and how quickly we can improve services and create innovations in useful packaged or bundled products. The mobile phone is a successful story of knowledge bundle, where the telephone also functions as a camera, an online network service, and a television.

Knowledge capacity can be defined as the capacity to create new knowledge, attract knowledge from elsewhere, store, transfer, transform for use, and use knowledge and link various actors in the field. Knowledge capacity is defined as the ability of individuals, organizations or systems to perform appropriate functions effectively, efficiently and sustainably. Current thinking links capacity with performance of the defined and appropriate functions and tasks, i.e. they should contribute to the achievement of strategic objectives of the entities. The thinking about capacity building has moved from a focus to individual training to development of institutions and further to the complex systems thinking of today. The new definitions emphasize the continuing process of strengthening of abilities to perform core functions, solve problems, define and achieve objectives and understand and deal with development needs.

Capacity development is the process by which individuals, groups, organizations, institutions and societies increase their abilities to:

1. Perform core functions, solve problems, define and achieve objectives
2. Understand and deal with their development needs in a broad context and in a sustainable manner.

Capacity building is a **continual process** of improvement within an individual, organization or institution, not a one-time event. It is essentially an **internal process**, which only may be enhanced or accelerated by outside assistance, for instance by donors. Capacity building emphasizes the need to **build on what exists**, to utilize and strengthen existing capacities, rather than arbitrarily thinking of starting from scratch. However, in some situations radical and extensive changes may be needed. Human-centered development strategies emphasize that besides being a means to an end, i.e. improvement of organizational performance, capacity building has an intrinsic **value on its own** in fostering job satisfaction and self-esteem. In a fast changing, globalizing world, an essential aspect of capacity building should be to build capacity **to cope with change** and to inculcate more **integrated and holistic approach** rather than traditional, sectoralised ways of thinking in addressing problems at hand. Hence, capacity building is a **broad concept**, which overlaps with and includes human resource development and various management issues and trends such as strategic management, change management, quality management, organizational re-engineering, knowledge management, information management, etc. The integration of knowledge management with the capacity development of organizations is depicted in Figure 2 below.

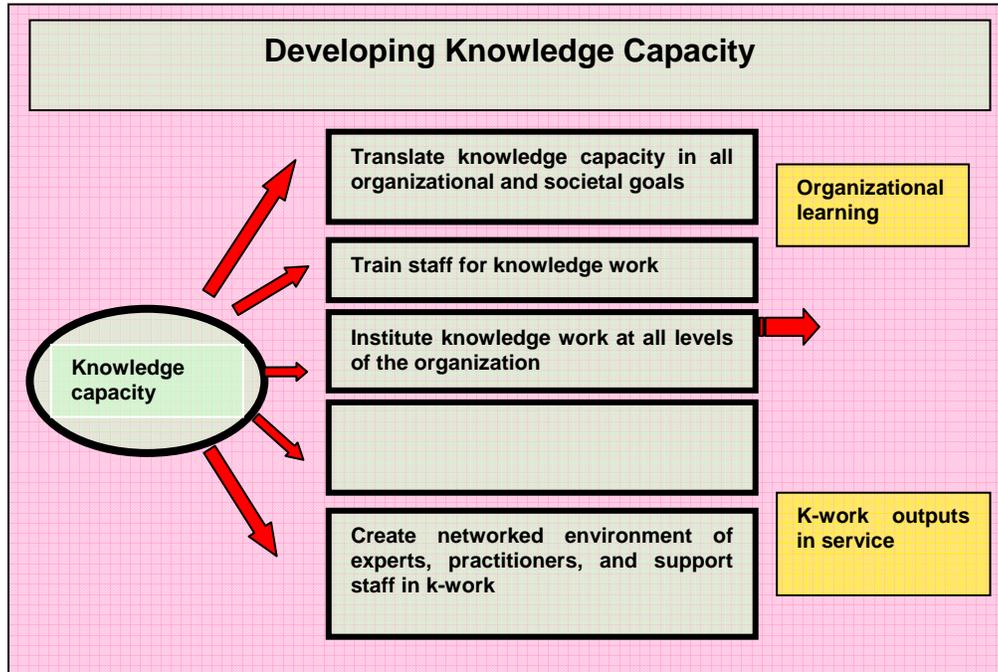


Figure 2: Stages of capacity building in collaboration with knowledge management

The first phase, **needs assessment** for capacity building is a basis for designing a strategic plan. Capacity gaps are identified by first defining the essential capacities at individual, team, organization and system levels for achievement of policy or organizational or program goals and objectives. Assessment of existing capacities is then compared with the future needs. In practice, this process may take several rounds. A number of assessment tools have been applied at systems, organizational and individual levels. The challenge in capacity assessment is to link the assessment with planning of strategies and tasks, to examine enabling and hindering factors for good performance at all levels, to choose appropriate methods, and to keep in mind that the purpose of the assessment is to lead to improvement of performance. A recent study on



capacity gaps in health sector reforms is summarized to illustrate the new thinking.

In the second phase, **strategies and actions** in capacity building are tailor-made for each situation on the basis of identification of capacity gaps. In knowledge management terms, we look at the corporate objectives and the core functions of the organization. We also analyze the work processes as well as the collaborations to support those work processes. We then design a technologically supported environment that create an efficient working environment that enables data and information to be shared, prompts work flows through various modular applications, and instant collaborations. In knowledge management we believe that the wise management of knowledge is in itself a business strategy. The better we handle opportunities to share information and to make sure that the information is used and enriched through the insights from practitioners, the sharper the edge of our business competitiveness. In knowledge management systems, there are various data analysis applications that can assist practitioners and professionals not only to manage data but also to mine underlying patterns, analyze relationships and differences in multiple dimensional ways, and to predict various conditions based on artificial intelligence.

The last part of a capacity building cycle is **monitoring and evaluation**. The point about collecting data and sharing them in the process of our daily work is to enable us to monitor at the end of the day our own achievement relative to the goals of the organization. How much we have achieved, what are our added strengths; what do we still need to do tomorrow; why have we not been able to accomplish what we have set out to do and how do we know this are some of the questions that typically arise during the monitoring and evaluation process.



1.4 Elements in knowledge management systems

1.4.1 Taxonomy.

The data base stores all information that the organization believes is important. It is a ‘deep empty vessel” into which all kinds of data and information can be thrown in, but if improperly labeled, none of the contents can be retrieved or accessed. Information needs to be properly labeled and stored in folders, and these folders themselves need to be arranged in a sensible and visible hierarchy so that users can track the information they want right down to the very source within the very category of information they have initially searched. The way that information is hierarchically organized is called taxonomy. There are various kinds of Taxonomy. One simple illustration of a taxonomy hierarchy is: Proton >> car>> four wheeled motor vehicle. Any person who searches for Proton will also be likely to read about other cars, just as while some one else who initiates a key word search for four wheeled motor vehicle will also likely come across Proton. In complex organizations where there are numerous sources of information across departments, a clear taxonomy must be drawn so that every user in the organization knows where to look for the information.

1.4.2 Metadata.

Even though a good taxonomy may be already in place, an efficient search engine would still find it hard to sieve through the massive amount of information documents within every folder to locate a specific document. In good knowledge management systems, taxonomy is thus often aided by a reasonably good capture of important although disparate bits of information about the particular document, or within it, such as author, date, type of document, and so forth. It is quite usual for knowledge management systems to standardize the kind of metadata required once the taxonomy is already decided. In Universiti Putra Malaysia,



standardized metadata about any journal publication contributed into its knowledge management system must include the author's name, publisher, title of publication, date of publication. Each of these metadata can later help to define or limit the fields of searches.

1.4.3 *Integration with other data systems*

Knowledge management systems often integrate databases from various owners or origin source. Technically, a tool is used that enables the system to read information from the other data bases provided that the data architecture is not too diversely variant from the host system. This condition is often referred to as interoperability of systems. Interoperability very often only enables sharing of information. However, the host system can only read information that is allowed by the third party, but it will not be able to update any information in the third party data base, nor can it run any analyses on the data since the data is not directly imported or 'accessed' into the host system in any true sense. In other words, the third party data is only virtually mirrored in the database of the host system. However, with open and common understanding, interoperability may of course then involve co-using of actual data amongst various systems. Often the integration is depicted by links to the third party web sites.

1.4.4 *Modular applications*

Information flows must be incorporated within work processes of the organization so that the monitoring of actual progress can be made possible. Information flow can start from the moment that someone fills in a request form. In the process of filling in the request, the requester may ask for specific kinds of information, just as he or she is also prompted by the system to answer mandatory questions. As soon as the form is filled and submitted, the information contained in the request form becomes a data set upon which subsequent work flow within the organization will now act upon. These processes of blending information into work flows are



achievable through modules. For example an e-application module comprises several sequence or layers of work flows from the time that the system offers an electronic form to be filled by an applicant, to ensuring that all mandatory information are filled in, to real-time check of several matches of information before approval or access is granted to the requestor.

1.4.5 Knowledge mapping

In the knowledge system, knowledge maps are used as a navigational tool that gives an overview of a logical or structural view of the data base contents. Knowledge maps do not tell where to look for information; they merely give visual displays of what critical information and knowledge are available in the repository, and their location (Natarajan and Shekar, 2000). In terms of information in the database, this could mean access to customer information, client information, competitor information, and product/market information. These are all external information which has historically not been provided by most computer systems. Several internal knowledge domains were may also be desired, including activity-based costing, human resource information, and up-to-date financial status. The diagram in Figure 3 illustrates a simple knowledge map of several databases in a repository.

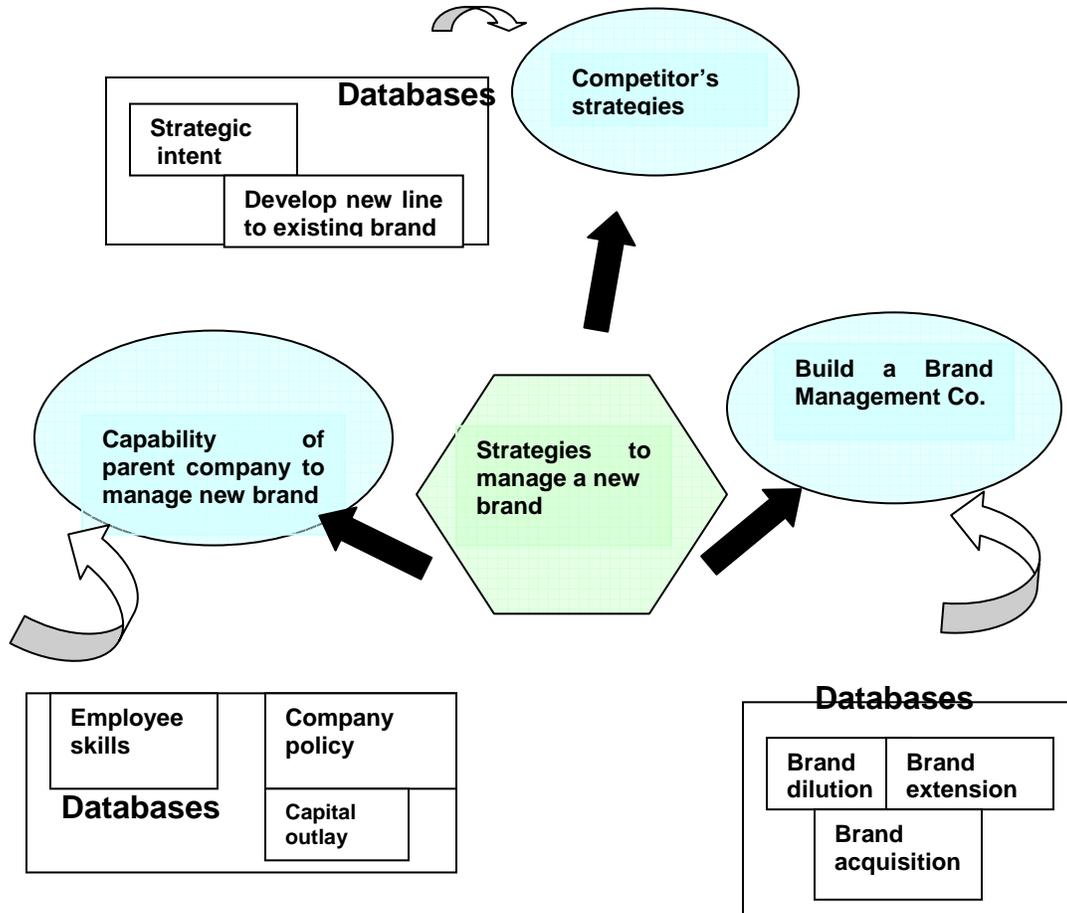


Figure 3: Example of knowledge mapping

Procedural knowledge maps show knowledge (and information) mapped onto a business process. This could be any process for a business or organization, for example, a marketing strategy of an organization. Procedural information usually is Information on how to do the job and where to get information Conceptual knowledge maps illustrates information content in a hierarchical classification. For example, content may be organized by the chronological sequence in the development of a concept. Sometimes taxonomies are also used to organize content. 'Knowledge generation' is an example of taxonomy where information obtained through experimentation, merging and grafting can be sited.

Finally, **competency** knowledge maps document the skills, positions, and even career path of individuals in an organization to create a competency profile of its employees. Competency maps are like 'yellow pages' directory of experts, which enables companies to locate specific needed expertise within the organization.

According to Denham Grey (1999), knowledge maps can benefit organizations in the following ways:

- ✓ Reduce the burden on experts by helping staff to find critical information quickly
- ✓ Improve customer response, decision making and problem solving by providing access to applicable information in reduced time
- ✓ Highlight groups of expertise in the organization and suggest ways to build bridges to increase knowledge sharing
- ✓ Highlight opportunities for learning and leverage of knowledge
- ✓ Help to design a corporate knowledge architecture or a corporate memory
- ✓ Provide a baseline for measuring progress of projects in juxtaposition to the knowledge and information repository that has been, and is still being, developed.

1.5 Interoperability between systems

Knowledge management systems may be linked to existing databases through a middleware tool. The middleware provide users with a standard method of access and interaction

1.5.1 Knowledge management structure

There are many knowledge management structures. The diagram as shown in Figure 4 is a basic structure.

A viable structure is one whereby the design allows for a “building blocks” approach, which is a key benefit from an implementation and investment perspective to JKR. As the ECKM is still in the infancy stages, JKR needs the flexibility to systematically select and implement various modules as required at the onset and address future requirements by “inserting” a new module in the framework, all within a tightly integrated environment. The framework is used to synergize the processes of knowledge production, sharing and application for maximum **effectiveness and efficiency**, resulting in productivity increase.

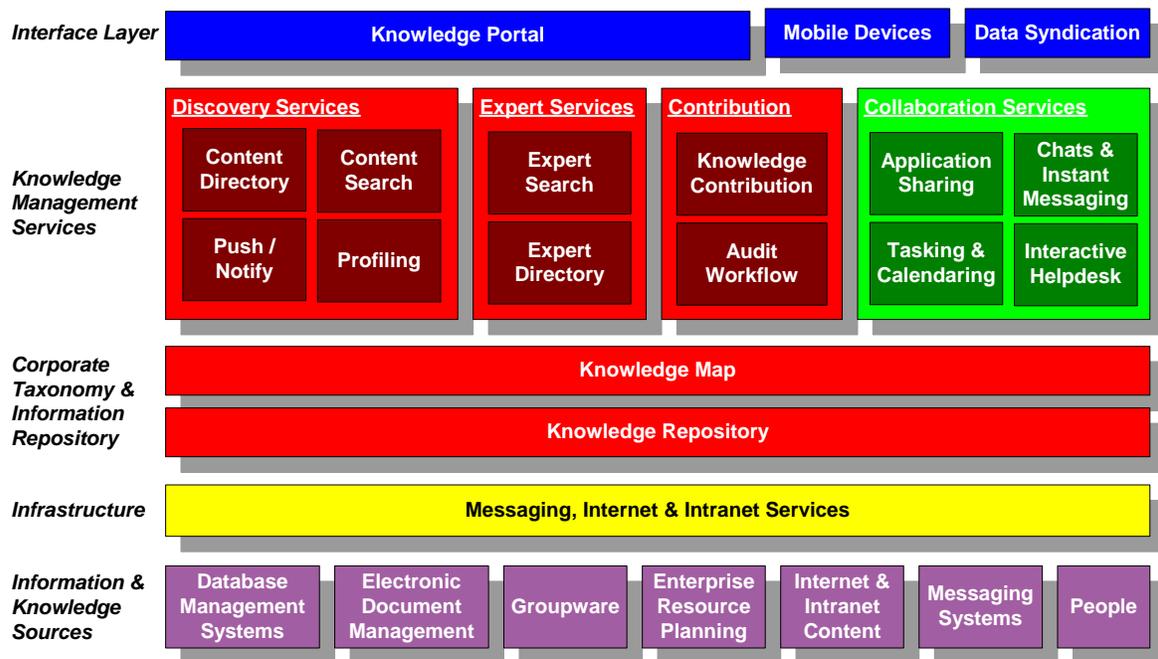


Figure 4: Knowledge Management Structure

The benefits of a “building blocks” approach can be summarized as:

- Proof-of-concept
- Short Project lifecycles
- Track Critical Success Factors



-
- Responsive to new user requirements
 - Encourage user acceptance and collaborative culture

JKR “building blocks” implementation approach to implement ECKM will follow three principles:

- Build on existing resources and systems
 - Ensuring ***Interoperability***
- Provide an immediate ROI on knowledge resources
 - A measurement for ***Availability and Accessibility***
- Ensure that each step is a building block that provides a foundation for **future** enhancements
 - Provides ***Scalability***



2 MISSION AND OBJECTIVES OF ECKM FOR JKR

The ECKM initiative will be in line with and supportive of our vision to become a world class service provider and centre of excellence in asset management, project management and engineering services for the development of nation's infrastructure through creative and innovative human capital and state of the art technology.

The mission of ECKM is to support JKR overall vision and achieve the following:

- ✓ Assure JKR as a competent and effective public service
- ✓ Build and leverage on intellectual capital to serve our external and internal clients
- ✓ Develop capable JKR “knowledge workers” who contribute, generate and use knowledge creatively and efficiently
- ✓ Develop communication infrastructure comprising of knowledge repository structures and network technology and KM-related IT capabilities
- ✓ Facilitate and promote effective policy development and monitoring in JKR
- ✓ Facilitate and promote a knowledge culture among our co-workers

2.1 Objectives of ECKM

It is essential that the objectives ECKM are aligned with JKR strategic objectives. If objectives are not stated or are not clear for the ECKM effort, it “tends to become just another activity imposed on people for no apparent reason.” Some of the areas of our focus will be:

- ✓ Financial objectives
- ✓ Quality
- ✓ Customer satisfaction
- ✓ Innovation



Another reason for focusing ECKM on a set of clear objectives is that most successful knowledge management projects start small and are tested thoroughly. The idea is to test the process and cultural changes—not merely the software—on a small scale and then refine and apply the techniques to other business problems across JKR.

Finally, a clearly focused ECKM will avoid information overload. In the 1990s, Arthur Andersen started its Global Best Practices (GBP) knowledge base. Early in the lifecycle of GBP, GBP team responses to experienced user demand for more information lead to content volume increasing thirty-fold. The result was “an unwieldy blob of information” that turned casual users into non-users. The team realized it had sacrificed speed and specificity for size and generality. Eventually, Arthur Andersen chose alternate delivery systems for knowledge details to keep the GBP application focused and more usable.

ECKM aims to fulfill JKR’s strategic objectives by enabling us to:

- ✓ organize our information acquisition and sharing processes via technology
- ✓ utilize information more efficiently in delivering services and policy outcomes
- ✓ share and upgrade standardized procedures to ensure consistent outcomes throughout the organization
- ✓ enable the use of information in direct ways and through multiple levels of analysis so that more efficient asset and project management are achieved
- ✓ enable the networking of experts and sharing of information between communities of practice so that engineering competencies are constantly upgraded



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- ✓ enable instant gaps and needs analysis to be identified so that more relevant human capital development is achieved
 - ✓ enable direct and on line communications with various external and internal clients so that the integrity of JKR services will be upheld at all times
 - ✓ enable the sharing of best practices so that the well being of JKR and the environment is harmoniously blended

While we have identified the general areas to focus for the objectives of ECKM, your input is critical for us to clearly establish measureable goals to be achieved by the ECKM initiatives as all of us will have a role towards ensuring that the objectives are achieved.

2.2 Successful implementation of ECKM in JKR

Knowledge management is a system, but like all other electronic systems, its success is determined by regular use and the quality of output achieved. There are three fundamental work principles that need to be established in a knowledge-based organization.

First, there must be a champion - a leader - to push the idea of knowledge management system as one of the requisite structures in the business organization. The leader needs to ensure that the functions of the knowledge management system are developed strategically to support the information needs of the business. There must be a fair regularity, and reliability of activities mooted by the leadership to encourage cross-fertilization and (re)-use of knowledge. Above all, the leader needs to continually prove the importance of the system in enriching organizational knowledge and decision-making.



Secondly, a knowledge sharing culture must be institutionalized. All of us in JKR must feel that our knowledge contributions are important to other practitioners and the well being of JKR. We need to develop internal policies to encourage their employees to contribute knowledge, access it, and further develop the value of that knowledge using insights gained from our experience. Culture is often associated with human activity, but today, the culture of knowledge contribution and knowledge creation may also be technologically created. Knowledge tracking for example work at the back end of the system or another department, to gather useful data regarding usage patterns, knowledge versioning, and query entries, which altogether provide important information to JKR or other departments in our value chain. Knowledge ontology or how knowledge is connected is another recent development in which the knowledge management system aids our users to visualize how connected knowledge can suggest different ways of finding meanings or solutions.

Third, our ECKM initiative has to be synchronized within our other organizational efforts in our strategic framework outlined for 2007 - 2010 to achieve improvement and quality. In order to be successful, ECKM must have system-wide perpetration. This would include integration or sharing of data from various databases and department within JKR, and even beyond; and collaboration and links to our other significant external and internal clients who play essential roles to JKR's objectives. The ECKM initiative has also to be worked within the work processes of JKR and our matrix system so that data can constantly be accessed, used, updated, and "pushed" through the pipeline to other colleagues and partners. Once these work principles are in place, they become the catalyst to change the way we interact and share knowledge to achieve JKR vision.



2.3 Benefits of KM system

What will JKR and all of us be able to gain from the ECKM initiative?

ECKM will be designed to achieve process result improvements leading to organizational outcomes. The process improvements involve shortening the time for delivering public infrastructure, saving time, improving project management, increasing staff participation, enhancing communication, making the opinions of our staff more visible, reducing problem solving time, better serving our external and internal clients, and providing better measurement and accountability. These process improvements can be thought of as either relating to communication improvements or efficiency gains. The process improvements will help us to:

- ✓ Reduce cost in specific activities
- ✓ Increased focus for our customers
- ✓ Improved asset management
- ✓ Standardize to offer consistent quality in our projects
- ✓ Contribute towards earned value
- ✓ Improved communication with our external and internal customers

In summary, the organizational benefits of ECKM can be thought of primarily as being of a financial and general improvement in service delivery.

Ultimately, the public will be the main beneficiary with improved and faster completion of nation's infrastructure as our contribution to the National Mission as outlined in our Strategic Framework 2007 -2010.



3 IMPLEMENTING JKR EKCM

At the outset, the challenges of ECKM may sound daunting and perhaps incomprehensible. To many knowledge management practitioners, knowledge management is a costly, political, and ceaseless process—but a process that organizations cannot afford to avoid. A practical question facing JKR regarding knowledge management: “How much does it cost for JKR to forget what key employees know, to be unable to answer customer questions quickly or at all, or to make poor decisions based on faulty knowledge?”

It is this practical approach to implementing ECKM to bring real benefits to JKR that forms the core implementation approaches in this handbook.

3.1 Knowledge Audit

A Knowledge Audit starts by working with you to locate the knowledge you need to solve business problems and the desired ECKM objectives. At this point, as JKR has already established the key strategic framework, a productive knowledge audit will need to concentrate on answering the following question: “In order to achieve the desired objectives, what knowledge do I have, what knowledge is missing, who needs this knowledge and how will they use the knowledge?” that is necessary to achieve JKR’s mission.

Some of you have already been exposed to the on-going interviews as part of a knowledge audit and your feedback is being analyzed to identify key problems and the objectives of the ECKM initiatives. These interviews are but one of the key activities that we are executing as part of the ECKM implementation.

The audit begins by breaking that information into two categories: what knowledge currently exists and what knowledge is missing. Once the



location or source of the missing information is identified, we can begin to structure the relevant information so that it can be easily found by you and your colleagues. At the conclusion of the knowledge audit, the ECKM committee will have the information necessary to design our ECKM.

3.1.1 Identify What is Missing

A common mistake is to limit the knowledge audit to merely cataloging existing explicit information assets, or the information that is documented, transferable and reproducible (e.g. project reports and standard operating procedures). Certainly, we need to determine what explicit resources currently exist and how they might be categorized for more effective use, but we also must identify which additional resources may be missing, such-as industry-specific news required for analysis.

In addition to capturing explicit information assets, ECKM must be structured to capture tacit knowledge. Tacit knowledge is the hand-on skills and experiences of individuals and it is most often the key to the effective solution of many critical business problems. Examples of tacit knowledge include valuable information about a report that the author knows, but has not documented. Tacit knowledge is typically found in the answer to questions such as “Why was the report written?”, “Where else can these results be applied?”, “What was the outcome of this project?” and “Who else understands the report’s contents?” The value of capturing tacit knowledge should not be underestimated. Davenport and Prusak have stated that “having access to knowledge only when its ‘owner’ has time to share it or losing it entirely if she leaves the company are significant problems that threaten the value of the organization’s knowledge capital.”



There are two methods for increasing the transfer of tacit knowledge. One way is to make tacit knowledge more accessible by capturing it as metadata — data about an explicit knowledge asset. Asking subject-matter experts what kinds of questions they most often ask others in the process of doing their jobs is a way to identify what tacit knowledge will have the most value by being made explicit.

Another method for increasing the transfer of tacit knowledge is to make it easier for individuals to identify and contact subject-matter experts. Methods of identifying experts that are enhanced by the application of knowledge management techniques include creating skills databases, online communities of practice, and searchable repositories of resumes or skills profiles.

3.1.2 Organizing Knowledge

Knowledge maps present you with the big picture of JKR's intellectual capital. They allow individuals to navigate our vast resources so they can quickly find relevant information. There are many methods to organize knowledge, some more effective than others.

The most common, but often most ineffective way to map information in a corporate environment is to organize knowledge based on the physical systems where the information resides. This goes beyond a file/directory metaphor to a higher level that shows databases, file servers, document management systems, groupware systems and other knowledge silos, in addition to the individual files contained in those systems. This classification scheme helps you find information quickly because it shows you exactly where the information you need resides. However, it is of little use to those who are unfamiliar with or uninterested in learning the information technology architecture of the organization.



For those who are unfamiliar with, or do not want to learn an organization's IT architecture, a qualitative organization of knowledge assets is more useful than file directory organization. Qualitative organization helps you quickly find the information you are looking for by allowing you to search for it by its topic instead of its location. The qualitative methods appropriate for organizing corporate knowledge assets can be classified as process oriented, functional or conceptual. Process classification uses a generalized model of how our matrix system functions— from understanding customers and projects to managing people, processes and resources—and maps it to the knowledge contained in the JKR.

Functional models, which are loosely based on an organizational chart, commonly exist within companies but tend to work better as a corporate archive or “information morgue.” They are usually not effective for sharing information across functions, since most workers do not have the time to browse through the knowledge assets of other departments in the hope that they stumble upon something useful.

Conceptual models are often the most useful method of classification, but harder to construct and maintain. Conceptual models organize information around topics, such as proposals, customers or employees. These topical areas contain information originally produced by different departments and across functions which helps in transferring knowledge across the organization.

In practice, the best system for helping you quickly find what they are looking for depends on individual preferences, the information required and the clues with which you begin the search. For example, you may know that you are looking for information from a news-feed and that it's stored in the news-feed server. In this case, the classification system that



helps you find the desired information is physical by showing the location of the news-feed system in relation to other physical information systems.

However, if that person is looking for information about a particular project, a physical classification system offers little value because knowledge about that project is likely spread across many physical information systems. In this case, the best classification system is a conceptual knowledge map that includes a project category.

Regardless of how JKR chooses to organize our knowledge, knowledge maps help you contribute knowledge to the system and search the system for knowledge. They characterize contributions in a consistent manner and speed searches for knowledge assets by narrowing the search to a category of knowledge, which can then be searched for keywords appearing either in document text or in metadata. Content must be able to be categorized by multiple knowledge maps so users can employ the organization scheme that applies the appropriate context for quickly locating the information they are seeking.

3.2 Current KM Situation in JKR

In almost every case, the intentions of sharing knowledge are good, even if the definition of knowledge management and the definition of knowledge itself differ. An element of knowledge management states that knowledge management involves a discipline of spreading knowledge of individuals and groups across JKR in ways that directly impact performance.

This impact on performance can take many shapes and forms. The impact can be related to the promotion of "healthy" or smart business activities, the involvement of knowledge stewards in daily activities, the limiting of the risk associated with people leaving JKR, understanding your



needs for knowledge, and making that knowledge, information, and data available to you.

Through the initial knowledge audit conducted, we have identified some key challenges facing us as an organization to achieve the general goals of ECKM. It is important for you to be aware of these challenges so that together we can work together to overcome.

3.2.1 Challenges uncovered

Knowledge silos. The main challenge facing JKR today is we currently create and maintain knowledge in isolated systems or “knowledge silos” that provide adequate functionality for a specific workgroup or business process, but are often invisible to or unreachable by others in JKR. This challenge is exacerbated by the matrix organization structure, for example, the roads and geo-engineering department has now been re-organized into 3 separate units comprising of Design, Construction and Maintenance units. Project files, circulars, designs which are immensely valuable to the members of the Design unit who know where the database exists, what is contained in it, and the commands to access and update it. But the information contained in the knowledge silo is hidden or inaccessible to others or units and even the corporate headquarters that may require precisely that kind of knowledge. Other examples of knowledge silos include file servers, personal computers who are assigned to individuals and personal physical files categorized based on an individual’s initiative (e.g., policy and procedures systems, resume systems, etc.).

Best Practices and Processes. While there is a desire to share knowledge, the underlying systems and policies did not provide adequately for the sharing of best practices and the building of consistent processes. Different JKR teams in different units often develop what are termed “best practices” - processes and standards that are to be the target



for the work of their teams. In JKR with multiple departments, multiple buildings, spread out over the city and states, there are potentially “best practices” that are developed for each location by the various units as part of the matrix organization structure. While this type of development of practices works quite well, there is a cost associated with duplication of effort when best practices are not shared. This cost can be associated to the man power that is wasted when recreating what already exists. This cost can be associated with a lack of consistency in how decisions are made, how problems are handled, how employees are managed, etc.

As an organization, JKR stresses on consistency in process and decision making which provides a key concern to be addressed by the ECKM. JKR that wishes to establish "the JKR way" require a means to share that way with new employees, employees in remote locations. Sharing best practices and building consistent processes are two of the major business impacts desired of ECKM.

Brain drain. When a JKR employee leaves the organization, they take the majority of their knowledge and all of their experience with them. Attrition is a major cause of “brain drain” within corporations and is especially damaging for an organization like JKR with its multiple departments and responsibilities.

For JKR to attempt to capture departing employee’s knowledge -- time is short, incentive to share is decreased, projects are being handed over, and the departing employee is busy through their final days. This leaves little or no time for the departing employee to share their knowledge. If a JKR employee is expected to record what they know in a reusable format, there is much less risk associated with that person’s departure.



Employees morale. Another truth is that valuable employees can become dissatisfied with their job when they are not provided with the knowledge that they need to be successful. This potentially demoralizes employees and places them into a position to consider alternatives. Employers that provide employees with knowledge sharing environments have an advantage over companies that don't when it comes to employee satisfaction and the evaluation of growth potential when making their career plans.

On another side of the same issue, JKR by facilitating knowledge sharing have an additional selling point when attempting to attract new employees. By recording knowledge and encouraging the sharing and spreading of knowledge, JKR will be able to make new employees productive quicker and more effectively. This "ramp up" time and time to bring a worker "up to speed" can be dramatically reduced if shared knowledge is made available through the ECKM.

Instant access. JKR has individuals that are invaluable because of their knowledge and the experience from which they draw. These individuals are called upon time and time again to answer questions, provide assistance, provide support, and basically lead the way. These employees often work many extra hours because their knowledge is so critical and they need to put in the extra hours to get all of "their" work done. These employees are always expected to be there when needed. In this day and age, this expectation is somewhat dangerous.

It is easy to understand the risks of losing this person (or these persons) when they leave JKR for any reason. It is not as easy to understand the risks associated with needing this person around the clock or in multiple places at one time. It is not possible for everyone to be there for everyone all the time. Recording knowledge and making that knowledge available



through the ECKM portal 24x7 takes care of that problem. Granted, it is not particularly easy to duplicate the knowledge of the "experts"; especially when that "expert" is too busy to focus on becoming less busy but the necessary incentives would need to be in place to effect that "digitization" of the domain knowledge.

Knowledge Asset Management. An asset can be defined as a physical asset or as a piece of knowledge that exists in a format that can be classified, cataloged, and retrieved. A knowledge asset can be a document, a spreadsheet, diagram or plan that can be cataloged and classified in the metadata database, researched, and found helpful for a business or project purpose while a physical asset can be a building, a personal computer or physical equipment that belongs to JKR.

Knowledge in someone's head is not an asset until it is recorded. A drawing on a napkin over lunch is not an asset -- A phone conversation is not an asset -- A series of emails is not an asset -- A video-conference is not an asset ... until it is recorded. Recording can be done via text, graphic, audio, or video into a classifiable format. Knowledge exists in all of these, but that knowledge does not become an asset until it is recorded and cataloged.

At the moment, JKR while having some of these assets does not have a corporate policy that ensures that these assets are captured, categorized and shared.

3.3 Meta Data & Classification & Search

Defining metadata area would form one of the backbones of ECKM, especially for capturing tacit knowledge. Just like "data metadata" is the information about the data and information systems that exist in JKR, the



“knowledge meta data” is the information about the knowledge that has been cataloged and classified by JKR. Being able to identify specific knowledge when it is needed has, perhaps, the greatest impact on the bottom line. If you have a question, you want to be able to find the answer. The answer is in the knowledge. The ability to find the knowledge is through the metadata.

In order to catalog the JKR’s knowledge, it will be necessary to create a database that will store the metadata and you must be able to access the metadata. Whether the database is built or bought can be based on available know-how of how to create a meta model and database. Either way, the knowledge metadata model (meta model) must be made available and the database must be extensible to take on new aspects of knowledge and classification values.

Before knowledge is cataloged in the metadata database, an organizational schema must be developed to identify key locator and search information about the knowledge that will be cataloged. For example, the knowledge may need to be broken down by -- who can see it (management level) -- what business areas it applies to (subject matter) -- what type of knowledge it is (check list, project plan, etc.) -- when it needs to be reviewed -- ... and on and on.

Once the metadata database is built and the classification and organization schema is built, the next step is to start classifying the knowledge into the database. Initially this may require a team of individuals that focus on entering submitted pieces of knowledge.

The more detailed the classification, the easier it will be to narrow the search. But it will also mean it will take longer to enter and manage each piece of knowledge. Worthless options in the search option may impact



engine complexity and performance potentially making the search for data more confusing.

Also, the amount of time it takes to classify a document is something to consider. We need to gauge how much “pain” you will be willing to tolerate to get your knowledge cataloged and strike a balance. The time to catalog becomes important when you are trying to catalog 50 documents from 20 business areas for 1000 pieces of knowledge.

Therefore, it is important for ECKM to develop an easy-to-follow (that is, well thought out, defined, and documented) workflow for knowledge to make its way from the creator, through the steward, past the approver, and into the database. This workflow will be shared time and time-again as more of you become involved in the ECKM.

3.4 Possible Approaches to JKR Knowledge Map

The Knowledge Map, also known as Taxonomy or Information Architecture, provides a means to represent all the assets in JKR within a hierarchical structure. This technique of visualizing the assets in a taxonomy structure provides a condensed view of the relationships between the assets and their related categories within a single user-interface. The taxonomy structure allows for categorization and searching of information in a structured manner using an intuitive interface.

The taxonomy is exhibited in a tree structure containing sub-trees (branches) and nodes (leaves) (Figure 5). Each sub-tree can contain further sub-trees or nodes. There is no physical limitation to the number of levels of sub-trees that can be created although for practical reasons it is usually limited to no more than 4 or 5 sub-nodes. Each sub-tree represents a category with the parent sub-tree representing a broader

category for its child sub-trees. Each node is a pointer to the taxonomy representing the association of an asset within the category it is residing.

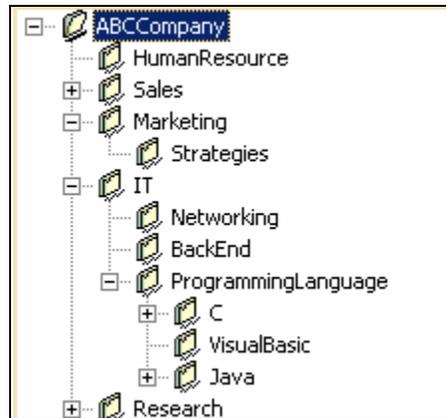


Figure 5: An example of a Knowledge Map representation

A suitable design of the taxonomy for JKR is a critical success factor that will determine the usefulness of the taxonomy. A suitable taxonomy would take into consideration the following three factors:

- ✓ The type of users in the organization,
- ✓ How they access organizational resources, and
- ✓ What is their business processes.

The type of users in JKR will determine the complexity level of the taxonomy. Users working within a restricted domain can typically handle a complex taxonomy with a well-defined domain specific structure while general users might appreciate a taxonomy that describes broader concepts or categories.

How you will access organizational resources would determine the design of the different levels within the taxonomy. This would determine whether



the taxonomy would exhibit the different levels in terms of functional groupings, different business processes or simply classifications of different document types.

The business processes within JKR would provide additional considerations concerning the overall design of the taxonomy in terms of administrative requirements and maintenance. Different organizational sub-units may require a centralized or decentralized mode of administration depending on their typical business processes or the type of information to be contained with the taxonomy.

Our taxonomy may be designed to map to our matrix organization structure and how information is transferred throughout the entire process. A possible design for the JKR taxonomy may have three distinct layers, namely, the process layer, the services' layer and the enablers' layer. An alternative taxonomy would be Technology Cluster layer, services (or subject headings) and the enablers (specific types of information).

During the design of the JKR taxonomy, it should be considered if certain users from specific units or departments may access certain first layer nodes more often than the other nodes due to the nature of their work (e.g. designers looking for best practices in design will focus on the Design node more often than other nodes). Therefore, the general consensus is that each first layer node will exhibit a copy of all second layer nodes, while each second layer node will exhibit a copy of all third layer nodes. This intended design ensures that all users will be comfortable navigating through any of the first level nodes as the following hierarchy for the subsequent layers is identical, thus reducing the familiarization curve for navigating through the taxonomy. However, each third level node may or may not exhibit additional fourth level nodes depending on individual requirements.



Another design issue that was taken into consideration is the usability of the taxonomy. It is important that the taxonomy should be sufficiently comprehensive to allow for effective mining into the desired concepts, and yet not excessively complicated to discourage new or potential users. As such, the final design has to provide a tradeoff between comprehensiveness of the taxonomy and its user-friendliness.

An example of the various layers using a process-based approach is listed as follows:

First Layer - Process

- Business
- Specialist
- Management

Second Layer - Services

- Design
- Construction
- Maintenance
- Training and Seminars
- Risks
- Feedback

Third and Fourth Layers - Enablers

- Policies and Procedures
 - ▲ Contracts
 - ▲ Agreements
 - ▲ MOA
 - ▲ MOU
 - ▲ Best Practices



-
- ▲ Project Management
 - ▲ Project Schedules
 - ▲ SLA
 - ▲ Reports
 - ▲ Minutes of Meetings
 - Segments
 - ▲ External Customers
 - ▲ Internal Customers
 - ▲ Special
 - Techniques
 - ▲ User Surveys
 - Research
 - ▲ Internal
 - ▲ External
 - Templates
 - Standards
 - Collaterals
 - Vendors and Suppliers
 - Partners
 - Events
 - Evaluation
 - Technical Competency Dictionaries
 - Functional Competency Dictionaries
 - Behavioral Competency Dictionaries

An example of the various layers using a technology-cluster approach is listed as follows:

First Layer – Technology Cluster

- Electrical Engineering
- Mechanical Engineering



-
- Geo-Engineering
 - Information Technology
 - Telecommunication
 - Advanced Engineering

Second Layer - Services

- Recent Updates
- Technology Brief
- Market Developments
- Applications / Products
- Players
- Images
- R & D
- Regulations

Third and Fourth Layers - Enablers

- Analysts
- Partners
- Companies
 - ▲ Vendors and Suppliers
 - ▲ Partners
- Templates
- Standards
- Collaterals
- Events

Our organizational knowledge can also be dissected in other various dimensions, namely, private-public, component-architectural, individual-collective and explicit-tacit. As we embark on ECKM taxonomy, a shared understanding of the classification of organizational knowledge is an



important step towards achieving the objectives of ECKM. Communication among all of us can be greatly facilitated when specific terms are used to refer to a particular type of organizational knowledge. In addition, more efforts will be expended to discover the sources of competitive advantage for JKR.

4 STRATEGIES FOR DEVELOPING ECKM IN JKR

A wealth of knowledge exists in JKR, but more often than not this knowledge has often been managed implicitly and without specific focus. ECKM will pursue explicit, systematic, and enterprise priority driven approaches to develop a distributed, non-bureaucratic enterprise-wide practice that is part of our work environment to enhance JKR performance (Figure 6).

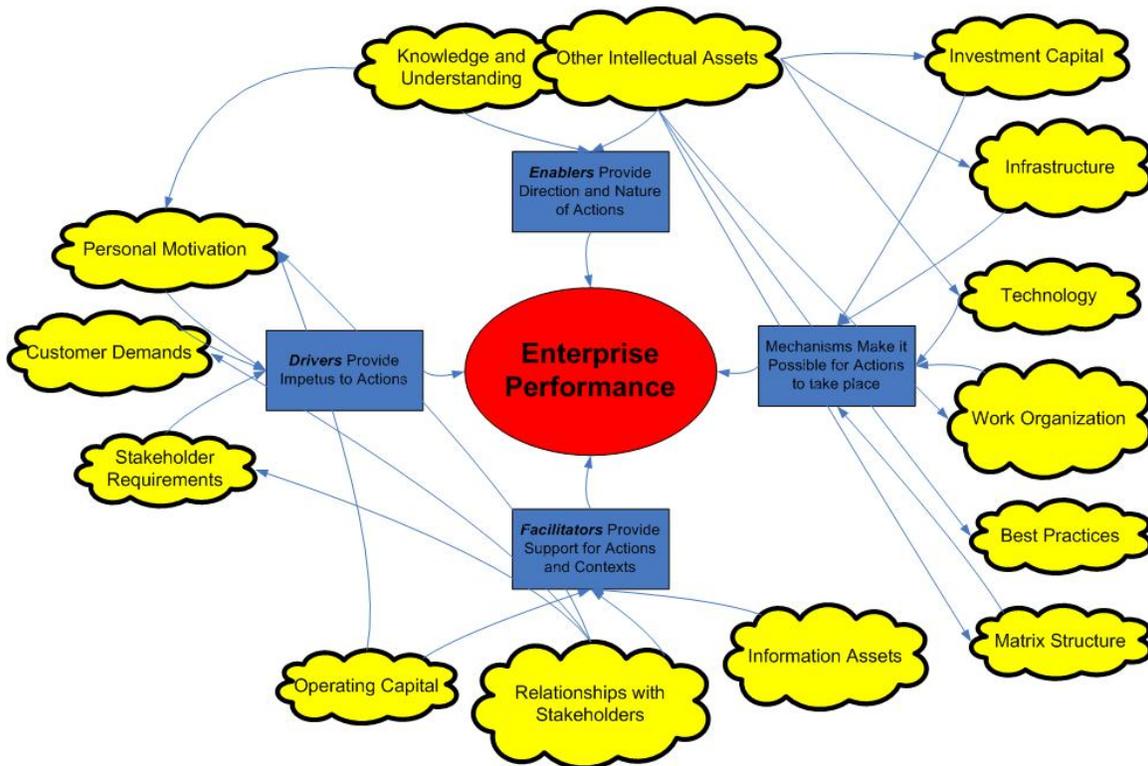


Figure 6 Perspective of the Role of ECKM in JKR Performance

ECKM will include deliberate efforts to:

1. Identify what knowledge needs to be created and maintained – including the knowledge desired for our deliverables for the public infrastructure and expertise that needs to be available at points-of-action for delivery of desired projects and service paradigms.



2. Create, transform, and provide (learn and deploy) the required knowledge and ascertain that it is continually renewed.
3. Ascertain that all available knowledge assets are diligently leveraged wherever appropriate through use or exploitation.
4. Govern knowledge management-related processes and relationships by providing enterprise-wide support, infrastructure, and leadership.

ECKM will also pursue sub-practices that in combination contribute to the overall success. We will focus vigilantly on making knowledge work effectively as chief enabler of enterprise performance. These sub-practices include efforts to:

- ✓ Focus the ECKM vision and practice to align with enterprise direction.
- ✓ Provide effective governance for the ECKM 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 and individual’s own interest.
- ✓ Practice accelerated learning – by pursuing a broad range of knowledge transfer activities to ascertain that valuable knowledge is captured, organized and structured, deployed widely, and used and leveraged. The impetus is on making important knowledge 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 metadata, and by providing



-
- information and other resources necessary to deliver quality work products that satisfy work requirements and service paradigms.
- ✓ Provide opportunities – by placing you in situations where you can use your capabilities.
 - ✓ Give permission – by providing you with safe environments in which to do your work and have understanding of how far you can improvise enterprise guidelines and policies to serve individual situations and customers.
 - ✓ Foster motivation – by motivating you 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 yourself.
 - ✓ Create supportive infrastructure capabilities – by including extensive IT applications.

ECKM will be for any potential activities which fall into four main functional areas:

- ✓ Governance functions to direct and support ECKM-related efforts throughout the enterprise from enterprise perspective and goals.
- ✓ Staff or infrastructure functions that support ECKM objectives and individual activities of many kinds including supporting capabilities like special expertise teams, institutions, and technological facilities.
- ✓ Operational functions to obtain and create knowledge and to capture, organize, distribute, and manipulate it.
- ✓ Functions to realize the value of knowledge-related investments through understanding of 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.

ECKM recognizes that enterprise strategy will be guided and decided by our top management who convenes regularly in Mesyuarat Pengurusan Tertinggi.



However, strategy implementation frequently is achieved through the minute ‘decisions-in-the-small’ that you make as part of their daily work, especially when the sector leaders meets regularly meeting with their respective branches in Mesyuarat Ketua Sector. Strategy and business direction is most often implemented in the field and depends on ECKM to build shared understanding of enterprise direction and intents.

When pursuing ECKM, 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.

JKR have broad responsibilities in pursuit of societal objectives. JKR 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 JKR. Responsibilities extends to govern and facilitate other knowledge-related and affected areas, particularly preparing effective policy partners, building and leveraging societal knowledge, and building and maintaining a capable and competitive workforce. Figure 7 indicates examples of ECKM actions in the four areas. Furthermore, the responsibility also includes creating and governing the overall vision, perspective, and strategy for the society’s general ECKM practice.

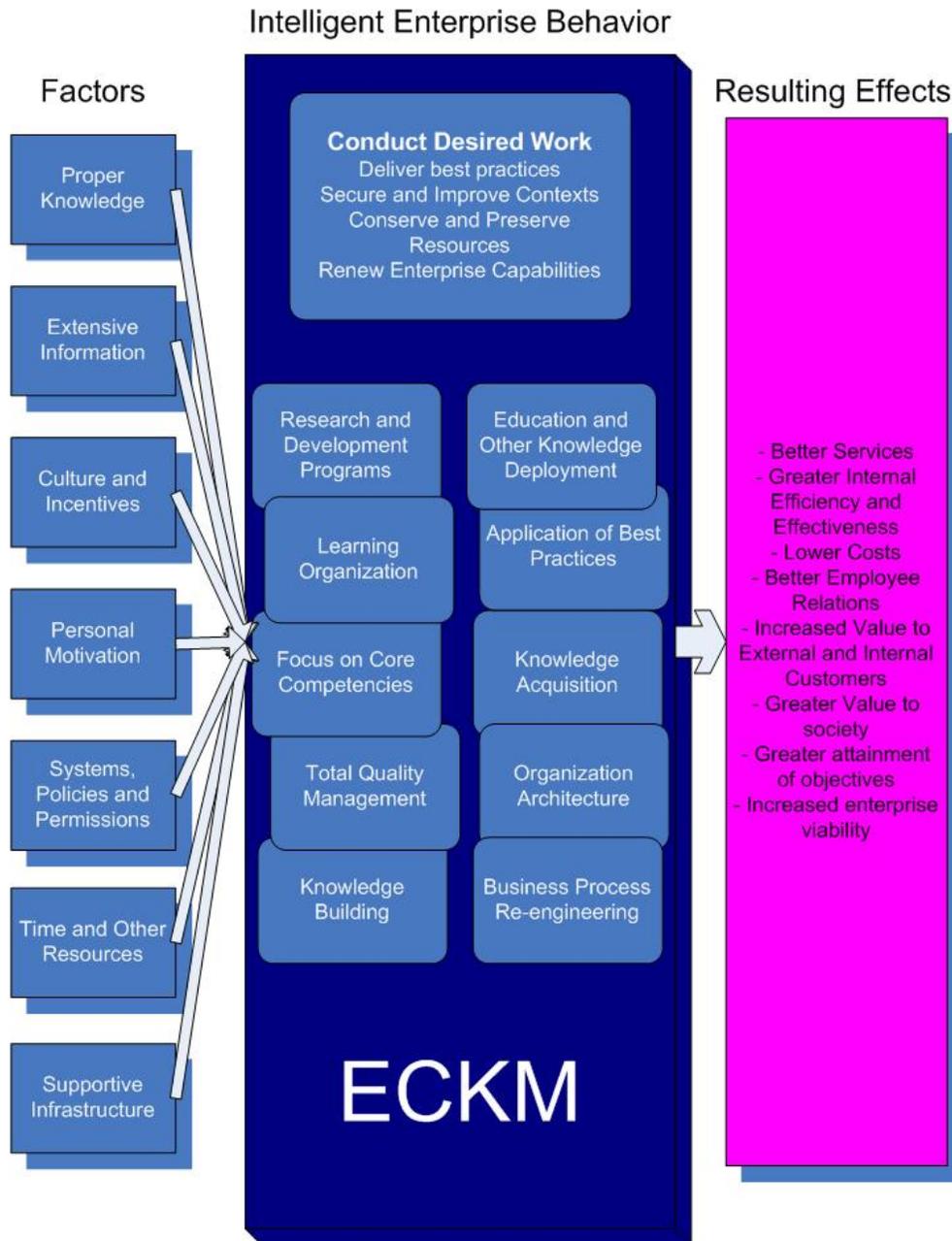


Figure 7: Factors leading to objectives

Starting any new practice – and ECKM is not different – requires a 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 ECKM 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 planned to build a broad ECKM that reaches all intended areas and parties and produces the capabilities and results that are envisioned. Some ECKM potential governing steps to start a broad ECKM include:

- ✓ Identify people who are conceptual drivers for ECKM and rely on them for guidance.
- ✓ Develop vision for the public ECKM for all locations.
- ✓ Create the ECKM office function.
- ✓ Create taxonomy covering the overall responsibility area of JKR with special emphases on delivery of public services, preparation of the public as effective policy partners, building and leveraging public and private knowledge, and development of citizens as capable knowledge workers – all considering capabilities, opportunities, needs, and constraints.
- ✓ Develop knowledge-related policies and obtain legislative commitments and funding for the overall program.
- ✓ Govern the overall knowledge – related practice.

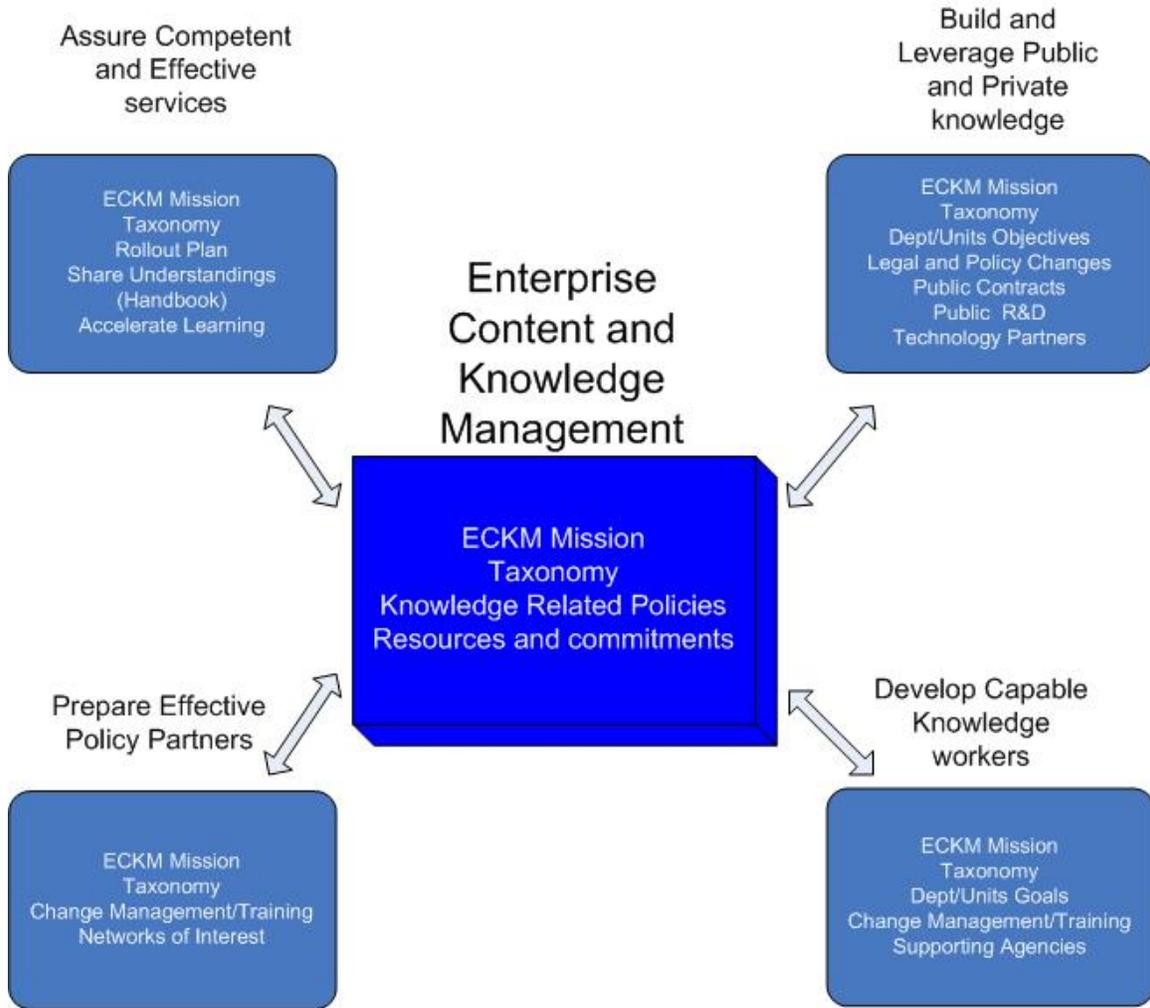


Figure 8: Elements of JKR ECKM

Another key element of our strategy is to enable essential value of the ECKM system, which is the use of the information and knowledge within the system, to initiate new thinking and new perspectives. The strategies include:

- ✓ Map knowledge capabilities, opportunities, needs and constraints
- ✓ Measure intellectual capital and create an intangible asset monitor
- ✓ Create collaborative work practices
- ✓ Foster communities and networks of practice



-
- ✓ Capture and transfer expert know-how
 - ✓ Capture and transfer expertise from departing personnel
 - ✓ Capture decision reasoning
 - ✓ Lessons learned system

Information can be acquired formally and informally. Formally, standard operating procedures may require you to deposit information you have in stipulated periods of times, or at various points in your work process. Informally, you may also contribute your own information as and when to they have the resources to do so. Technologically, it is also possible to “discover” new information by various forms of information query. Below are listed some ways that information can be acquired in JKR:

- ✓ After Action Reviews
- ✓ Outcome Feedback
- ✓ Expert Networks
- ✓ Knowledge Discovery from Data
- ✓ Performance Support Systems and Knowledge-Based System Application
- ✓ Deploy knowledge bases in and outside JKR
- ✓ Information mining technology tools for knowledge management

As the ECKM is implemented, we will 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 ECKM activities, IT-related support activities and infrastructures are also 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 9 where the joint infrastructure activities are separated from activities that serve particular purposes. In addition, we will also identify implementation sequences such as those that should be considered for implementation in Round 1, Round 2, and so on. Building the infrastructure for ECKM within JKR 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.

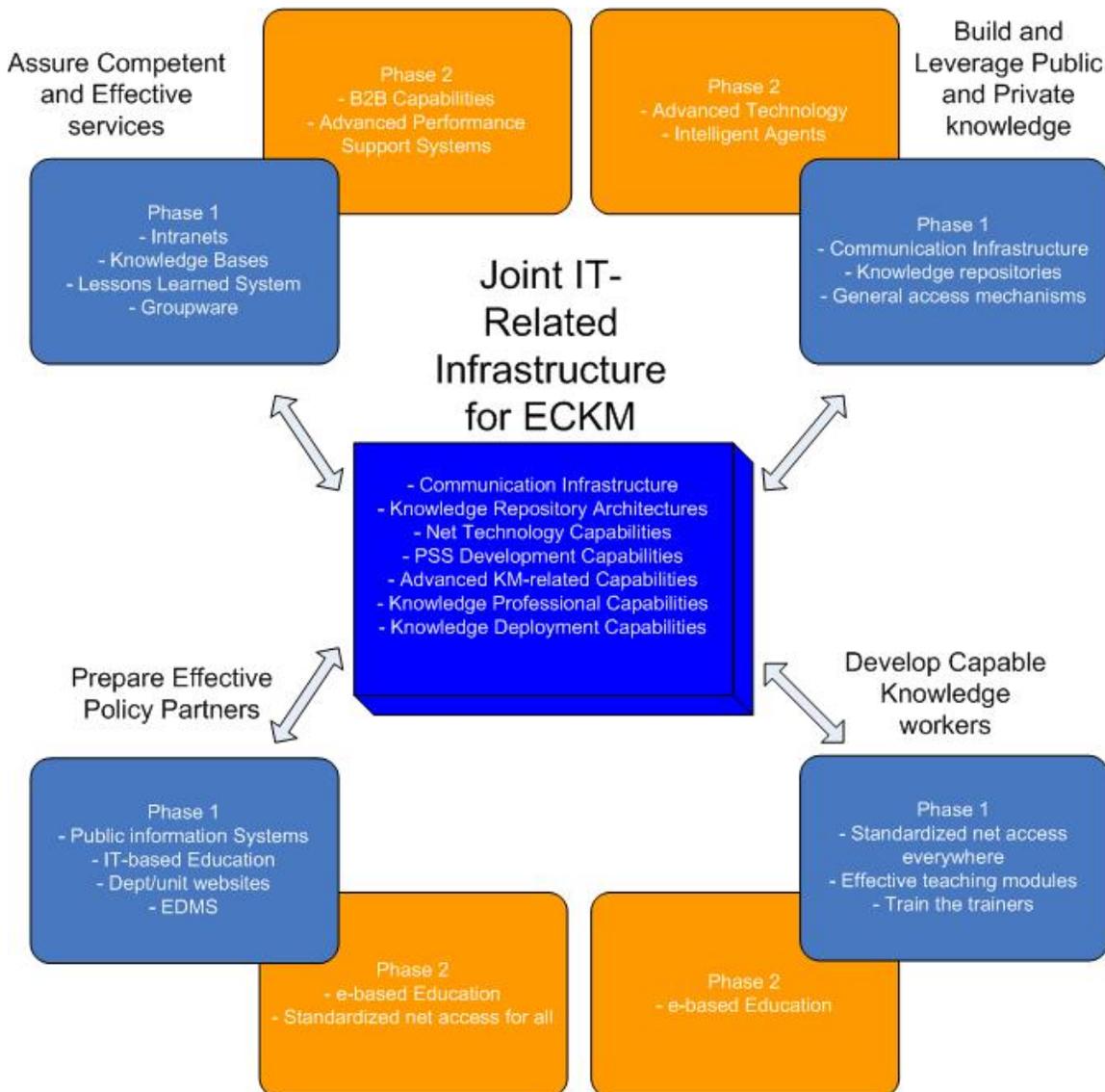


Figure 9: IT-Related Elements of ECKM



5 PLAN OF ACTION

This ECKM Handbook is just a start to introduce the principles of knowledge management and the ECKM initiatives.

The ECKM Committee has lined other crucial milestones:

- ✓ Policies and Roadmap for ECKM,
- ✓ Strategies and Roadmap for Enterprise Taxonomy,
- ✓ Assessment Tools and Technology for Content and Knowledge Management,
- ✓ Enterprise Knowledge Portal JKR – a prototype, and
- ✓ Training for knowledge managers.

ECKM will support our core competencies as well as operational and administrative efforts of JKR in order to enrich the entire JKR community.

These milestones are based on a practical approach to implementing ECKM to bring the desired benefits to our organization.

Broadly, ECKM will embark on the following phases to define and design ECKM:

Phase 1: Defining the functionalities of the Knowledge Management system for JKR

- ✓ Defining what repositories to develop, what information is important, and who has the information and who will use the information for what aspect of their work and develop a taxonomy to categorize

Phase 2: Develop Technological infrastructure including

- ✓ Collaborations to gather the necessary information and to “push”/share the information to various users: clients, officers, supervisors



-
- ✓ Communication networks/collaborative networking

Phase 3: Usage of system

- ✓ Develop and Use of e-applications for all work flows
- ✓ Maintenance of new tables to capture new types of data/information
- ✓ Updating of procedures and manuals relevant to work flows
- ✓ Integrating data about clients or assets from various data bases

Phase 4: Policy development

- ✓ Policy for Knowledge contribution
- ✓ Policy for Data/Knowledge maintenance
- ✓ Policy for the Use of information in monitoring and planning stages
- ✓ Policy for collaborating and re-using data from other agencies
- ✓ Policy for incentives for knowledge users, contributors

Phase 5: Using Enterprise Knowledge Management as strategic business analytical tool

- ✓ Develop analytical tools to manage, supervise and evaluate projects
- ✓ Develop related tables to ensure parallel updates
- ✓ Develop interfaces for upstream and downstream users and processes to create and enhance on value chains



6 CRITICAL SUCCESS FACTORS

The success of any enterprise depends on the interplay of many factors. While some are beyond the influence or control of the enterprise, others depend on the strategic moves taken by its leaders. More importantly, it depends on how the enterprise arranges its internal affairs for operations and service delivery through initiatives, practices, and allocation of resources. Figure 10 provides an overview of a particular perspective of how enterprise performance is the result of management philosophies and practices, deliberate and systematic KM, allocation of resources, scoping of jobs, and assignment of employees. The success factors affect the ability to handle situations to the best advantages for the enterprise, individual employees, and other stakeholders.

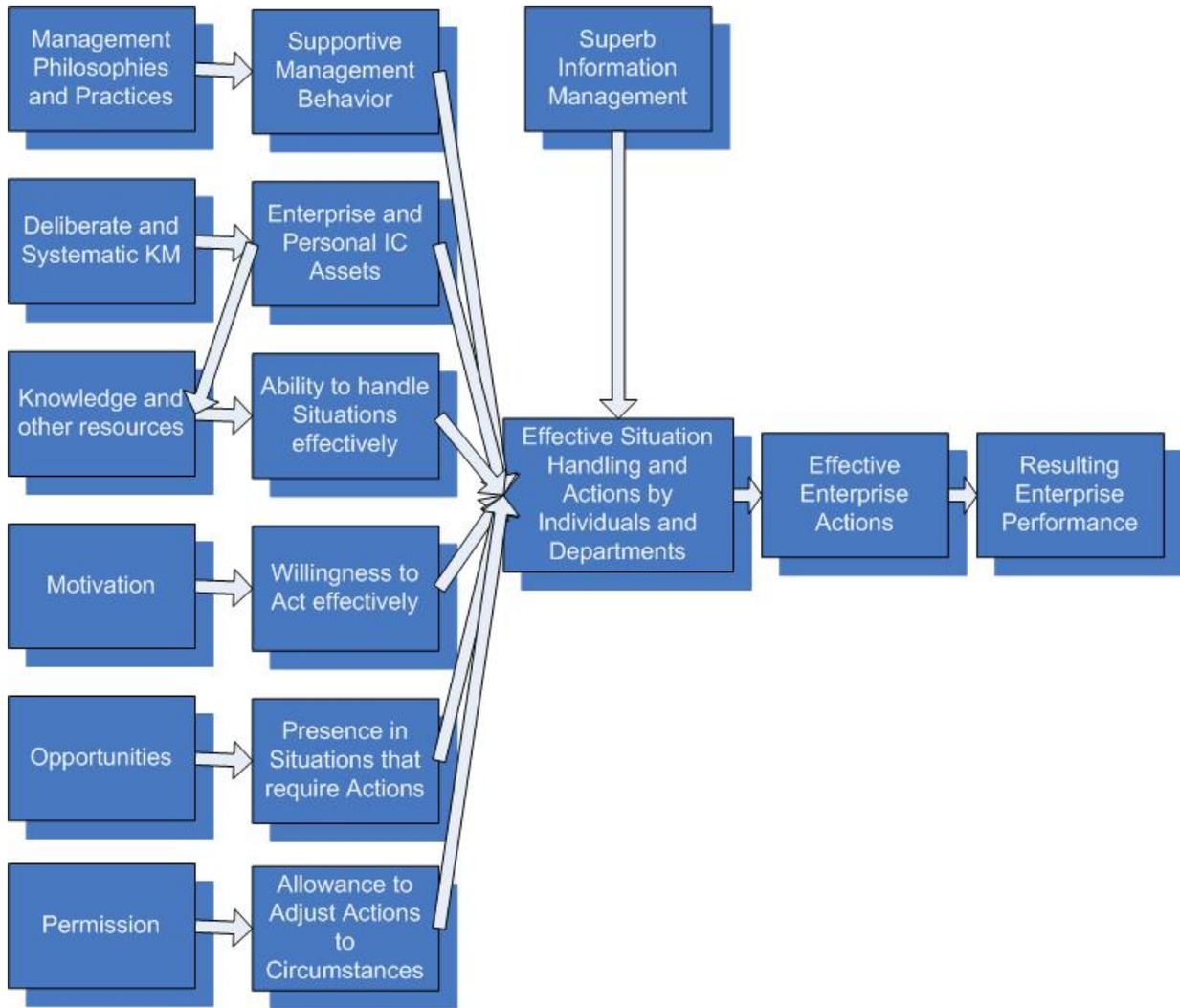


Figure 10: The Path to Organizational Performance

The path to enterprise performance starts with management philosophies and practices and with deliberate and systematic knowledge management. These and other factors influence capabilities and behaviours that lead to effective actions.

6.1 Management Philosophy and Practice

A basic requirement for intelligent operation of the enterprise is a management philosophy that supports effective behaviour of people and



operational units. In particular, people will act effectively and responsibly when satisfied with their conditions, given the chance to contribute, and when they understand that it is in their interest to do so.

There is also a significant group of people who are reluctant to assume responsibility and prefer to work in supportive roles. They will need to be acknowledged and included when collaboration teams are structured and evaluated. In most instances, people who wish to act in support roles are crucial for performing the enterprise's basic work tasks.

Management philosophy must support changes in the enterprise culture, particularly through practices and incentives to approve and foster new behaviours that must become "this is how we do things around here."

6.2 Deliberate and Systematic Knowledge Management

If we believe and accept that personal knowledge and organizational/structural Intellectual Capital (IC) assets in general are the most important factors behind enterprise success, then these assets must be managed diligently. These assets must then be created, renewed, and exploited for the greatest benefits for all concerned by deliberate and systematic KM. That will include a widespread intellectual asset management mentality and culture. The purpose of KM is the systematic, explicit, and deliberate building, renewal, and application of IC assets to maximize the enterprise's knowledge-related effectiveness and the returns from these assets.

6.3 Knowledge and Other Resources

Professionalism, craftsmanship, navigational knowledge, meta-knowledge, information, and other necessary resources must be made available for employees to deliver quality work products that satisfy the situational requirements and the general service paradigm. Employees must possess



the requisite skills and attitudes and be supported in their ability to think critically and creatively by being provided with relevant meta-knowledge. They must be provided with all other essential resources to handle situations appropriately.

6.4 Motivation and Personal Energy

Employees must be energized and motivated so that they are willing to act effectively, efficiently and intelligently, i.e. “to do the right thing” by knowing that they are provided with understanding and have emotional acceptance of how their actions will be of value to stakeholders, to the enterprise, and, most importantly, to themselves. In addition, they must have the secure understanding that “doing the right thing” and “doing the things right” can be accomplished with the available resources.

According to Loehr & Schwartz (2003), energy is a necessity for success — personal energy to pursue situation information, search and innovate aggressively to identify and create the best approaches to handle situations, act decisively, and monitor with strong leadership.

6.5 Opportunities

Employees must be placed in situations that offer them the opportunity to contribute and use their capabilities for the betterment of the organization. Frequently, organizations fail to take advantage of the important expertise possessed by many of their employees and that result in less than desirable quality of work and unhappy employees who feel they are being neglected. A totally different kind of opportunity that has resulted in highly valuable innovations is created when employees, as well as outsiders, are allowed to collaborate or meet informally to explore ideas and potentials for new approaches, solutions, and products and services (Wiig, 2004). Work flows must be organized to take advantage of people’s capabilities and to exploit the potentials for innovation and application of diversity.



6.6 Permission

Employees must be provided not only with a conducive environment to work in but also a safe one for them to do their work. They must be given the authority that matches their capabilities and expertise to provide them decision rights to adjust actions to correspond to the requirements of the situations they handle. They must be encouraged to innovate, improvise, and “stretch” enterprise policies and practices beyond predetermined scopes and standards to serve the organization and its stakeholders’ best interest. They need to be given permission to adjust actions given the organization’s strategy, tactics, policies, and intents. At the same time, however, they must accept responsibility and accountability, act creatively and responsibly, and be accountable for their actions.



7 GLOSSARY

After Action Reviews (AAR)

Three questions drive the AAR method: What happened? Why did it happen? What should we do about it? The purposes of AAR are to: Improve the accuracy and detail of feedback available to sector leaders and employees; Identify collective and individual strengths and how to leverage them; Identify collective and individual deficiencies and how to correct them; Reinforce and increase the learning that took place during a business activity; Increase interest and motivation; Guide the individuals and groups towards achieving performance objectives; Identify lessons learned so that they can be applied to subsequent activities or tasks; Increase confidence in performance capability; and Increase proficiency of all participants. These learnings are compiled, edited, and stored in ECKM for further studies and to be available in future situations.

Best Practices

Best Practices or "lessons learned" capture the most successful or recommended practice or procedure. For example, you may document a Best Practice for a specific business problem, a repair procedure, or possibly a design procedure, depending on the nature of your unit.

Change Management

Change management is the process, tools and techniques to manage the **people-side** of change to achieve the required business outcome. Change management incorporates the organizational tools that can be utilized to help individuals make successful personal transitions resulting in the adoption and realization of change. This is important as for the ECKM to succeed, it is imperative that JKR creates a collaborative culture may require redesigning organizational values and implementing incentives to encourage participation in meeting organizational goals.



Contribution

The process of adding knowledge that is to be stored and shared into the ECKM.

ECKM

JKR's Enterprise Content and Knowledge Management initiative.

Explicit Knowledge

Explicit knowledge is knowledge that can be easily codified, packaged, and transmitted. Traditional documents, spreadsheets, e-mail, and audio/visual presentations are all examples of explicit knowledge.

Expert Mining

The process of identifying and connecting with an expert in a specific field or domain.

Expert Networks

Used to provide formalized capabilities for workers in the field to consult or collaborate with topic experts on complex or unfamiliar tasks. Several mechanisms and infrastructure elements may be used to create and support an expert network. They include: (a) Guides to "who knows what" in the form of "yellow page" systems on intranets, knowledge inventories, or knowledge roadmaps; (b) Policies that permit knowledge worker access to experts; (c) Budgets for experts to help knowledge workers; (d) Communication channels that range from on-site expert visits, face-to-face meetings, telephone consultations, e-mail, groupware-based communication, video conferencing, and so on; (e) Learnings capture systems to build frequently asked questions (FAQ) help systems; and (f) Outcome feedback analysis and capture systems.



Info-famine

Info-famine refers to an apparent lack of information resulting in a user not being able to find or access useful information.

Info-glut

Info-glut refers to the excess quantity of irrelevant information received by a user, typically through e-mail, "push" technologies, or by using tools with low accuracy, such as some Internet search engines.

Knowledge Asset

Information from various sources can be stored in a normalized form in the ECKM. Each metadata set is called a Knowledge Class and each instance of a Knowledge Class is called a Knowledge Asset. A Knowledge Asset is made up of metadata fields (that may contain for example, the title of the asset, author(s) and contributors) attached documents, binary files, links to Web pages, and so on.

Knowledge Discovery from Data (KDD)

Uses sophisticated statistical or automatic reasoning methods to identify patterns of interesting cause-effect relationships.

Knowledge Map

Knowledge Maps are hierarchical classification schemes for knowledge. They may be modeled after the organizations functional structure, the physical systems in which the information resides, underlying processes, or various conceptual schemas. Knowledge Maps are also referred to as **taxonomies**.

Knowledge Mining

The process of searching and retrieving knowledge from the ECKM.



Knowledge Silos

Isolated information systems or applications (for example, electronic discussion groups, relational databases, specialized text repositories, intranet servers, and document management systems), which provide adequate functionality for specific workgroups or business processes. However, these systems are often inaccessible (or completely unknown) by others in the organization that could benefit from the explicit knowledge contained in them.

Metadata

Meta is a prefix that in most information technology usages means "an underlying definition or description." Thus, *metadata* is a definition or description of data and *metalanguage* is a definition or description of language. See also Knowledge Class.

Outcome Feedback

How work products perform in the external or internal customer environment is necessary information on which to base work performance assessments.

Performance Support Systems (PSS) and Knowledge-Based System (KBS) Applications

A computer-based system which contains explicit or implicit domain knowledge used specifically for reasoning about specific situations. Examples of KBSs are case-based reasoning (CBR) systems, expert systems, and neural nets. With systematic perspectives encouraged by ECKM, the reliance of automated knowledge and reasoning may be increased for the benefit of JKR. Instead of being considered as standalone or relatively isolated solutions to relieve particular critical knowledge-related functions, knowledge-based systems (KBSs) can be considered as integral building blocks within ECKM perspective.



Tacit Knowledge

Tacit knowledge is knowledge that is personal, context-sensitive, and difficult to capture and transmit. Knowledge and skills essential to your job, which only you know, is an example of tacit knowledge. This knowledge is often “locked inside people’s heads” and is usually transmitted in casual manners, such as personal conversations or demonstrations. Knowledge Experts, defined within the Knowledge Management Suite, are people who possess tacit knowledge.

Taxonomy

Taxonomies are hierarchical classification schemes for knowledge. They may be modeled after the organization’s functional structure, the physical systems in which the information resides, underlying processes, or various conceptual schemas. Taxonomies are also referred to as Knowledge Maps.