Malaysian Administrative Modernisation and Management Planning Unit (MAMPU)

Knowledge Management Blueprint

Final

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Executive Summary

The Knowledge Management Blueprint depicts the strategies and recommendations for setting up the Knowledge Management initiatives within the Malaysian public sector environment. As the basis of the strategies formulation, assessments and analysis have been conducted in the areas of business and technical environments to ensure alignment with the national aspirations and stakeholders demands.

Based on the findings, majority of the government agencies' perception with regards to Knowledge Management (KM) is that they do not have a knowledge management strategy in place. However, upon further investigation and probing, it is found that some of these agencies are using some of the knowledge management tools that exist within the public sector's Enterprise Wide Applications as well as their own respective agency specific applications that can be considered as Knowledge Management.

ICT Strategic Direction

The Public Sector ICT Strategic Framework below depicts the strategic thrusts and key focus areas that the public sector has to develop in order to achieve its vision in becoming a citizen centric public service.

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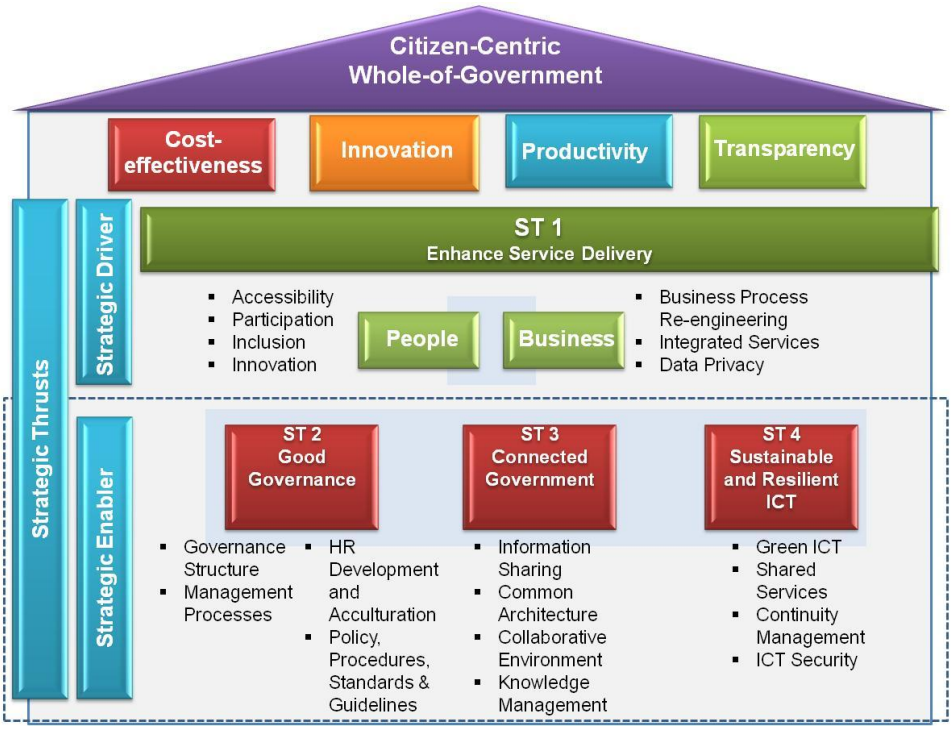

Figure 1: Public Sector ICT Strategic Framework

A *Citizen* Centric and *Whole of Government Approach* public service means that the public sector must meet and exceed the expectations, preference and needs of Citizens and Businesses through:

- Identifying citizens & business requirement & needs;
- Designing services around the needs of citizens and businesses;
- Providing services through modern, coordinated delivery channels and gateways;
- Providing customisable services to suit the preference and liking of citizens; and
- Increasing government's professionalism in terms of the planning, delivery, management, skills and governance of ICT enabled change.

- Practice higher levels of inter-agency collaboration that is applied to policy formulation, programme development and delivery

The expectations mentioned above demand that the government adopt the qualities of a **Cost Effective**, **Innovative, Transparent and Productive Government**. The Cost Effective government will practice value management to reduce public finance wastages and to ensure public spending is utilised properly. The Innovative Government will provide citizens with newly designed creative services that enable quicker response / delivery time with high quality through the use of modern delivery channels. Next, the Transparent Government will practice the highest standards of ethical conduct and good governance to improve transparency and public confidence in the integrity of government transactions. The Productive Government on the other hand, will display faster decision making and execution based on sound judgment to respond quickly to the demands of the public.

There are four strategic thrusts in the public sector ICT strategy framework (ST1 to ST4), with each thrust having its respective focus areas to ensure ICT effectiveness and enablement to the public sector. These strategic thrusts are divided into two main segments with ST1 being represented as the strategic driver whilst ST2 to ST4 represented as strategic enablers. The strategic driver segment represents the needs and demands of the public that drives the way services are delivered by the public sector. The strategic enabler segment on the other hand, represents the internal machinery and operational aspects of the public sector that strives to maintain an effective and efficient service experience to the public.

Current Assessment of the Public Sector Environment

It is without a doubt that the Malaysian Government understands the importance of having a knowledge management platform in place. This can be seen from our current findings that most of the ministries and

agencies within the scope of this study have some form of knowledge management initiative plan in place albeit within their ICT Strategic Planning arena.

However, these needs were often centred on specific ministries / agencies requirements and are perhaps myopic in scope. Only a few ministries and agencies (out of the 94 government agencies surveyed) acknowledged of having some form of knowledge management system in place within their own agencies. Figure 2 below summarises the current KM environment in the public sector.

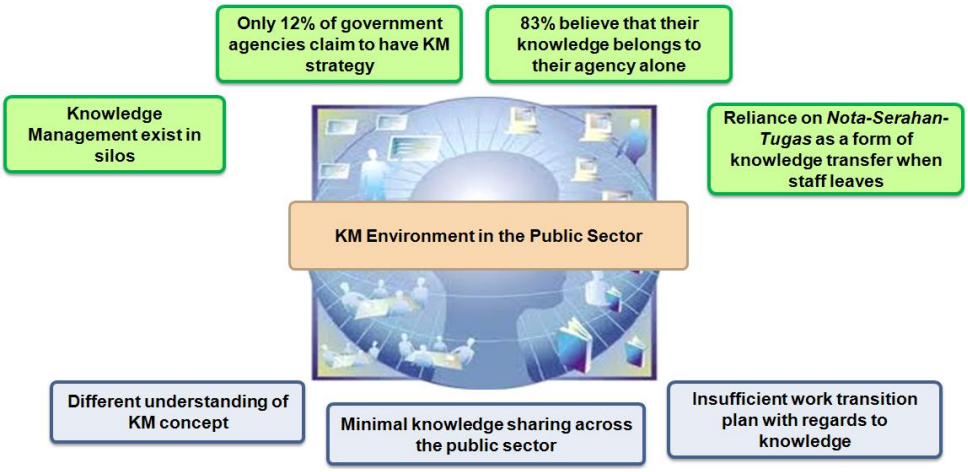

Figure 2: Current KM Environment in the Public Sector

As mentioned in the figure above, it can be explained that currently, these knowledge management exist in different forms and platforms (different type of applications) and often exist in silos – meaning that the knowledge management is designed specifically for a unit within an agency or only within an agency alone. This may be due to the fact that the concept of Knowledge Bank is only emphasised in the 2003 public sector ICT Strategic Plan (ISP) (refer to Figure 3 below). This has also attributed to a narrow focus towards the implementation of Knowledge Bank only, as opposed to a wider spectrum of a Knowledge Management platform. As per the original definition of the knowledge bank, it is meant to support the

sharing of information and experiences within government agencies to increase productivity and improve efficiency and effectiveness. However, current findings based on the 30 selected agencies that were interviewed were that most of the agencies deploying these KM initiatives are focusing on building data dictionary and sharing purposes instead of focusing on knowledge excellence.

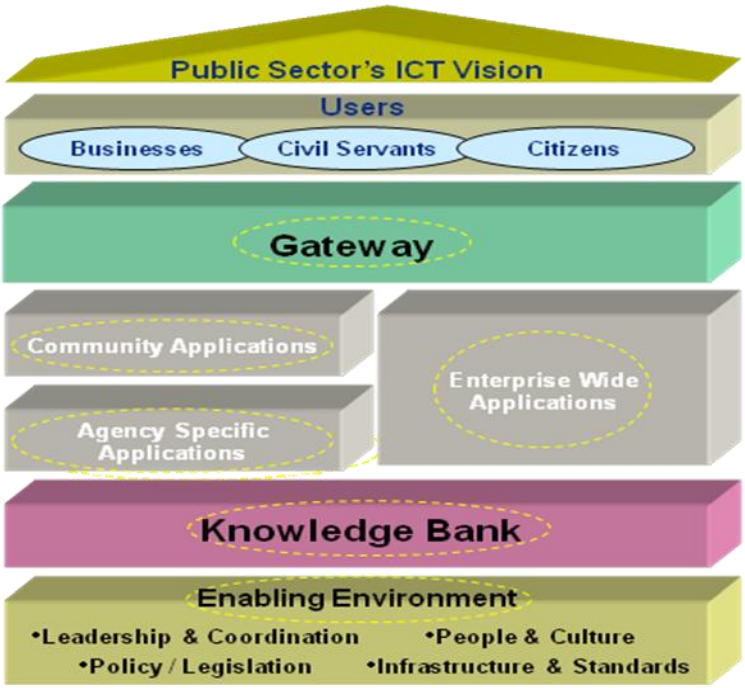

Figure 3: Public Sector ICT Framework for Year 2003

Leading Practices

For the purpose of this study, an assessment on two case studies was conducted – UK and the US knowledge management initiative. Both have approached the development of KM differently. The United Kingdom chose to go with a unified approach in its Knowledge Network with the intention for it to be a government-wide electronic communication tool assisting government departments to share knowledge with each other, and work online with colleagues across government; whereas the United States chose to develop the Knowledge Management initiatives by

agencies in a decentralised approach where its knowledge management initiatives is very much focused on its government agency's core function.

Knowledge Management Overview

A well designed Public Sector Knowledge Management Framework and Implementation Methodology is important to effectively organise and manage the knowledge that is shared. The consolidation of all current and future public sector Knowledge Management efforts into an interconnected network will allow for a better and more effective knowledge management across government agencies in order to improve service delivery and decision making through an informed knowledge environment via a whole of government approach.

For the purpose of this study, **knowledge management** is defined as the process of **managing and leveraging the stores of knowledge** such as documentation, business process and / or experience in an entity by transforming information and intellectual assets into enduring value in order to provide services to the public and to improve performance. An example would be the sharing of presentation slides, materials and / or work information by keeping the "knowledge" in a public shared location that is accessible by any officers within the agency. The other key term is "knowledge analysis". In order to analyse an object, one must first describe it. In KM, taxonomy is the most common method that facilitates description and analysis of knowledge.

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Analysis Approach

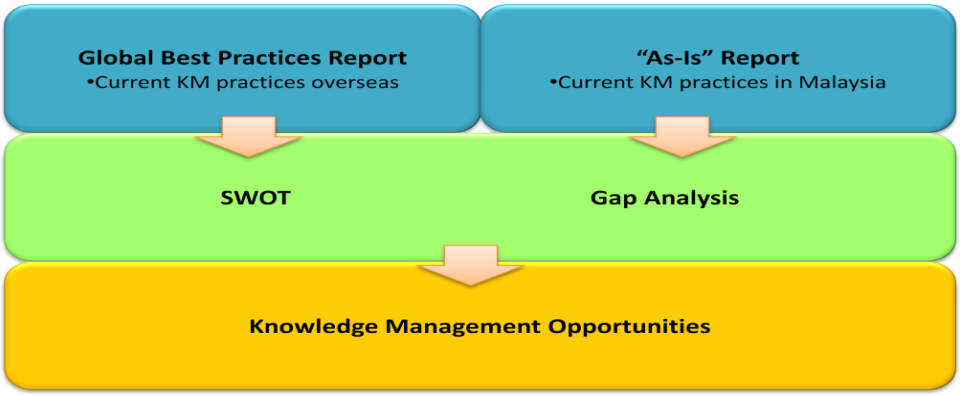

Figure 4: Analysis Approach

In order to find out the knowledge management opportunities suited for the knowledge management public sector in Malaysia, a systematic analysis approach as shown in Figure 4; was conducted. Based on the knowledge management practices by other public sector overseas and current knowledge management practices in Malaysia, a SWOT and gap analysis was conducted to assess the current strengths, weaknesses, opportunities and threats faced by the knowledge management within the public sector in Malaysia. It also looked at the elements or features that can be further enhanced and / or improved based on current successful knowledge management implementation within the government agencies in Malaysia and abroad. Based on the results of the SWOT and gap analysis, a few strategic knowledge management opportunities for the Malaysian public sector were suggested as part of the recommended output for the public sector.

SWOT Analysis

SWOT analysis is a strategic planning tool used to evaluate the Strengths, Weaknesses, Opportunities, and Threats involved in implementing knowledge management within the public sector. A summary of the SWOT Analysis with regards to the knowledge management within the Malaysian public sector is detailed in Figure 5 below.

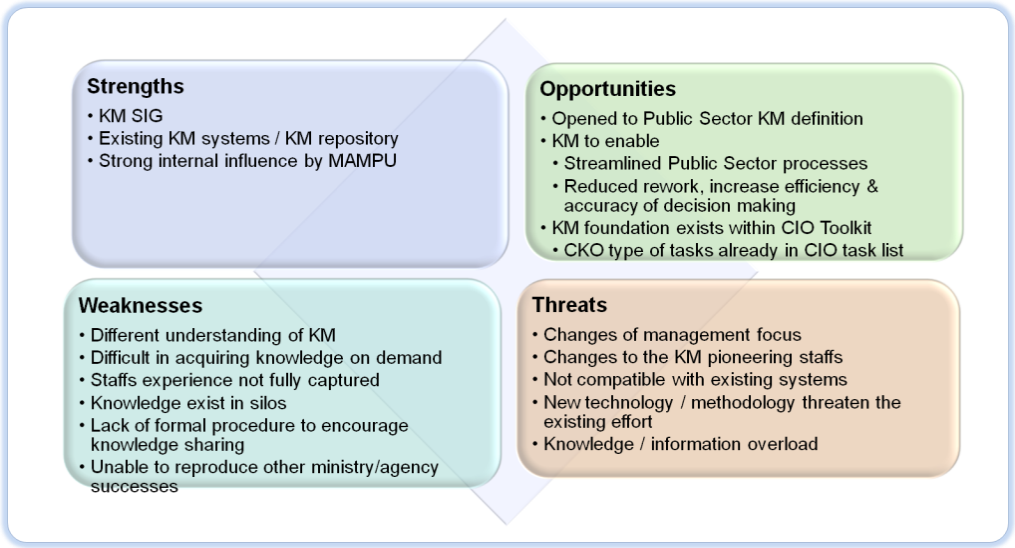

Figure 5: Public Sector KM Strengths, Weaknesses, Opportunities and Threats

Knowledge Management Establishment

Based on the analysis that have been done, the proposed overall knowledge management framework for the public sector is illustrated by the figure below.

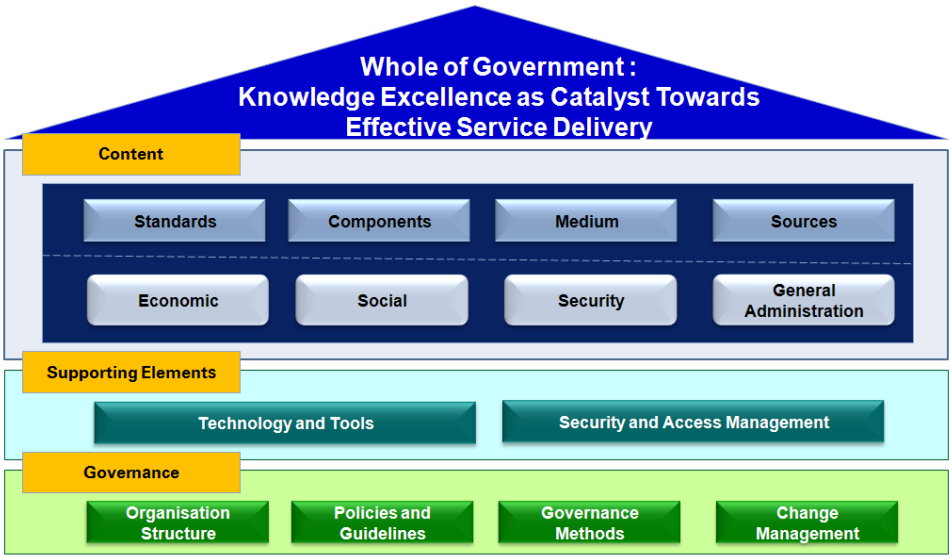

Figure 6 : Overall Public Sector Knowledge Management Framework

The vision for the public sector knowledge management is "**Whole of Government: Knowledge Excellence as Catalyst towards Effective Service Delivery**". By leveraging on the public sector's knowledge management strategy, it is foreseen that more intra government collaborations and work efficiency will increase due to the active learning environment in placed, thus creating a knowledge excellence within the public sector via a whole of government approach. The content covers the guideline that needs to be covered for content management for the public sector's knowledge management blueprint such as the standard static knowledge that is needed as a reference, the different type of knowledge components or categories of dynamic knowledge that is updated frequently (for example, research papers), the different type of medium that a knowledge can be stored in (visual, audio, text) and the different type of sources for knowledge. This also includes delving into the four known business environment sectors as the main public sector content categories which was defined by the Malaysian government sectoral framework (economic, social, security and general administration) that enables the government bodies to execute their functions and roles to the various sectors. Guided by the vision of the public sector's knowledge management framework, the governance represents the public sector's governance structures with regards to knowledge management and the supporting element will be the foundation to aid the successful implementation of the overall knowledge management framework.

Knowledge Management Strategy

A standardised approach of knowledge management within the public sector is recommended to tackle area of concern where the knowledge management in the public sector is not fully matured.

A knowledge sharing culture must be developed in order to improve the public sector's service delivery and decision making through an informed knowledge environment. Hence, it is identified that two strategies are

needed in order to create a knowledge sharing culture in the public sector which are; inculcate the culture of knowledge management and strengthen knowledge management initiative in the public sector. The programs to support each of the strategies are outlined in the figure (Figure 37) below.

Figure 7 : Knowledge Management Strategy

Based on the figure above, 3 programs have been identified to inculcate the culture of knowledge management; KM Foundation Program to create awareness and educate the public sector on the prerequisite needed before initiate their own knowledge management initiative, Knowledge Practitioner Development Program to inculcate the knowledge management practice in the public sector via a people to people approach and Rewards & Recognition Program to instil the continuous habit of knowledge sharing and management in the public sector. Another 2 programs have been identified to strengthen the knowledge management initiative in the public sector; Development of High Impact KM Projects Program to ensure that the knowledge management initiatives are optimised throughout the public sector and the Intelligence Hub Program to integrate all the knowledge management initiatives that exists within the public sector as well as the creation of a knowledge management

template as a reference for the public sector to received informed knowledge via a whole government approach and to encourage the creation of new relevant knowledge management initiatives.

Therefore, the recommended public sector knowledge management roadmap is depicted in Figure 8 below.

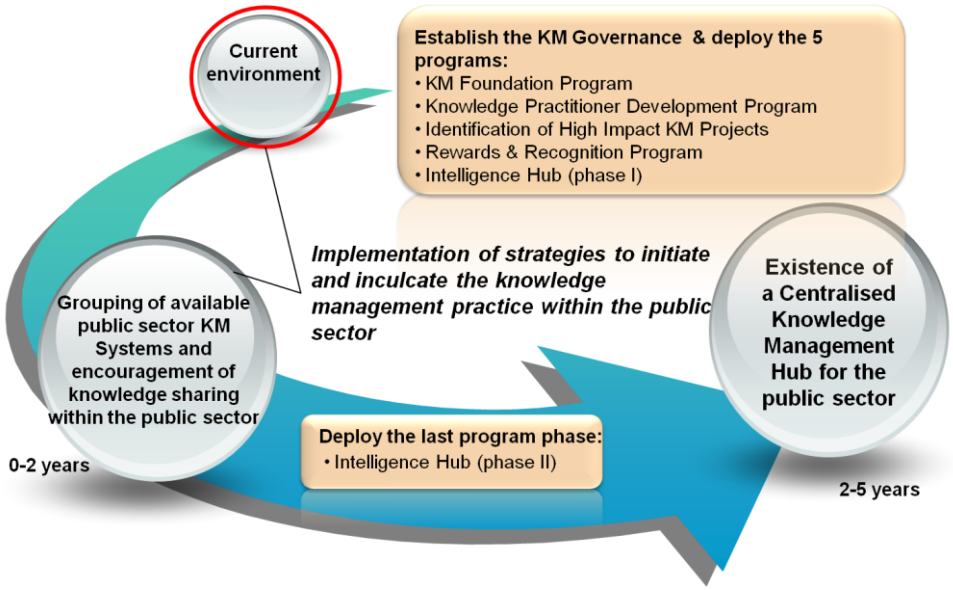

Figure 8 : Public Sector Knowledge Management Roadmap

Knowledge Management Implementation Approach

Having a knowledge management framework and strategy is not sufficient to equip the public sector to start developing its own knowledge management initiative and / or system. A standardised knowledge management implementation approach has to be in placed to further strengthen the public sector's understanding of how to implement a knowledge management initiative. Therefore, the Overall KM Implementation Methodology approach is depicted in Figure 9 below:

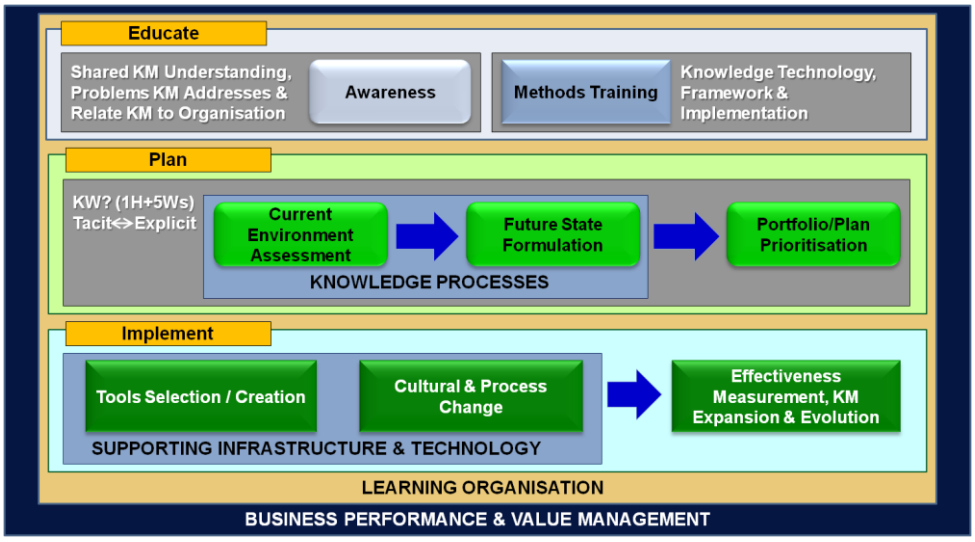

Figure 9: Overall Implementation Approach

In general, there are 3 main phases that the public sector has to execute to implement a knowledge management initiative; **Educate**, **Plan** and **Implement**. In the first phase (Educate), the knowledge management implementer will need to create an awareness within its organisation with regards to what is knowledge management, its benefits and what type of knowledge can be created, captured, shared, used, exploited and sourced within the organisation itself. Current environment assessment with regards to knowledge management and future state formulation with regards to planning of what knowledge to be kept within the knowledge management initiative and possible business cases and / or pilot projects that can be produced for the knowledge management initiative to be successfully implemented are conducted during the second phase (Plan). Once the projects have been identified and a pilot project has been identified, the type of technology to capture tacit and / or explicit knowledge will then be decided and used to develop the knowledge management initiative during the third phase (Implement). The change management that needs to be implemented (such as rewards and recognition program) in order to gain acceptance from the future users of the knowledge management will also occur during the third phase. Once the knowledge management has been implemented, a periodic

performance measurement of the knowledge management will take place with the intention of ensuring that the knowledge that resides within the knowledge management initiative is based on current needs and is always up-to-date.

Governance in Knowledge Management

Although KM is not fully utilised / operationalised in government agencies, the management function known as knowledge management has been widely embraced by many organisations in the federal government. In those agencies where KM is found, it is often considered an important, if not integral management tool. Implementing KM will assist the public sector to meet their service and performance requirements in spite of the many challenges that are faced by the government in this new century. Many public and private sector organisation leaders have accepted the need and rationale for knowledge management activities. However, there is still a major debate as to where the management of this function should fall in the organisation. The Knowledge Leader (KL) is the person in charged with managing and leading this function. There are many other titles in existence for this position, including Chief Learning Officer, Special Advisor on learning and knowledge management and Director of Information Services. Three of the management practices that have contributed the most toward the development of the knowledge management discipline and to the shaping of the Knowledge Leader position are the Information Management concept, the product / service quality movement, and the growing awareness of the value of human capital to an organisation. The public sector's Chief Information Officers (CIOs) has different responsibilities from that of the public-sector Knowledge Leader (KL). Whilst the CIO focuses on management of the organisation's physical computer and network assets, the Knowledge Leader is more likely to be concerned with a complex set of activities that reflect human behaviours in organisations, including but are not limited to,

work processes, reward systems, knowledge collecting and sharing, information dissemination, and similar social actions.

Critical Success Factors

Using the lessons learned from early adopters, many organisations have effectively provided their staff with the tools they need for managing and sharing knowledge. Yet, it is easy to forget to account for certain critical elements that enable knowledge sharing. Critical Success Factors (CSF) are the subjects which must be addressed effectively in order for the public sector to achieve its vision and objectives in knowledge management initiatives. It is a simple concept which helps focus attention on major concerns; thus making it easier to communicate and to monitor.

Critical Success Factors can also be considered as barriers which needs early identification and ready solutions. Understanding the CSF together with the challenges and key issues would assist the public sector in materialising their vision statement more realistically and effectively.

Figure 10 shows the 7 critical success factors that have been identified.

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Figure 10: Critical Success Factors

In conclusion, knowledge management is a new endeavour undertaken by the public sector. This document should be used as a guideline to help the public sector initiate and kick start its knowledge management initiative. It is architecture based on the RRS principle, i.e. Reusable, Reconfigurable, and Scalable. The public sector is strongly encouraged to continue to evolve its KM initiative beyond this document and seek other opportunities from what has been laid out. It is of utmost importance that the public sector understands the nature of the knowledge management initiative, constantly assess its effectiveness and seek opportunity to improve and expand the knowledge management coverage inside the agency.

The writing is on the wall is that if public sector is to excel, thrive and achieve in its goal to become a connected government that provides first

class service to its citizens, it must be able to provide real value through their strength. Call it knowledge management or simple business wisdom – the phenomenon is here to stay.

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1 Introduction

Knowledge management has increasingly been recognised by most governments in the world as the strategic resources within the public sector. Some of the common challenges that affects the public sectors worldwide include increasing needs to enhance efficiencies across all public sector agencies, improving accountability, making informed decisions, enhancing collaboration and strategic partnerships with stakeholders, capturing knowledge of an ageing workforce as well as improving overall operational excellence. It is also noted that knowledge management plays an imperative role in providing strategy and techniques to manage e-government content eloquently in order to make knowledge more usable and accessible as well as to keep it updated.

In addition, Zhou and Gao (2007) have identified three benefits of knowledge management in e-government as being conducive to enhance governments' competencies, to raise governments' service quality and to promote a healthy development of e-government. Knowledge needs to be managed in a timely and cost-effective manner to improve information sharing and to encourage participation from the stakeholders and the citizens. In moving towards citizen-centric and whole-of-government approach, the development of the Knowledge Management Blueprint is imperative to ensure the perception of a more effective and transparent government as well as to foster the habit of achieving knowledge excellence to improve service delivery and decision making by sharing knowledge amongst the public sector agencies.

1.1 Objectives

The objectives of this blueprint are numerous and include:

- Managing knowledge in the public sector;
- Creating a learning organisation;

- Establishing an organised knowledge repository shared by everyone and usable by all;
- Establishing a lifecycle of knowledge production, integration and validation (creation, share and innovate);
- Creating an ongoing and adaptive interaction with the knowledge base;
- Allowing for organised and proactive transfer of skills, know-how and expertise;
- Instituting support through integrative technological means (e.g. knowledge management systems); and
- Instituting better governance for promoting knowledge sharing and creation for the benefit of the whole public sector.

1.2 Scope of Work

The scope of work for the development of the Knowledge Management Blueprint includes the following:

- Develop the public sector Knowledge Management strategy and implementation plan;
- Develop the framework, methodology and guideline for the development and implementation of the Public Sector Knowledge Management; and
- Develop the change management framework, standard operating procedure and roadmap for the Public Sector Knowledge Management.

2 Strategic Analysis

2.1 ICT Strategic Direction

The Government Transformation Programme (GTP) states that an innovative *rakyat*-centric model of public delivery should be in place by the year 2020. This means that the public sector must be geared towards delivering quality public services according to the needs of its citizens and businesses.

The Public Sector ICT Strategic Framework below depicts the strategic thrusts and key focus areas that the public sector has to develop in order to achieve its vision of becoming a citizen centric public service.

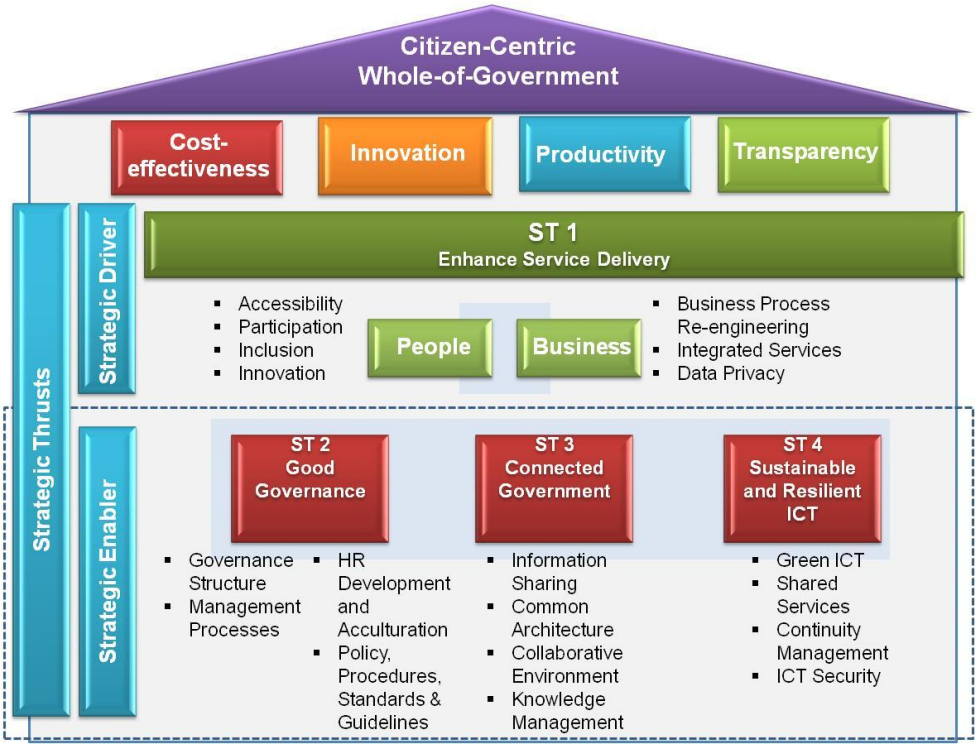

Figure 11: Public Sector ICT Strategic Framework

A *Citizen* Centric and *Whole of Government Approach* public service means that the public sector must meet and exceed the expectations, preference and needs of Citizens and Businesses through:

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- Designing services around the needs of Citizens and businesses;
- Providing services through modern, coordinated delivery channels and gateways;
- Providing customisable services to suit the preference and liking of citizens;
- Increasing government's professionalism in terms of the planning, delivery, management, skills and governance of ICT enabled change; and
- Practice higher levels of inter-agency collaboration that is applied to policy formulation, programme development and delivery.

The expectations mentioned above demand that the government adopt the qualities of a **Cost Effective**, **Innovative, Transparent and Productive Government**. The Cost effective government will practice value management to reduce public finance wastages and to ensure public spending is utilised properly. The Innovative Government will provide citizens with newly designed creative services that enable quicker response / delivery time with high quality through the use of modern delivery channels. Next, the Transparent Government will practice the highest standards of ethical conduct and good governance to improve transparency and public confidence in the integrity of government transactions. The Productive government on the other hand, will display faster decision making and execution based on sound judgment to respond quickly to the demands of the public.

There are four strategic thrusts in the public sector ICT strategy framework (ST1 to ST4), with each thrust having its respective focus areas to ensure ICT effectiveness and enablement to the public sector. These strategic thrusts are divided into two main segments with ST1 being represented as the strategic driver whilst ST2 to ST4 represented as strategic enablers.

The strategic driver segment represents the needs and demands of the public that drives the way services are delivered by the public sector. The strategic enabler segment on the other hand, represents the internal machinery and operational aspects of the public sector that strives to maintain an effective and efficient service experience to the public. The knowledge management blueprint falls under strategic thrust 1-enhance service delivery and strategic thrust 3- Connected Government.

The Strategic Thrusts of the Public Sector ICT Strategic Framework are explained in detail below:

2.2 Strategic Thrust 1 – Enhance Service Delivery

The public's perception and satisfaction levels towards the public sector are highly dependent on the quality, efficiency and method of service delivery. The public judges and forms a perception of the public sector when transacting, interacting and dealing with government agencies / ministries. Hence, Service Delivery is vital and represents the frontline / public facing aspect of the public sector. The public sector's main responsibility in this Strategic Thrusts is to enhance service delivery to two target groups which are citizens and businesses. Businesses require better service delivery from the public sector for trade facilitation and business expansion whilst citizens want better accessibility to public services and innovative service offerings.

This strategic thrust comprises of the focus areas below and is divided to into two main target groups, People and Business:

2.2.1 People - Accessibility

Many international governments have employed the "anywhere and anytime", "24/7 "and "round the clock" public services concept to improve accessibility of their services to the public. This can be achieved through the use of transformational Information and Communications Technology available today such as mobile government and e-government services. The public sector could increase its accessibility of its services through

shifting more of its services to the mobile government and e-government platforms. Furthermore, public services can be deployed through the use of modern, coordinated delivery channels and gateways to extend services outreach.

2.2.2 People - Participation

Participation plays a vital role in service delivery as the public will be provided with the platform and channels to give and exchange views with the public sector regarding public services allowing both citizens and the government to better appreciate the issues; formulate new solutions and open up new spaces. Public Services should include options for the public to provide feedback and comments on services rendered. With this, the government can develop action and service improvement plans in order to meet the public expectations.

2.2.3 People - Inclusion

Inclusiveness of services accentuates that public services are catered for all levels of citizens regardless of race, gender, age and status. Public Services must be designed to include all levels of the public and meet their expectations accordingly. Furthermore, public services must be extended to include people without access to ICT or without the skills to use them. The public sector must develop action plans to ensure that no citizen is left behind, by promoting Inclusive e-government, under which specific measures are developed to deliver public services and connect vulnerable groups at risk of exclusion.

2.2.4 People - Innovation

Innovative public service offerings have the capability of attracting and increasing the public usage of services. Public Service could utilise new modern delivery channels for their services such as facebook and twitter to attract young users to use public services. Furthermore, many international governments have employed customisable e-government portals where information provided is structured thematically and the

services are grouped and sorted according to user's needs. This method is proven to increase the usage of e-government services dramatically.

2.2.5 Business – Business Process Reengineering

Processes across government agencies must be re-engineered and streamlined to develop services that address business needs. Many international governments have realised that re-engineering and streamlining their services to meet business needs have enhanced business development, encouraged public private partnerships and drive expansion of Small and Medium Enterprises' (SMEs) business expansion in their economies. For example the UK's BusinessLink portal does not only provide all the advice and support to businesses, it also fast-tracks businesses to the specific expert help they need from relevant government agencies. This value adds is only possible with the streamlining and re-engineering of processes in government agencies. With this, it is evident that the public sector service delivery that assists in business expansion and trade facilitation will eventually enhance and drive the nation's economy.

2.2.6 Business - Integrated Services

Integrated Services involves borderless information sharing between ministries & agencies and integrated government back office to provide seamless services to businesses. Integrated Services has the capability to speed up the service delivery, increase flexibility on services and enable better trade facilitation of businesses. Furthermore, integrated services contribute to the ability to respond instantaneously to information from across government organisations as well as improve the ability to respond to the business needs. Governments have already embarked on providing integrated services through the Single Window approach whereby all government services are offered to the public using a one stop services portal or gateway. Through this, citizens and businesses do not have to find their own way around the maze of government agencies and bodies to perform transactions. Malaysia has already embarked on its Single

Window journey, offering services from many government agencies in one portal: MyGov. However, Malaysia's next step would be to provide personalised expert advice / support to start, maintain and grow businesses within the nation.

2.2.7 Business – Data Privacy

The public sector must be able to assure security and confidentiality of Government Business transactions and data. This is to earn the confidence and trust of businesses and the public when using public services. In the utilisation of ICT in public services, the aspect of security is highly important to ensure the confidentiality, integrity and availability of information. With the advent of technology, there are also risks to the security of information in the form of cyber threats such as viruses and worms which are programmed to expose confidential information in a networked computer system. The public sector must protect the government's information and technology infrastructure from these cyber threats by practicing effective ICT security practices and developing a formidable ICT security infrastructure. The Malaysian public sector possesses a good foundation of ICT Security with infrastructures and units such as The Pemantauan Rangkaian ICT Sektor Awam (PRISMA) and Government Computer Emergency Response Team (GCERT) in order to protect the confidentiality of information. The public sector has also introduced several guidelines and policies relating to ICT security as a reference of best practices for public sector agencies to implement in the effort to secure their systems. The next step for the public sector is to ensure proper and effective adoption of ICT Security best practices, policies and guidelines by government agencies.

2.3 Strategic Thrust 3 - Connected Government

Currently Malaysia is ranked number 32 in the world's top e-Governments (based on a UN survey). As most governments have adopted the e-Government approach, the focus on the second generation of e-Government has shifted towards connected government, which is focused

towards more collaborative models of service delivery. The countries listed in the top 10 have all implemented programs and initiatives to achieve a connected government. This is done by implementing a common architecture across the public sector to enable information sharing and collaboration to take place.

Malaysia is well-positioned to embark on this global trend in order to improve and expand its existing service delivery channels to the public. This is in line with the Public Sector Transformation Plan, which has outlined the "Connected and Collaborated Government" as the fourth strategic thrust. The key focus areas under this strategic thrust are:

2.3.1 Information Sharing

Collaboration by providing open government data and sharing of information between government agencies, public and the private sector will enable the government to become more transparent in its administration. By leveraging on enabling technologies such as Web 2.0 to enhance information sharing, effective tools will also allow proper management and distribution while ensuring security needs are met.

2.3.2 Common Architecture

By adopting well defined common architecture and standards across the public sector, data and information can be re-used and shared seamlessly between the relevant agencies, sectors and even with the public and private sectors. The outcome will lead to an integrated service delivery benefiting every single Malaysian citizen.

2.3.3 Collaborative Environment

The resulting ecosystem will be conducive for a collaborative environment, promoting partnership and integration between cross agencies within the public sector as well as externally with businesses and citizens. An open environment that allows for ease of data and information portability will enable effective analysis, interactive feedback between government and

citizens and create a platform where citizens can actively participate in government initiatives.

2.3.4 Knowledge Management

It is vital that knowledge management is in place to enable easy sharing of knowledge and at the same time cultivate a knowledge sharing culture. A well designed Public Sector KM Framework & Implementation Methodology is also important in order to effectively organise and manage the information that is shared. The grouping of all current & future public sector Knowledge Management efforts which are in silos into a knowledge network will allow for a better and effective information service delivery across government agencies which will enable the realisation of a connected government.

2.4 Approach and Focus Areas

2.4.1 Approach

A detailed approach for the development of the knowledge management blueprint is depicted in the following figure.

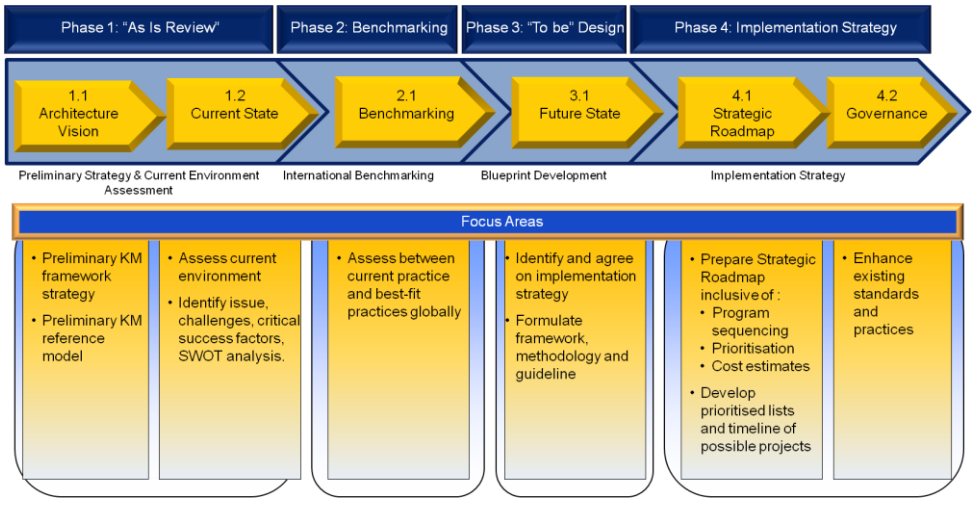

Figure 12: Knowledge Management Project Methodology

The overall approach for the development of the Knowledge Management blueprint is divided into four phases as indicated below:

1. **Phase 1**

   There are two stages in this phase. They are vision and current environment assessment. In the vision, the focus lies in establishing a preliminary knowledge management framework strategy and knowledge management reference model. The activities in this phase would assist in setting the strategic direction and determining the end deliverable of the Knowledge Management blueprint.

2. **Phase 2**

   This phase includes an analysis on the international best practices that could be adopted and adapted to the current public sector Knowledge Management landscape. The analysis will include the compilation of Governance best practices and standards that should be adopted by the public sector.

3. **Phase 3**

   This phase is the development of the Knowledge Management blueprint for the Malaysian public sector. The scope would be to formulate the framework, implementation methodology and roadmap for Knowledge Management and Change Management for the public sector. It would also be to identify and agree on the implementation strategy with regards to the moving forward plans.

4. **Phase 4**

   This phase focuses on developing the strategic roadmap as part of the implementation strategy. The key activities would include developing strategic roadmap that consist program sequencing and prioritisation.

2.4.2 Focus Areas

The focus area for the public sector knowledge management blueprint is based on the areas for improvement as well as opportunities identified during the study on the "As-Is" Report. Some of the focus areas identified include:

- **Capturing Knowledge**

  Most scholars agree that information generation, capture, or acquisition from a variety of sources is the first phase of increasing the volume of knowledge for learning. This creates the need to capture and codify knowledge to make it easy to handle, to transform it into manageable pieces of information that can be easily transported. Explicit knowledge normally does not raise any problem in this process but in other hand, tacit knowledge remains as a big challenge for KM practitioner. Tacit knowledge is captured more through informal discussion rather than formal discussions, appraisals, inductions and interviews. With regards to the public sector, there are approaches towards capturing the tacit knowledge into explicit such as the usage of *Nota Serahan Tugas* where the employee notes down his current tasks for his successor before leaving the department or agency.

- **Knowledge Retention**

  All knowledge captured must be codified, presented and put in stores in a structured way, so it can be reused in the future in similar situations. This is most important in terms of tacit knowledge where organisations must be able to capture the knowledge and experience of their employees to be able to change their tacit knowledge into organisational knowledge, so it can be used even after the employee is no longer with them.

- **Knowledge Sharing**

  This strategy is based on "re-use economics" – invest once in and re-use it many times. This is also about developing networks to facilitate people-to-people knowledge transfer and sharing. It is based on

"expert economics" – channelling individual expertise to others with less expertise that may employ it to further the organisation's goals. Currently, knowledge management exists in silos or "islands" in the government and sharing is limited to within one's own agency. Through knowledge sharing across public sector agencies, knowledge duplication and redundancies can be reduced where one single version of truth can be maintained.

- **Perpetual Learning Organisation**

  In order to ensure the sustainability of the public sector knowledge management initiative, it is important to focus on the creation of a perpetual learning organisation within the public sector via knowledge management. By ensuring that the knowledge management implemented remains relevant to the needs of the government agencies, it will be used as a source of reference as well as learning tool to gauge the effectiveness of past and current initiatives. It will also allow for the government agencies to be creative and innovative, deliver better services and / or even create new service to serve the citizens through learning from knowledge sharing with other government agencies as well as lesson learnt in past activities or initiatives.

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3 Current Environment

In Knowledge Economy, knowledge is the most valuable asset and recognised as one of the sources of sustainable competitive advantage. In 2000, the Organisation for Economic Co-operation and Development (OECD) for the first time listed knowledge management as an important issue in Government restructuring, and a 2002 survey of the status of knowledge management that addressed 132 government agencies in 20 member countries showed that it had become a topic of significant management interest. Most of the agencies reported that strategies had been drawn up and practical initiatives were under way to improve their knowledge management operations. Based on the survey, it was noted that OECD member states were progressively increasing the creation and flow of knowledge in government agencies, and that central government bodies were increasingly dependent upon local governments, universities, specialised corporations and international organisations as sources of information and knowledge. Meanwhile, the extent of knowledge interaction among public and private sector bodies, as well as academic institutions, consultancies and international organisations had been significantly liberalised.

It is acknowledged that the Malaysia public sector realises the importance of having a knowledge management in place. This is evident from the fact that development of knowledge bank has been emphasised as one of the key strategic components of the public sector ISP that aimed to facilitate sharing of knowledge and experience by capturing information across the Government (see Figure 13).

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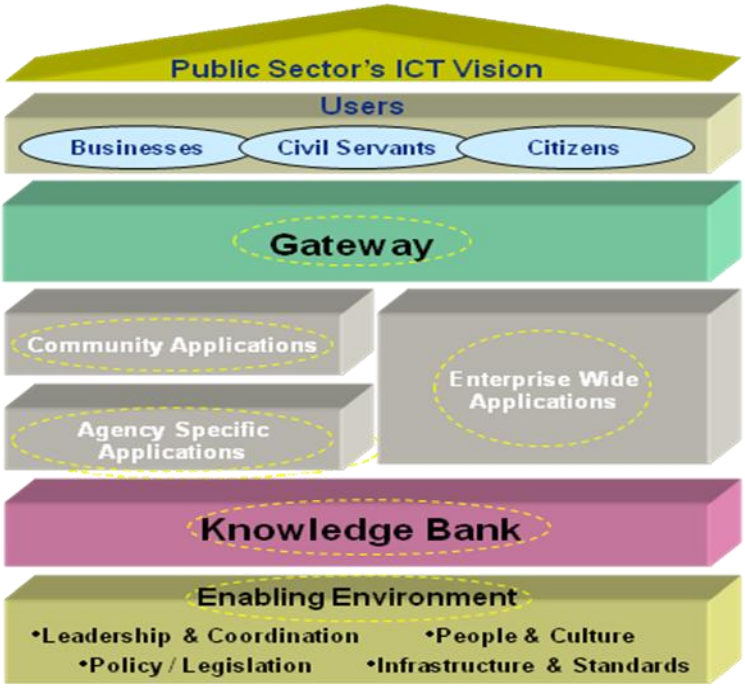

Figure 13 : Public Sector ICT Framework for Year 2003

Based on the current findings, most of the ministries and agencies have a knowledge management initiative plan within their ICT Strategic Planning (ISP). However, these ministries / agencies developed the plan based on their own needs and interpretation. In terms of implementation, our findings also show that the knowledge management systems appear in many forms (different type of applications) and exist in silos. In addition, results from ISP Consistency Study also show that 43% out of 30 agencies are more focused on sharing of data and information through creation of a central document repository which is only part of the steps in developing a comprehensive knowledge bank.

As highlighted in the public sector ICT strategic plan report, an effective Knowledge Management programme should also focus on improving process efficiency and effectiveness, creating avenues for better use of knowledge, and increasing productivity. However, it was also highlighted by the agencies that among the challenges faced during the planning of a knowledge bank are capturing tacit and explicit knowledge and inculcating

the culture of knowledge sharing through the use of ICT. Hence, a guideline for agencies to implement knowledge management is required to ensure consistency among the public sector agencies.

3.1 Current Landscape

Based on the ICT Effectiveness Study, it is noted that only 12% of the government agencies acknowledge the existence of a knowledge management strategy within their agency (Please refer to Figure 14 below). However, this may be a perception that Knowledge Management Strategy exist only when an agency has a knowledge portal. This is due to the fact that more than 12% of the government agencies adopt other knowledge management tools such as document management system; MyMeeting and Digital Library (see Figure 15 below). Whether or not an agency has a knowledge management strategy, most agreed (at 72%, see Figure 16 below) that it is necessary to appoint a specific person (champion) to be responsible to manage the knowledge within the agency.

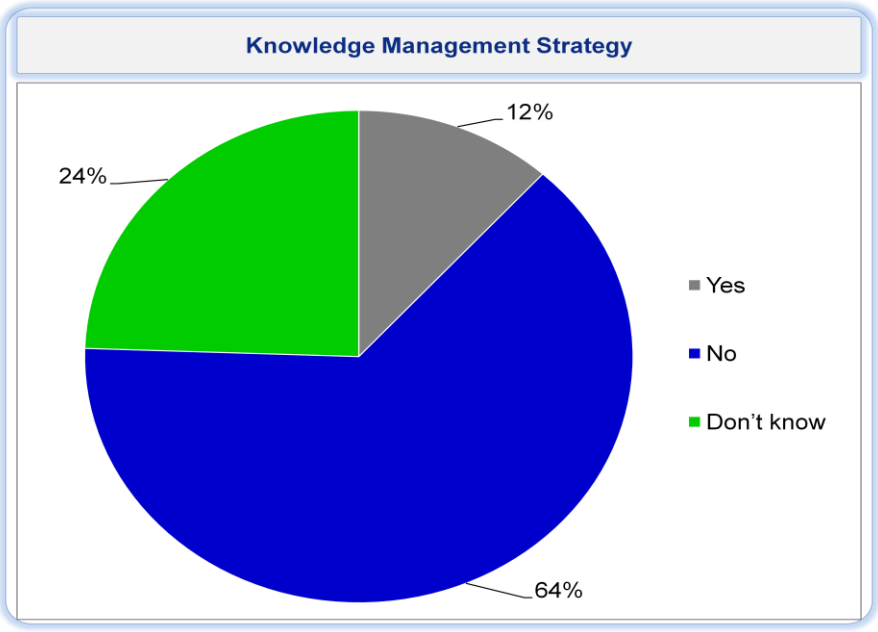

Figure 14 : Status of Existing Knowledge Management Strategy

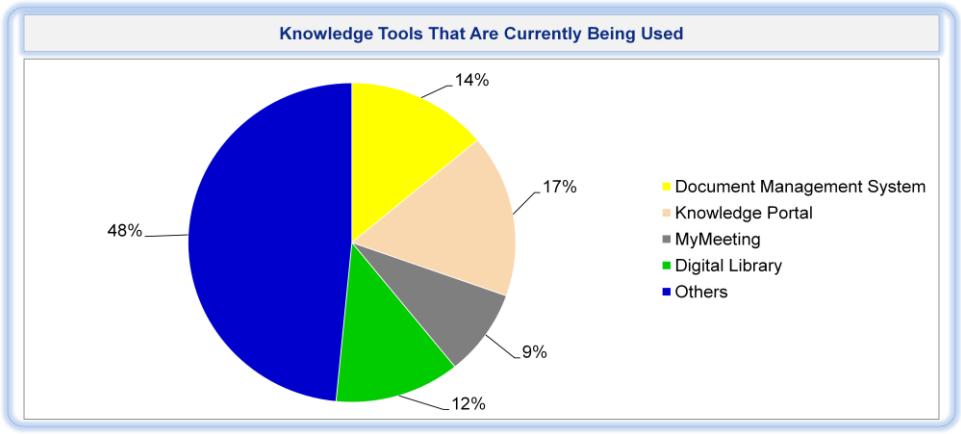

Figure 15 : Knowledge Management Tools That Are Currently Being Used Within the Agency

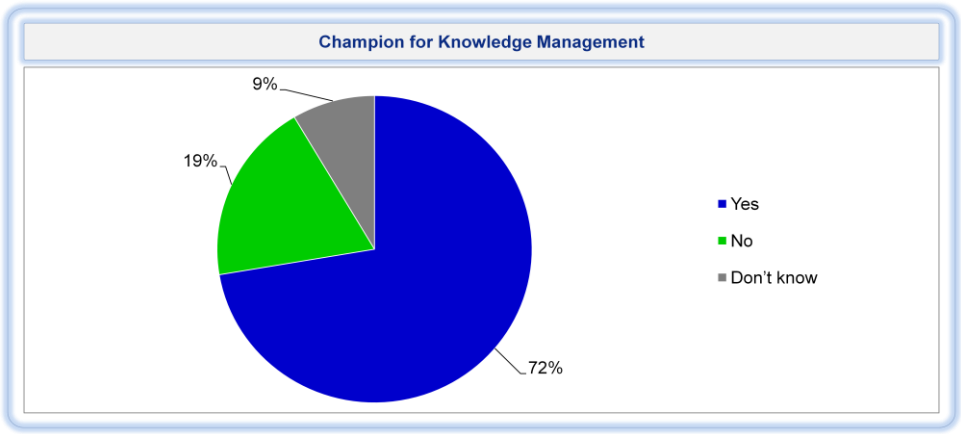

Figure 16 : Necessity to Appoint a Champion to Be Responsible To Manage Knowledge Management within the Agency

In terms of further enquiry on which department or unit should spearhead the knowledge management initiative, there are mix signals from the group being questioned as majority believe that it should be spearheaded by either the library unit, corporate division or others.

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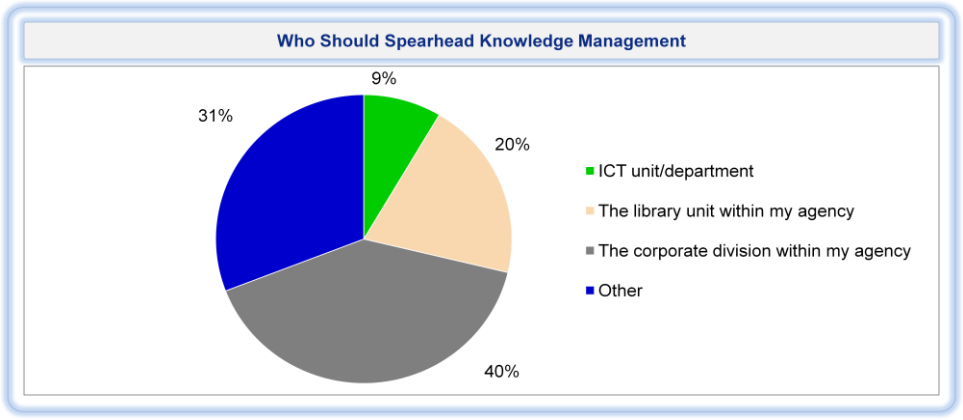

Figure 17 : Department or Unit That Should Spearhead the Knowledge Management Initiative

Due to the opinion by the respondents that majority of the knowledge seekers and knowledge providers are from their own ministry, agency and department alone, therefore it is logical that majority of the perception of the respondents with regards to the ownership of knowledge that has been acquired by their department belongs to the agency alone. Therefore, from the Figure 17 above and Figure 18 below, it can be inferred that majority of the management of knowledge within the public sector in Malaysia is aligned with their core business alignment but there is still room to improve in terms of inter agency and ministry knowledge sharing.

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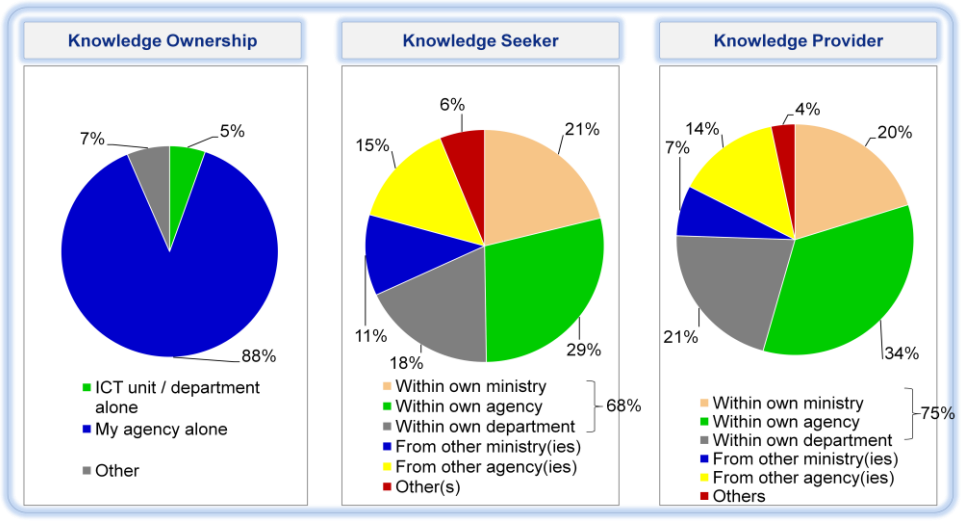

Figure 18 : Perception on Knowledge Ownership, Seeker and Provider

With regards to succession planning within the respective agencies, most of the agencies rely on other methods and the *Nota Serahan Tugas* (please see Figure 19 below) instead of conducting a critical incident interview or questionnaire where staff will be interviewed and will have to fill in a questionnaire on how to handle all possible critical incidents that may arise that requires his knowledge and expertise. This is an area of concern since significant amount of experience and knowledge is lost when staffs leave the agency. This will directly affect the core business activities due to existence of brain drain syndrome within the agency in the future.

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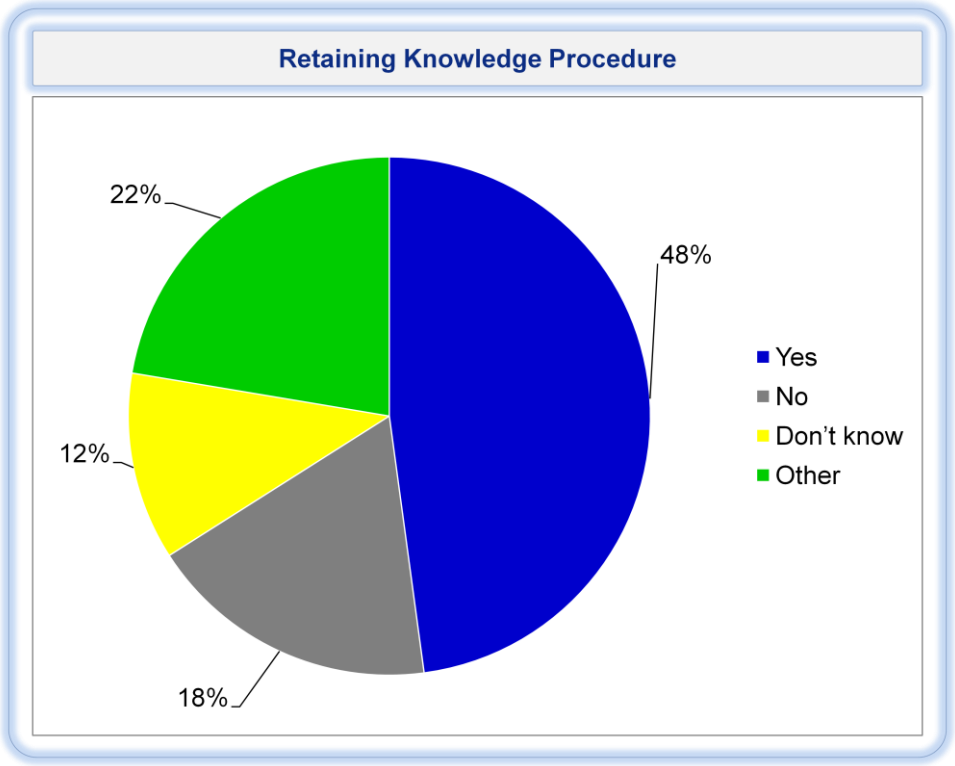

Figure 19 : Knowledge Management for Staff Succession Planning

For those agencies who have implemented a knowledge management system (Figure 20), majority finds that biggest benefits comes from the area of improved knowledge sharing culture (23%) and follow closely by policy for resource allocation within the agency for knowledge profiling (18%). Some of other benefits include improve the accessibility to knowledge and the use of knowledge as an enabling environment for decision making (14%)

On the other hand, lack of rewards and recognition may be the cause for minor improvement on recognition for employees' active participation (4%) and also low pool of internal knowledge officers (4%).

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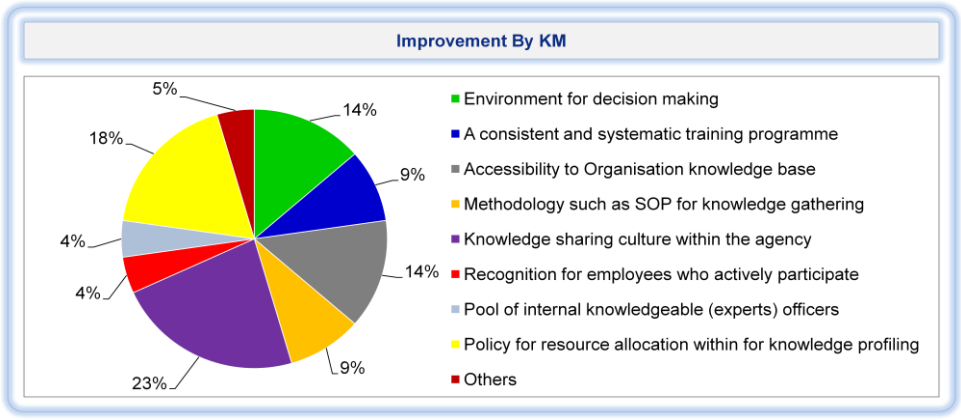

Figure 20 : Improvements due to Knowledge Management Strategy in Place

Despite observing that through the implementation of knowledge management system, there is an improvement of the decision making processes of the agency, majority finds that the biggest challenge faced by the agency in implementing knowledge management is getting the sponsorship from the stakeholders (28%) for the implementation of the knowledge management system (see Figure 21 below). This is partly due to the need for high ICT budget allocation in order to implement a knowledge management system.

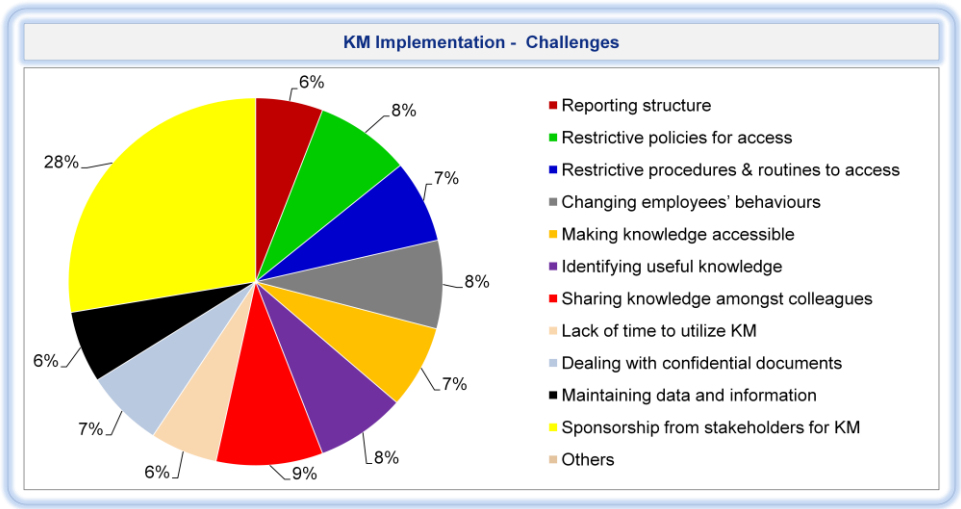

Figure 21 : Challenges Faced by Agencies in Implementing Knowledge Management System

3.2 Leading Practices

Acquisition and creation of knowledge takes places from various sources such as Individual level, Group level, and Organisational level. Sharing of knowledge among stakeholders ensures in capturing, collating and creating specific, reliable, useful, up-to-date and timely knowledge. Organisations are today striving for improving their bottom line and therefore realise the importance of involvement of customers and suppliers as sources of product and service innovation. Strategic partnerships with customers are viewed as long-term proposition. Emergence of Communities of Practice has shown that individual and common goals and interests are taken into account to provide a natural focal point for organising and promoting knowledge in a particular area. This helps to provide solutions to organisational problems, as well as to provide insight on new or innovative product and services. Hence Benchmarking is seen as an important aspect with respect to Knowledge Management. It helps in understanding where the organisation features in comparison with other organisation's in the industry with respect to knowledge, competency and capability which helps in the growth of the organisation. For the purpose of this study, an assessment have been conducted to two different approaches towards Knowledge Management where the United Kingdom chose to go with unified approach with its Knowledge Network whereas the United States chooses to develop Knowledge Management initiatives by agencies in a decentralised approach.

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3.2.1 United Kingdom

3.2.1.1 General Information

The United Kingdom (UK) possesses one of the best e-Government in Europe, with most of its benchmarking ratings superseding the European Union's (EU) benchmark average. There is high internet penetration and connectivity and widespread e-Government adoption among households and businesses.

The UK's introduced its current e-Government strategy which is 'Transformational Government - Enabled by Technology' in 2 November 2005. This strategy is aimed at exploiting latest technologies in order to transform government services. Through the exploitation of technology, the UK government aims to tackle the major challenges that modern governments are facing – economic, social justice and public service reforms. The UK's strategy consists of several focus areas which is trickled down to action plans for each of its public sector organisations to implement (European Union, November 2009)[1]. The knowledge management system in the public sector within the UK Government is highly regarded and has won several accolades. In February 2002, the Office of the e-Envoy (later renamed to e-Government Unit) announced that the knowledge management system; named **Knowledge Network**, had won an award from the Management Consultancies' Association as the UK's best ICT consultancy project of 2001 (Office of the e-Envoy, 2002)[2].

[1] *European Union. (November 2009).e-Government Benchmark (8th Benchmark Measurement),118-119*

[2] *Office of the e-Envoy (February 2002). Office of e-Envoy Led Project Wins Best UK IT Consultancy Project of 2001 retrieved from http://archive.cabinetoffice.gov.uk/e-envoy/mediacentre-pressreleases-2002/$file/7feb02.htm*

3.2.1.2 Origins of the Knowledge Network

The Knowledge Network has its origins in the communications tools and techniques developed by the Labour Party in opposition in the period running up to their 1997 General Election victory. According to the Daily Telegraph, “Tony Blair has set up a massive computer database, which will be updated 24 hours a day as news breaks to tell his ministers what to say about Government policies and to give instant rebuttal to negative stories. A Downing Street source said Mr Blair was determined to harness the Government machine more efficiently to get his views across and keep all his ministers on message" "Blair brings his ministers ‘on message’ by computer”(Daily Telegraph, 23 January 2008). The Daily Telegraph article continued "A Downing Street spokesman denied that the new database could lead to the politicisation of the Civil Service. He said "This is not about setting up a crypto-Millbank in Whitehall. It is about the government waking up to 24 hours a day media". Nevertheless, when the plans for the Knowledge Network were unveiled, the Civil Service remained suspicious about its motives. The Guardian newspaper reported in January 2000, "A new electronic government information and rebuttal system which will use the latest technology to help Whitehall stay on message and respond to critical attacks by MPs, the press and the public, is being developed by Downing Street. The overall aim of the project is to explain the government's core message so that citizens can get the full facts without going through the distorting prism of media reporting. It is to be a computer network into which every department can feed their lines to take on every key issue and from which every department can read," according to cabinet office documents passed to the Guardian (The Guardian, January 2000)[3].

Motivation and purpose of UK Government’s Knowledge Network

According to the UK Government's e-Government Unit (formerly the Office of the e-Envoy) "the Knowledge Network (KN) is a world first - a government-wide electronic communication tool helping government

[3] *The Guardian (7 January 2000). "Labour's hi-tech plan to foil critics”.*

departments to share knowledge with each other, and work online with colleagues across government" (Office of the e-Envoy, 2002)[4].

The UK Government's Knowledge Network was launched in December 1999. Following 6 months of preparation and planning, in July 2000 KableNet.com reported that a consortium headed by Cable and Wireless and involving IBM and its Lotus subsidiary had been selected to support an in-house team in developing and deploying the necessary infrastructure and applications. Following 6 years of being run in-house, since 1 April 2006, it has been run on behalf of the UK Government as an out-sourced service.

According to a 2005 review of the UK Government's Knowledge Network ("Knowledge Network Review - the results" Cabinet Office e-Government Unit 2005) carried out for the e-Government Unit, the Knowledge Network provides a unique cross-government communications infrastructure, allowing officials in all government departments and associated bodies connected to the Government Secure Intranet (GSI) to communicate securely with each other and share common, secure access to up to 40 dedicated KM applications, discussion forums, web-based community sites, integrated workflow applications and 'knowledge pools'.

In June 2002, the Office of the e-Envoy announced: "A team working on the Government's Knowledge Network has today been named as the Information Age Innovators of the Year at the annual Government Computing Innovation Awards. The Knowledge Network is a world first – a government-wide electronic communication tool helping government departments to share knowledge with each other. The Information Age Innovators award recognises personal achievement in a project advancing the cause of information-age government and was awarded to Joe McCrea, Director of Knowledge Enhanced Government and Chris

[4] *Office of the e-Envoy (2002). Knowledge Network. Retrieved from http://archive.cabinetoffice.gov.uk/e-government/responsibilities/kn.asp*

Hancock, Director of the Knowledge Network (Office of the e-Envoy, 2002)[5].

According to the review of the Knowledge Network done in 2005, of these applications, 25 are described by users as being “mission critical" to the business of the UK Government. Some examples of what the Knowledge Network has pioneered include:

- A series of online departmental **'ministerial policy briefing systems'**, allowing policy officials to create, maintain and disseminate key aspects and explanations of government policy;
- **CabCom** – a community for Ministerial Private Office staff to share papers and background knowledge to prepare Ministers for Cabinet Committees – leading to the abolition of the paper-based processes across Government;
- The **Electronic Library for Government** – a community site for the Government Information Managers and Librarians Community to share key policy resources, job opportunities and professional development resources and was launched by the Cabinet Secretary;
- **FCO Ecpolnet** (one of 4 global Foreign & Commonwealth Office 'Nets') – a secure global community for the Foreign Office linking economic policy analysts in embassies around the world to share economic policy briefing and supporting knowledge;
- **EUPol** - reduces the amount of duplication needed to disseminate information, and helps to provide UK embassies in the EU with up to date knowledge on the UK's engagement with the EU and Member States, wider EU **policy initiatives** and easily accessible **reference material, reports, articles and links**;
- **SDNet** - built for and financed by the Sustainable Development and Commonwealth Group in the Foreign & Commonwealth Office (FCO) so that officials throughout the world can share information and knowledge on **environment and sustainable development issues**;

[5] *Office of the e-Envoy (2002). OeE team win award. Retrieved from http://archive.cabinetoffice.gov.uk/e-envoy/mediacentre-pressreleases-2002/$file/12jun02.htm*

- **StatNet** - the **UK Government Statistical Service (GSS) Intranet site** is used by government statisticians either working from their department or at home. It helps improve communication across government and provides a link to important GSS documents and facilities, including events, a directory of staff and vacancies;
- An on-line '**knowledge pool**' for the Cabinet Office Performance and Innovation Unit to link together policy experts across government and ultimately beyond, to lay the foundations for true evidence-based policy making;
- A community for HM Treasury and colleagues in all departments sharing knowledge of departments' progress towards meeting their Public Service Agreements;
- A community for the Regulatory Impact Unit to allow departments to share knowledge through Regulatory Impact statements and background information on-line – to make the whole government-wide picture available to everyone in one place;
- An on-line community for the Government Legal Service, called LION (Legal Information Online Network) to enable its members to better co-ordinate their activities and share strategic legal information, access to core knowledge repositories and background knowledge – with over 2,500 active members; and
- WorldSearch - contains information about social security and pensions, education and training, as well as labour market policy from around the world. Responsibility for WorldSearch rests with the Joint International Unit which supports and coordinates the international responsibilities of the Department for Work and Pensions and the Department for Children, Schools and Families.

Methodology used in UK Government's Knowledge Network

The UK Government's Knowledge Network Project has developed methodologies to improve the way in which departments are able to share information and knowledge internally, and more radically to introduce a

new capacity for information and knowledge to be shared automatically across the government community.

- The project activities have taken place over different timescales;
- Each department to introduce a series of internal departmental briefing systems;
- The main tasks to be carried out at the strategic level were to carry out successful tendering, procurement and contract negotiations to enable construction to begin of the central Knowledge Network;
- Attention shifted to the development and deployment of the central Knowledge Network infrastructure which would knit together these relatively young departmental systems in a common government-wide capacity;
- The first example in the world of any government deploying an integrated, government-wide knowledge sharing system; and
- High correlation between maturity of departmental systems and embedded success (the longer the departmental systems have been in operation, the better their performance has been).

Benefits for UK Government's Knowledge Network

The UK Government's Knowledge Network has already delivered real improvements in departments' internal knowledge sharing:

- Information is instantly available to all stakeholders. Previously, much of the material was available in different places across the network or not at all;
- Regularly updated core policy briefing in the shape of key messages, supporting facts, parliamentary questions, media transcripts, quotes, lobby briefings and links to associated documents and internet sites – which were previously only accessible via fax, phone call, or e-mail are now available online;
- Used to get a broader feel of wider departmental and government policies, rather than simply their own area or department;
- Beginning to bring efficiencies and quality improvements in the briefing and knowledge sharing process; and

- Useful for general background briefing or cross-cutting briefs.

How They Start

An initial task set for the Knowledge Network Project Team is to conduct an audit of current practices in departments with regards to knowledge management and communications and to identify best practice across departments from which everyone can benefit. The document; Communications Audit Form provides the materials and the opportunity for each department in the UK Government to participate in that audit. The approach is to assess overall coherency and compatibility across departmental practice; and to identify and promote the best talents and the best approach in which departments are addressing the very similar challenges that they all face. Following this process, the intention is to provide the UK Cabinet Office, the Prime Minister's Office and every department with:

- An aggregated summary of the current state of knowledge management and communications, looking at the Government as a whole;
- An analysis of the range and compatibility of systems and processes across Government; and
- A compendium of best practice across Government.

The Communications Audit Form is split into eight sections:

- Communications Audit contacts;
- Section A: Staff and locations;
- Section B: Top level systems and software;
- Section C: e-mail and communications;
- Section D: Knowledge sharing;
- Section E: Working with Parliament;
- Section F: Direct communications with the public; and
- Section G: Departmental best practice.

Technology Used to Develop an Efficient Knowledge Network

The technology required to introduce a knowledge network efficiently and effectively has been rapidly developing over recent years and is now at a stage where it is ready to be adopted and deployed by UK Government – just as it has been adopted by organisations such as the Confederation of British Industry. In particular, the development of what is known as 'groupware' or 'knowledge management' technology coupled with the increasing familiarity with, and use of, the Internet and web pages by many people who would previously have shied away from working via computer networks – is allowing companies and organisations all over the world to make real and rapid progress in how they share and spread knowledge, facts and figures.

Groupware

Under 'groupware' technology, information, facts and figures which might be in the possession of a number of individuals, possibly working in geographically dispersed locations, can be held in one central electronic resource. As an example, rather than 8 different pieces of paper sitting in 8 different filing cabinets or on 8 different desktop computers, the information is pooled by the 8 individuals responsible for each bit of information in a common electronic space to which they all have access – together with any other people who might not be responsible for writing the information, but who need to use it. This way, knowledge management technology solves the problem of how to ensure that everyone in a department sees the same text, lines to take and facts and figures. It provides the technical solution to two of the Knowledge Network requirements; the 'one stop shop' for briefing and the logging of policy areas by benefits to specific identifiable groups.

Relational Database Technology

A second type of technology – relational database technology – is required to provide the further requirement of the Knowledge Network which is automatic regionalising of benefits of Government policy. Relational databases allow users to see regional and other breakdowns of statistical and other information in any number of ways they choose, without having to manually break the information down each time a new set of data is created.

Usable by All, Shared by All

One of the greatest frustrations over the years that some organisations have faced when they have looked to implement the very best solution to fit their needs has been that one type of technology would not talk to another type of technology – or that one supplier's products could not communicate with another supplier's products. That has meant that all too often, companies may not have been able to meet all of their needs. The adoption by most of the world's leading technology companies of either common or compatible standards in database design and programming mean that the very best of both types of technology which are groupware and relational databases that can now interact with each other.

In a nutshell, this Knowledge Network Project will undoubtedly help many more departments take advantage of the opportunities of developing their own knowledge networks. It will ensure that there is a wider benefit to the UK Government by ensuring that the efforts of individual departments are harnessed and enhanced at cross-government level. As the Knowledge Network is now fully established and operating, the United Kingdom are now able to truly claim the prize of the most modern and advanced government knowledge management system anywhere in the world.

3.2.2 United States of America

3.2.2.1 General Information

The United States features a very conducive ICT environment and has been a leader in technology for the past few years. This is due to the highly advanced infrastructure, competitive business and technology environment as well as world-class education and; research & development landscape. ICT usage among citizens and businesses are also ranked high, with the government taking a leading role in leveraging ICT. The enabling environment and widespread usage of ICT contribute to making the United States one of the world's most innovative countries with a high amount of utility patents produced. In the United States, there are a number of organisations which implement a knowledge management system to supplement their core businesses. Therefore, the US Government's National Aeronautics and Space Administration (NASA) is picked as part of the USA's knowledge management case study due to the fact that it was ranked among the five best-practice organisations recognised in the 2008 Collaborative Research study *Using Knowledge: Advances in Expertise Location and Social Networking*, conducted by American Productivity and Quality Center (APQC) in which they examined the use of social networking and other Web 2.0 collaboration tools to help employees identify experts and share knowledge.

NASA is tasked with space exploration, scientific discovery, and aeronautics research. NASA is headquartered in Washington, D.C. and operates 10 field centres in eight states. The NASA work force comprises more than 18,600 civil service employees along with 43,500 contractors and grantees who work at or near the NASA centres. The agency's data network includes 140,000 people. With a 2007 fiscal year budget of $15.1 billion, the agency conducts its work in four principle organisations, called mission directorates:

1. Aeronautics; pioneers and proves new flight technologies that enhance exploration and have practical applications on earth;

2. Exploration systems; creates new capabilities and spacecraft for affordable, sustainable human and robotic exploration;

3. Science; explores the Earth, moon, Mars, and beyond while charting the best routes of discovery and reaping the benefits of Earth and space exploration for society; and

4. Space operations; provides critical enabling technologies for NASA through the space shuttle, the International Space Station, and flight support.

3.2.2.2 Knowledge Management in NASA

In today's environment, engineers and scientists may work one to three years on a project and then move on. Individually they may gain a lot of knowledge, but that knowledge remains with them and is not captured or passed on broadly for future missions. New employees are tossed into a maelstrom of project implementation and expected to perform without any substantial introduction to NASA's processes, history, culture, and lessons learned. Rather than advocating a return to days of large projects, knowledge management principles offers a solution for moving ahead, acknowledging today's constraints and adapting to a world where technology and innovative processes must partially replace the mentoring and measured approaches of the past. NASA's knowledge, its intellectual capital, is the agency's primary, sustainable source of competitive advantage. Physical assets age, today's workforce is mobile, and technology is quickly bypassed. NASA's knowledge as an agency, however, can endure. This knowledge is a fluid mix of experience and know-how that allows NASA employees to strive for and achieve the improbable day after day. NASA's need to capture the key knowledge of its workforce and learn from its lessons is evident. The methods by which

they accomplish this goal are highly variable. The US Government, outside agencies, and NASA's own workforce are calling for NASA to infuse knowledge management practices into the daily work of the agency. This means providing access to information at the time people need it to make the best decisions possible for mission safety and success. For example:

- Providing an engineer the history of design decisions on previous projects;
- Giving a project manager access to the best risk management practices and tools when he or she needs them; and
- Providing the time for a senior scientist to mentor a promising young star.

Some of this can be accomplished through intelligent information technology solutions and improved access to NASA's already rich, explicit information. The larger part of this relates to capturing the tacit knowledge of their workforce and effecting cultural changes that will encourage people to share what they know.

In seeking the best way to achieve such a vision, the NASA Knowledge Management Team has set forth a Strategic Plan. The strategy is based on best practices in industry and is geared to specifically addressing the internal drivers for enhancing their ability to share knowledge among projects and with their partners. There are three goals where KM activities can help NASA's ability to deliver its missions:-

1. To sustain NASA's knowledge across missions and generations, *KM activities will identify and capture the information that exists across the Agency.*
2. To help people find, organise, and share the knowledge NASA already have, *KM implementations will help to efficiently manage the Agency's knowledge resources.*

3. To increase collaboration and to facilitate knowledge creation and sharing, *KM teams will develop techniques, tools, venues, and facilities to enable teams and communities to collaborate across the barriers of time and space.*

In realising these goals, some of the specific near-term objectives should include capturing key employee knowledge, managing the information resources they already have, and creating ways for remote teams to work collaboratively. The knowledge management efforts are envisioned as a coordinating function that encompasses implementation responsibilities that might be necessary to "fill the gaps" that exist between organisations.

NASA has developed its expertise location and social networking strategy in response to overarching knowledge management (KM) and human capital management needs. The organisation faces three main challenges from this respect.

1. Geographic dispersal - NASA's work force is spread across 10 different centres in eight states. This makes communication and collaboration difficult, especially on projects such as the Constellation program that require the various space centres to work closely with one another.

2. Ageing work force - The average age of NASA's civil servant work force is 46.4 years, and the average tenure is 17.9 years. Many of these older, experienced employees are nearing retirement, increasing the urgency for effective knowledge capture and transfer practices.

3. Mission transition - The current shift in focus from the space shuttle to the Constellation program requires changes to buildings, processes, budgets, and the work force as a whole.

NASA's KM Strategic Plan sets forth the roadmap to move to an environment that encourages knowledge sharing, preserves their organisational memory, and allows their employees to learn both

individually and from each other. NASA's knowledge management framework is featured on the next figure (Figure 22).

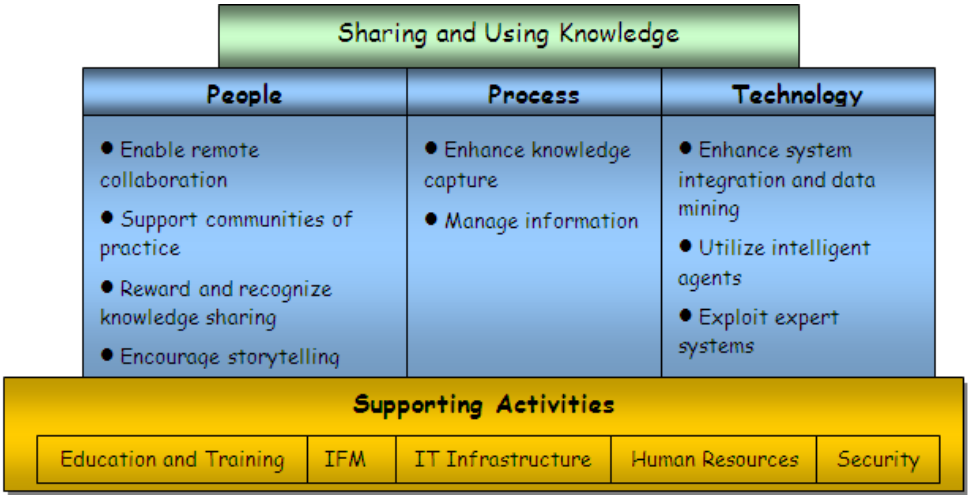

Figure 22 : NASA's Knowledge Management Framework

The Knowledge Management Environment at NASA

To achieve its knowledge capture and transfer goals, NASA has integrated KM into its engineering and project management life cycles. The agency's personnel, contractors, academic and global partners, and public stakeholders can tap into a range of knowledge resources including portals, networks, communities of practice, and a lessons learned database system (Figure 23). NASA has a lot of different audiences, so they want to make sure that they have a single infrastructure that can be repurposed dynamically for all of their audiences.

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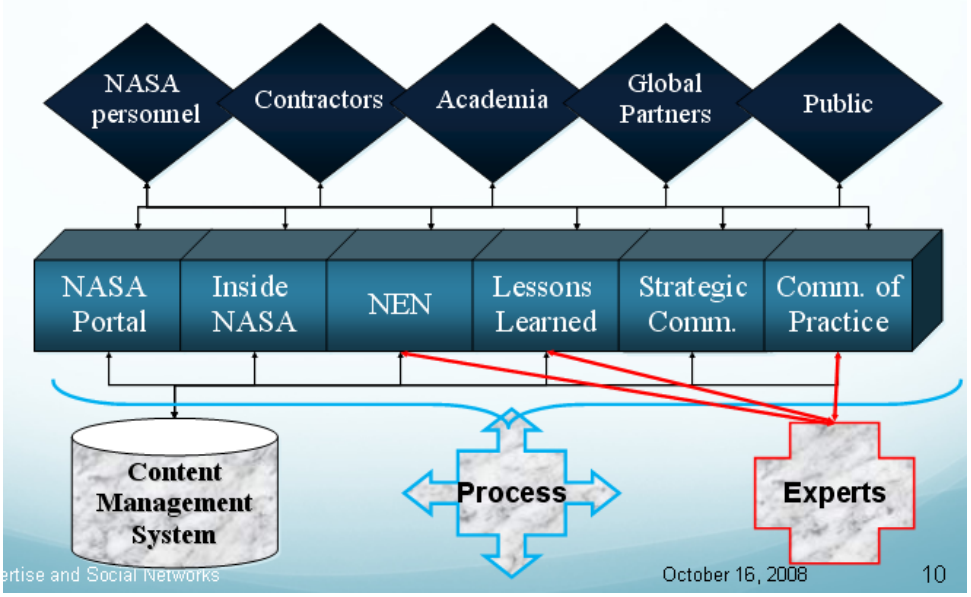

Figure 23 : NASA's Knowledge Management Environment

Some of NASA's most critical communications and knowledge platforms are described in the following sections.

NASA Portal

This public portal is designed to integrate NASA's Web resources for a broad audience including children, educators, students, and the media. Developed in just four weeks, the portal is highly interactive, easy to navigate using Google functionality, and incorporates automatic content migration from top NASA Web pages. The current version of the portal offers access to NASA TV, jobs, calendars of events, kids clubs, blogs, and interactive tests, among other features (Figure 24). Within minutes of the Mars exploration rovers landing, the site had streaming live coverage of the event and automatically uploaded images. There were 240 million unique visitors to the portal in 2007.

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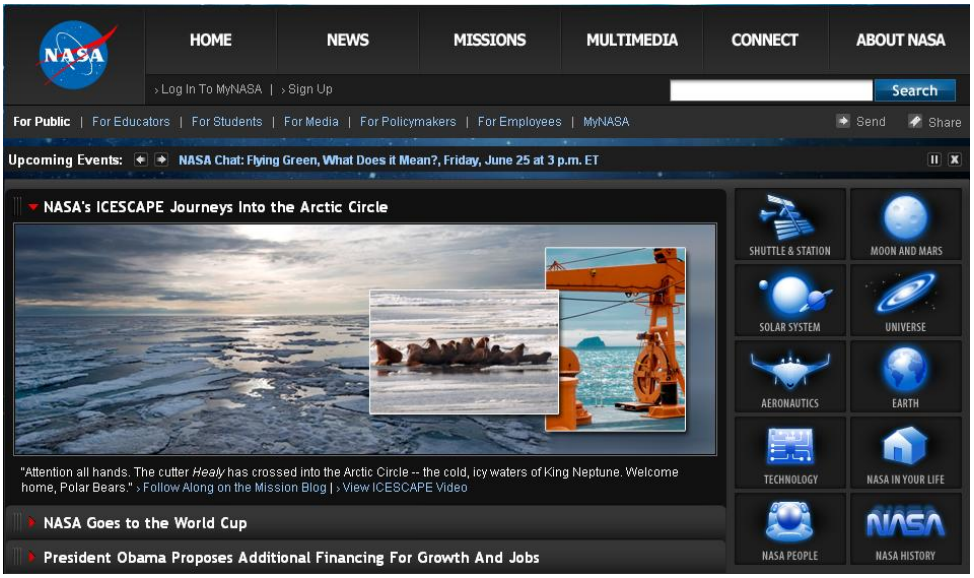

Figure 24 : NASA Public Portal

InsideNASA

InsideNASA is the agency's intranet portal for employees and partners (Figure 25). The portal is customisable as such that it highlights certain content depending on the location from which each user logs in. The portal is integrated with other NASA applications and lets users access vetted lessons learned and employee profiles. A combined Google and Verity search function pulls up a broad range of internal content. The portal also supports discussion forums and extranet capabilities for NASA's communities of practice; this functionality is typically used for collaborative writing projects and the development of standards and handbooks. Its features include:

- Access to e-mail and secure instant messaging;
- Collaborative tools such as wikis, e-rooms, and blogs;
- QandA forums with key administrators; and
- Community and team areas.

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Figure 25 : InsideNASA Intranet Portal

NASA Engineering Network

The NASA Engineering Network (NEN) is run by NASA's Office of the Chief Engineer and promotes learning and sharing across the agency's engineering population. The NEN delivers a wide range of resources including communities of practice, a "lessons learned" database, an agency-wide search function, expertise location functionality, and training to help NASA engineers solve problems and design solutions.

The goal is to capitalise on engineering and collaborative best practices while improving processes and elements of the organisational culture for which NASA has been criticised. From a technical perspective, the NEN

builds on shared infrastructure and seamlessly integrates with other NASA initiatives, distributed systems, and KM platforms. The network also incorporates information from academia, industry, contractors, other government organisations, and NASA personnel through internal and public-facing portals, collaborative tools, expert directories, and meta-search capabilities.

Communities of Practice

NASA has communities of practice for a number of projects and competencies. These communities disseminate critical lessons learned; provide forums for discussion, questions & answers as well as help employees find information. Each community has a charter, core team, and human facilitator and is integrated with document management functions.

Unlike other cooperative spaces within NASA, communities are mandated and led by NASA's Office of the Chief Engineer. Each person appointed to lead a community is a designated chief NASA expert in the topic around which the community is centred. These community leaders are tasked with considerable oversight responsibilities.

Lessons Learned Database System

NASA's Office of the Chief Engineer and engineering network provide public access to search the NASA lessons learned database system, which contains the official learned lessons from NASA programs and projects. All lessons are reviewed, validated, and approved before they are loaded into the database. Information associated with each lesson includes a summary of the original driving event and a set of recommendations that feed into NASA’s continuous improvement efforts via training, best practices, policies, and procedures.

Organisational and Cultural Issues

NASA leverages all its communications systems in support of the agency’s role as a learning organisation and its integrated approach to

applying best practices and lessons learned to its missions. Consequently, NASA is focused on innovation and breakthrough ideas. Because such ideas often occur at the boundaries of networks, the agency is interested in how its social networks intersect. In its attempt to communicate and collaborate beyond its organisational boundaries, NASA has developed some unique and very exposed ways to interact with external networks. In addition to sharing a large amount of agency information with the public on its website, NASA reaches out through a YouTube channel, weekly meetings open to the public, Facebook profiles for each space craft, frequent blog as well as Twitter posts, podcasts and other free content available through iTunes and various websites,—thus creating open forums in un-moderated public spaces.

NASA's Knowledge Management Achievements and Plans

NASA's recent accomplishments in the knowledge management (KM) space are summarised in Figure 26. As shown, the agency has experimented with and adopted a wide variety of new systems and platforms since 2003, each designed to support a distinct set of customers and stakeholders.

	Customers	Stakeholders	Systems	KM Infrastructure	Tools
2003	Educators and the public	The CIO, public affairs, and education	NASA Portal and KM for Space (U.N.)	O/S, applications and storage, and hosting (VeriCenter)	Digital Asset Management (eTouch), Vignette, Verity, Urchin
2004	NASA personnel	The CIO and strategic communications	InsideNASA and Research Web		SunOne, WebEx, eRoom
2005	Engineers and project teams	Engineers and mission directorates	NEN and emergency ops	Caching and streaming, service desk, and customization support	NASA Xerox (NX), Jabber (instant messaging)
2006	Disciplines and communities	Employees and senior management	Communities of practice		Semantic Web, W3C standards, expertise locator
2007	Engineers and partners	Scientists and peer-to-peer collaborators	InsideNASA v.2 and Collaboration 2.0		Social networking, Web 2.0, next-gen collaboration

Figure 26 : Milestones in NASA's KM System, 2003–2007

Looking ahead, NASA has mapped out specific goals for the next 25 years and defined how knowledge management will support those goals (Figure 27).

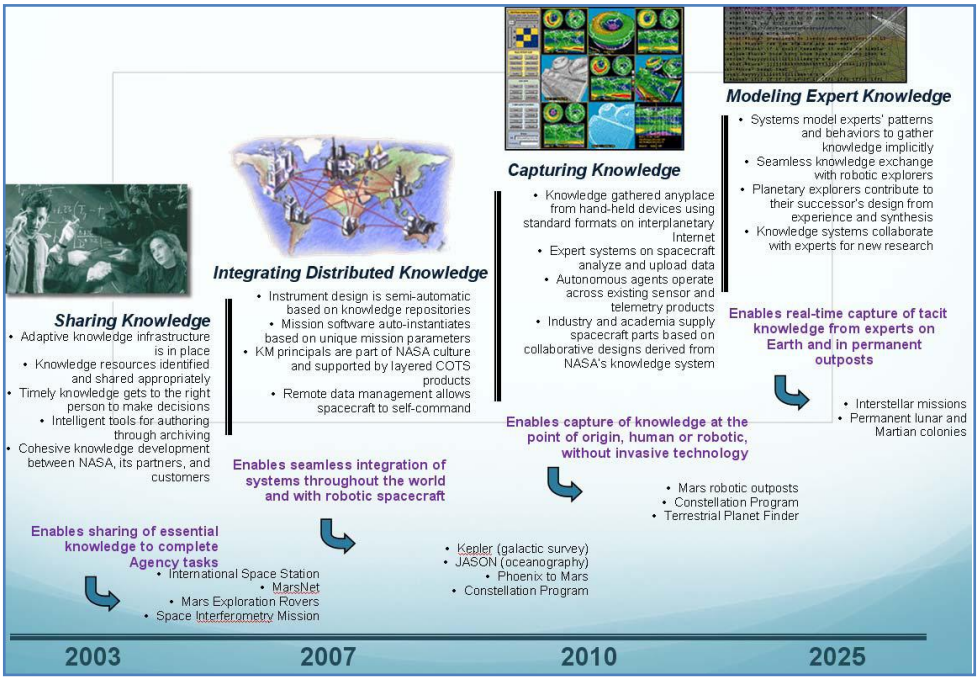

Figure 27 : NASA's KM Road Map

The agency is already researching how it can build the capabilities listed in Figure 27. One initiative involves developing a new agency-wide knowledge architecture that will update NASA's structured approach to integrating knowledge for mission success. The agency also plans to accelerate learning with a cohesive, integrated approach to e-learning. NASA will support its engineering efforts by driving multi-generational learning across its engineering network, facilitating communities of practice related to engineering and safety topics, and embedding lessons learned into its engineering practices. The agency also plans to help manage knowledge for aerospace and government through participation in the International Astronautics and Aeronautics U.N. Working Group on KM for Aerospace, the Federal KM Working Group, the Missile Defence Agency, and the U.S. Air Force Space and Missile Command.

3.2.2.3 Notable Examples of Other Federal Information Sharing

Nationwide Health Information Network (NHIN)

The Nationwide Health Information Network (NHIN) is an initiative for the exchange of healthcare information being developed under the auspices of the U.S. Office of the National Coordinator for Health Information Technology (Office of the National Coordinator for Health Information Technology, 2004)[6]. The Office of the National Coordinator for Health Information Technology (ONC) has been facilitating development of the NHIN, which will tie together health information exchanges, integrated delivery networks, pharmacies, government, labs, providers, payers and other stakeholders into a "network of networks". Health and Human Services Secretary Michael Leavitt has stressed, however, that the NHIN will be a public-private venture (NHINWatch, 2004)[7]. Foundations such as the Markle Foundation, the Robert Wood Johnson Foundation and the California HealthCare Foundation are now providing financial support for research and demonstration projects that could lead to advances in the development of a nationwide health information network. The NHIN is being developed to provide a secure, nationwide, interoperable health information infrastructure that will connect providers, consumers, and others involved in supporting health and healthcare. This critical part of the national health ICT agenda will enable health information to follow the consumer, be available for clinical decision making, and support appropriate use of healthcare information beyond direct patient care so as to improve health.

[6] *Office of the National Coordinator for Health Information Technology (2004). Retrieved from http://healthit.hhs.gov/portal/server.pt/gateway/PTARGS_0_10741_877368_0_0_18/WhatIsTheNHIN.pdf*

[7] *NHINWatch (2004). Retrieved from http://www.nhinwatch.com/performSearch.cms?channelId=6*

The NHIN seeks to achieve these goals by:

- Developing capabilities for standards-based, secure data exchange nationwide;
- Improving the coordination of care information among hospitals, laboratories, physicians offices, pharmacies, and other providers;
- Ensuring appropriate information is available at the time and place of care;
- Ensuring that consumers' health information is secure and confidential;
- Giving consumers new capabilities for managing and controlling their personal health records as well as providing access to their health information from electronic health records (EHRs) and other sources;
- Reducing risks from medical errors and supporting the delivery of appropriate, evidence-based medical care; and
- Lowering healthcare costs resulting from inefficiencies, medical errors, and incomplete patient information.

Scope of Activities

The Nationwide Health Information Network (NHIN) is built upon a core set of capabilities to enable nationwide information exchange encompassing a diverse set of organisations, technologies and approaches. Core capabilities include:

- Ability to find and retrieve healthcare information within and between health information exchanges and other organisations;
- Ability to deliver a summarised patient record to support patient care and to support the patient's health;

- Ability to support consumer preferences regarding the exchange of his or her information, including the ability to choose not to participate in the NHIN;
- Support secure information exchange;
- Support of a common trust agreement that establishes the obligations and assurances to which all NHIN participants agree;
- Ability to match patients to their data without a national patient identifier; and
- Support of harmonised standards, which have been developed by voluntary consensus standards bodies for exchange of health information among all such entities and networks.

The core capabilities of the NHIN establish an interoperable infrastructure among distinct networks and systems that allows for different approaches and implementations, while ensuring secure information exchange as needed for patient care and population health.

Homeland Security Information Network (HSIN)

HSIN is a comprehensive, nationally secure and trusted web-based platform able to facilitate Sensitive But Unclassified (SBU) information sharing and collaboration between federal, states, local, tribal, private sector, and international partners (US Department of Homeland Security, 2003)[8]. The HSIN platform was created to interface with existing information sharing networks to support the diverse Communities of Interest (COI) engaged in preventing, protecting from, responding to, and recovering from all threats, hazards and incidents under the jurisdiction of the Department of Homeland Security.

[8] *US Department of Homeland Security (2003). Retrieved from http://www.dhs.gov/files/programs/gc_1156888108137.shtm*

Built to enable collaboration through the use of web-based technology, HSIN facilitates collaboration among the various states, territories, the National Capital Region, and major urban areas. HSIN supports Department components and partners in the gathering, analysis and distribution of relevant, timely, and actionable mission-focused information across federal, state, and local government, and private industry COIs.

A key by-product of HSIN is the ability to provide real-time, interactive connectivity between states and major urban areas and the National Operations Centre (NOC). HSIN is focused on providing a collaborative environment that interoperates with existing mission area systems developed and managed by our federal, state and local partners. HSIN is focused on enhancing collaboration rather than duplicating the capabilities provided by our partners. As a result of its unique perspective, HSIN facilitates collaboration between mission areas such as Law Enforcement, Emergency Management, and Critical Sectors.

Mission Areas

HSIN has five major mission areas which allow local, state, and federal organisations, private sector partners, critical sector organisations like utility companies, fusion centres and government agencies with multi-missions to collaborate on HSIN everyday:

- Intelligence and Analysis;
- Law Enforcement;
- Emergency Management;
- Critical Sectors; and
- Multi-Mission Agencies.

By using HSIN, these diverse communities are able to work together to perform investigations, identify terrorist activities, respond to areas

affected by natural disasters and provide coordination during recovery operations.

HSIN Capabilities

HSIN offers many dynamic capabilities including:

- 24/7 availability;
- Document Libraries;
- Instant-messaging tool;
- Web conferencing;
- Incident reporting;
- Common Operational Picture (COP) provides situational awareness and analysis;
- Integrated Common Analytical Viewer (iCAV) gives geographical visualisation;
- Announcements;
- Discussion Boards;
- Task Lists;
- Requests For Information/For Your Information (RFIs/FYIs);
- Calendars;
- Really Simple Syndication (RSS) Feeds; and
- Online training materials.

National Information Exchange Model (NIEM)

To identify and facilitate information sharing between agencies, the U.S. Department of Justice (DOJ) and the U.S. Department of Homeland Security (DHS) launched National Information Exchange Model (NIEM) through a partnership agreement between their Chief Information Officers (CIO) on February 28, 2005. The NIEM is an XML-based information exchange framework from the United States (NIEM Program Management Office, 2007)[9]. NIEM represents a collaborative partnership of agencies and organisations across all levels of government (federal, state, tribal, and local) and with private industry. The purpose of this partnership is to effectively and efficiently share critical information at key decision points throughout the whole of the justice, public safety, emergency and disaster management, intelligence, and homeland security enterprise. NIEM is designed to develop, disseminate, and support enterprise-wide information exchange standards and processes that will enable jurisdictions to automate information sharing.

NIEM is an outgrowth of the United States Department of Justice's Global Justice XML Data Model (GJXDM) project (US Department of Justice, 2005)[10]. NIEM is now being expanded to include other federal and state agencies such as the Office of the Director of National Intelligence, Federal Bureau of Investigation, Texas, Florida, New York, Pennsylvania, and others.

Motivation for NIEM

Courts, for example, have widely adopted sophisticated case-management systems that meet their day-to-day internal operational needs, but they often do not routinely share information electronically with other agencies throughout the justice enterprise. Similarly, law enforcement has adopted computer-aided dispatch solutions, mobile

[9] *NIEM Program Management Office (February 2007). Introduction to the National Information Exchange Model. Retrieved from http://www.niem.gov/topicIndex.php?topic=file-introduction*

[10] *US Department of Justice (2005). National Information Exchange Model. Retrieved from http://www.it.ojp.gov/default.aspx?area=nationalInitiativesandpage=1012*

field-reporting technologies, and records-management and crime-analysis systems that meet their internal operational needs. Few communities throughout the nation, however, have successfully established integrated justice information sharing solutions that enable real-time, enterprise-wide sharing of critical data at key decision points. The result is a series of information system silos that perhaps meet the operational needs and reflect the business practices of individual organisations but are not positioned to effectively share critical data with others in support of day-to-day operations and emergency situations.

NIEM is designed to facilitate the development of enterprise-wide information exchange standards which can be uniformly developed, centrally maintained, quickly identified and discovered, and efficiently reused. NIEM is not a software program, database, network, or computer system. NIEM is designed to facilitate the creation of automated enterprise-wide information exchanges which can be uniformly developed, centrally maintained, quickly identified and discovered, and efficiently reused. The result is more efficient and expansive information sharing between agencies and jurisdictions, more cost-effective development and deployment of information systems, better quality decision making as a result of more timely, accurate, and complete information, and tangible improvements in public safety and homeland security.

U.S Department of Agriculture (USDA) MGen Enterprise 3.0

A learning, knowledge and human capital management system is being used by the U.S. Department of Agriculture (USDA) to integrate its knowledge assets. The USDA is using the solution from MGen to streamline business processes and reduce costs for such applications as training, news and information, knowledge communities, organisational knowledge management and human capital management.

MGen Enterprise 3.0 will help deliver several critical capabilities to the organisation: compliance with all government-related standards; the ability

to function across several layers of administration in large, dispersed groups; and the ability to create an integrated environment of learning, human capital management and information sharing. Using the software, the USDA can deliver training and communications materials to and share intellectual capital with 110,000 employees and, eventually, with public and private sector clients across the country. With the MGen Enterprise, they can link the various agencies of the USDA under one standards-compliant platform and leverage content across agency boundaries, reducing the amount of duplicate courseware. This will allow USDA to reduce costs and develop more content and courses to the employees and public/private sector clients that make up the USDA. The USDA has already achieved great success with the mGen Enterprise platform. With the help of mGen, the USDA created and hosted agency-specific courseware for dairy brokers and producers participating in the Dairy Options Pilot Program. David Vennell, an official from USDA Office of Communications, USDA On-Line University Administrator stated, "The dairy brokers and producers were given the option to take the certification program either in a traditional classroom or online via mGen Enterprise. Initially, I thought we would get a 10 percent response to the online program. However, 100 percent of the participating dairy brokers and producers opted to take the certification program online. The program has been a complete success, as 100 percent of the participating brokers and dairy producers have been certified using the mGen system. We are now positioned to begin the roll-out of the second phase of this training and expect the same successful results." (KMWorld, 2002)[11].

Jack Battersby, CEO and president of mGen stated, "The USDA is a complex organisation that must fulfil a variety of missions. mGen Enterprise is an ideal solution for large organisations, such as the USDA, that need to develop a variety of content and at the same time, leverage the knowledge assets already contained in each agency. In the case of the USDA, we enable trainers to do what they are paid to do - train. We

[11] *KMWorld (7 May 2002). USDA stamp of approval. Retrieved from http://www.kmworld.com/Articles/News/KM-In-Practice/USDA-stamp-of-approval-10085.aspx*

provide the tools that enable organisations to participate in a truly blended learning environment and expand according to their needs." (BusinessWire, May 2002)[12].

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[12] *BusinessWire (May 2002). USDA to Provide Personnel With a Variety of Knowledge Asset Applications to Streamline Business Processes and Reduce Training Expenses. Retrieved from http://findarticles.com/p/articles/mi_m0EIN/is_2002_May_7/ai_85499620/*

4 Knowledge Management Overview

The relevance and importance of knowledge is becoming increasingly important as we transition from an industrial era into an information and knowledge era. With the arrival of the knowledge and information age as well as the service economy, the importance of effective knowledge and management has been emphasised by several scholars and industry analysts (Quinn, 1992; Toffler, 1990; Nonaka, 1991; Glazer, 1991; Leonard-Barton, 1992; Bohn, 1994; Klein and Prusak, 1994). In fact, knowledge has been proposed as the primary source of wealth creation (Cole, 1998), and knowledge protection has been suggested as critical to generate and sustain competitive advantage.

Knowledge has also been recognised as the strategic resource by all types of organisations and institutions, whether private and public, service oriented or production oriented. As public sectors around the world are focusing on enhancing their delivery service delivery, knowledge management has increasingly crucial. This is due to the fact that citizens and businesses are demanding for more effective and efficient service quality. It is noted that e-government services are expected to be available the time with immediate response, simplified one-stop processing (Luen and A-Hawamdeh, 2001).

Knowledge is a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. In organisations, it often becomes embedded not only in documents and repositories but also in organisational routines, processes, practices, and norms. (Tim Butler, Encyclopedia of Knowledge Management)

In addition, one of the key success factors for knowledge management efforts within the public sector is the ability to identify the relevant knowledge, as well as to manage and extract valuable information out of this knowledge. It is the process in which the public sector performance is improved through better management of knowledge. Its goal is to improve the management of knowledge processes so that all information required to provide service to the citizen can be made available and efficiently used.

At the same time, this process aims to cultivate a knowledge sharing culture within public sector. A well designed Public Sector Knowledge Management Framework and Implementation Methodology is important in order to effectively organise and manage the information that is shared. The consolidating of all current and future public sector Knowledge Management efforts into an interconnected network will allow for a better and effective information service delivery across government agencies which will enable the realisation of a connected government.

4.1 Definition of Knowledge Management

Knowledge management (KM) has been defined differently by various authors and practitioners. Misra (2007) defines knowledge management for government as “leveraging knowledge to improve internal processes, for formulation of sound government policies and programmes for efficient public service delivery for increased productivity”.

For the purpose of this study, **knowledge management** is defined as the process of **managing and leveraging the stores of knowledge** such as documentation, business process or experience in an entity by transforming information and intellectual assets into enduring value in order to provide services to the public and to improve performance. An example would be the sharing of presentation slides, materials and / or

work information by keeping the “knowledge” in a public shared location that is accessible by any officers within the agency.

The other key term is “knowledge analysis”. In order to analyse an object, one must first describe it. In KM, taxonomy is the most common method that facilitates description and analysis of knowledge.

As different kinds of knowledge require different modes of representation, taxonomy becomes the central link between knowledge engineering and knowledge management. For instance, accounting data are represented as data records; routine manipulation of the data is performed employing accounting knowledge embedded in programs. Organisational use of accounting data may be mediated by expert systems, which are generally realised as a special form of rule-based programs. Thus, in order to effectively design a knowledge management system, one must first classify the types of knowledge to be embedded in it and hence the importance of a knowledge taxonomy. It is also imperative that knowledge management processes are taken into consideration to enhance the accessibility to all relevant information; thus resulting in the overall performance improvement of the public sector.

4.1.1 Type of Knowledge

Generally, there are two types of knowledge in knowledge management, which is explicit knowledge and tacit knowledge.

- **Explicit Knowledge**

  Explicit knowledge exists in the form of words, sentences, documents, organised data, and computer programs and in other explicit forms. In the public sector this may include documents stored in file servers, the intranet, third party reference material, training material, or business processes and policies. A fundamental problem of KM is to

explicate tacit knowledge and then to make it available for use by others.

- **Tacit Knowledge**

  Some knowledge is embedded in business processes, activities, and relationships that have been created over time through the implementation of a continuing series of improvements. Tacit knowledge inhabits the minds of people and is either impossible, or difficult, to articulate. Most knowledge is initially tacit in nature; it is laboriously developed over a long period of time through trial and error, and it is underutilised because "the organisation does not know what it knows" (O'Dell and Grayson, 1998, p. 154)[13].

Basically, explicit knowledge is documented, articulated into formal language, formally expressible and easily communicable, whereas tacit knowledge is difficult to express. It is articulated through actions used by employees to perform their tasks and achieved during face-to-face interactions, meetings, teleconferencing and electronic discussion forms.

In relation to public sector, types of knowledge depend on the functions of the agencies as government is the highest knowledge consumer and knowledge producers. Based on the Journal of Knowledge Management, common sources of knowledge within the public sector includes vision & national strategic plans, government documents, laws, rules & regulations, notifications, archives and directives among others.

4.1.2 Knowledge Management Processes

Knowledge processes are perceived as an enabler of the organisation to capture, reconcile, and transfer knowledge in an efficient manner, Based on KPMG's knowledge management approach that aims at bridging from

[13] *O'Dell, C., and C.J. Grayson. 1998. If only we knew what we know: identification and transfer of internal best practices. California Management Review 40(3): 154–174.*

strategy to business, six (6) knowledge processes has been identified as highlighted in the figure below.

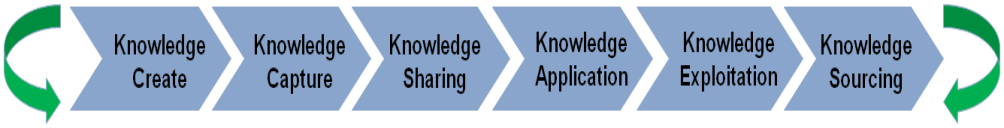

Figure 28 : Knowledge Management Processes

There is a need to emphasise the cyclical nature and means of managing an organisation's knowledge assets (knowledge that is valuable to an organisation). Without the abilities to create, capture, share, apply, exploit and sourcing knowledge that positively affects the operation of our organisations, knowledge management can be considered as non-existence.

A perpetual knowledge learning organisation is viewed as manifesting a cyclical process of six activities: create, capture, share, apply, exploit and sourcing. During this cycle; analysis, plans, and actions are formulated in terms of the above six basic operations on knowledge that can be executed in organisations.

- **Knowledge Create**

  In this process, new knowledge is created out of existing knowledge; as shared knowledge being applied and mixed together, it will ultimately give birth to new knowledge. This process will be supported and recognised in all area of organisation and should not be limited to Research and Development.

- **Knowledge Capture**

  This refers to the process of identifying the critical competencies, types of knowledge, and the right individuals who have the necessary

knowledge that should be captured. It relates to how we collect knowledge from members of the organisation or other sources, and it relates to the processes of knowledge discovery.

- **Knowledge Sharing**

  This relates to the ability to obtain the relevant knowledge to the person who needs it at the right time. The captured knowledge is shared between individuals, departments, agencies, and / or ministries.

- **Knowledge Application**

  The knowledge application process involves applying knowledge to gain competency, which includes retrieving and using knowledge in support of decisions, actions, and problem solving.

- **Knowledge Exploitation**

  Knowledge exploitation process is referring to the organisation activities taking full advantage of its knowledge by applying and reapplying existing knowledge assets to increase organisational effectiveness.

- **Knowledge Sourcing**

  This process is about acquiring new knowledge that is useful to the organisation and storing it into the knowledge repository.

4.2 Knowledge Management Learning Environment Methodology

Cohen and Levintal (1990) stated that the ability of expanding the knowledge base in an organisation depends on the level of learning and on the previous knowledge base of the individuals in the organisation;

which extend their ability to obtain further knowledge. In order to ensure the sustainability of the public sector knowledge management initiative, it is important to focus on the creation of a perpetual learning organisation within the public sector via knowledge management. In an organisation that has continuous learning as its core value, this will be used as a source of reference as well as learning tool to gauge the effectiveness of past and current initiatives. It will also allow for the public sector to be creative and innovative, deliver better service and / or even create new service to serve the citizens through learning from knowledge shared with other government agencies as well as lesson learned in past activities or initiatives.

KPMG Knowledge Management Learning Environment Methodology is as illustrated in the figure below.

Figure 29 : Knowledge Management Learning Environment Methodology

The key elements of the methodology are:

- **Learn before** considers we learn before we start a new job or piece of work. This includes; has someone done it before? Are there knowledge / information already available? Are we making the right

decisions based on past experiences? If we re-use knowledge, will it allow time to focus on activity that has not been done before?

- **Learn during** considers what we learn during the process of carrying out a job or piece of work. This includes: assessing how we are doing? Are we likely to achieve our objectives? Are we on the right track? Are we working as a team?

- **Learn after** considers how we leverage off our experience. This includes; when we do this again how we can do it better? Who can make use of what we've learned? What did we do really well that gives us an edge on our competitors?

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5 Analysis

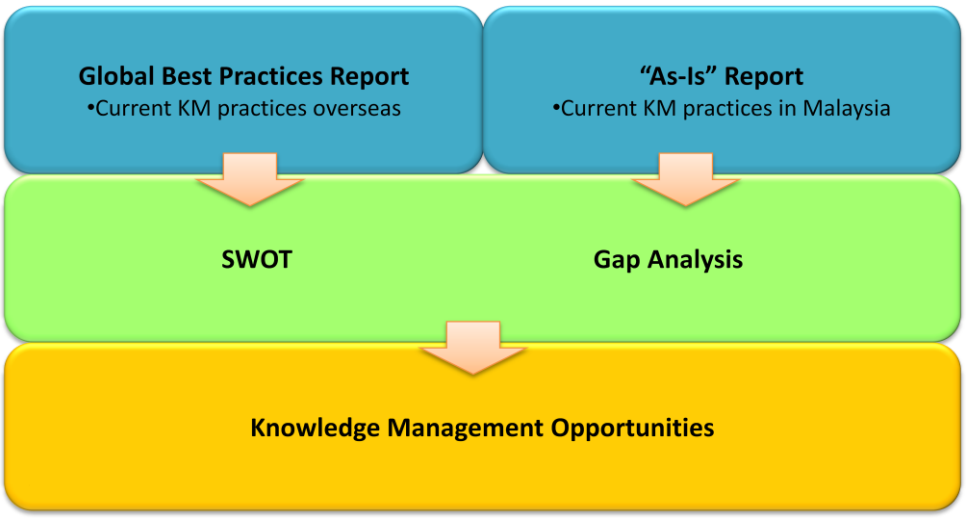

Figure 30: Analysis Approach

In order to find out the knowledge management opportunities suited for the knowledge management public sector in Malaysia, a systematic analysis approach was conducted. Based on the knowledge management practices by other public sector overseas and current knowledge management practices in Malaysia, a SWOT and gap analysis was conducted to assess the current strengths, weaknesses, opportunities and threats faced by the knowledge management within the public sector in Malaysia and what elements or features that can be further enhanced or improved based on current successful knowledge management implementation within the government agencies in Malaysia and also abroad. Based on the results found within the SWOT and gap analysis, a few strategic knowledge management opportunities for the Malaysian public sector are then suggested as part of the recommended output for the public sector.

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5.1 SWOT

SWOT analysis is a strategic planning tool used to evaluate the Strengths, Weaknesses, Opportunities, and Threats involved in implementing knowledge management. It involves monitoring the environment of the public sector with the aim to identify the key internal and external factors that are important to achieving the objectives. Figure 31 below depicts the SWOT quadrant with respect of time.

Figure 31 : SWOT Grid

SWOT is used to develop a plan that takes into considerations many different factors and maximises the potential of the strengths and opportunities while minimising the impact of the weaknesses and threats during implementation of knowledge management initiative.

Figure 32 below shows the major strengths, weaknesses, opportunities and threats for current knowledge management environment in the public sector.

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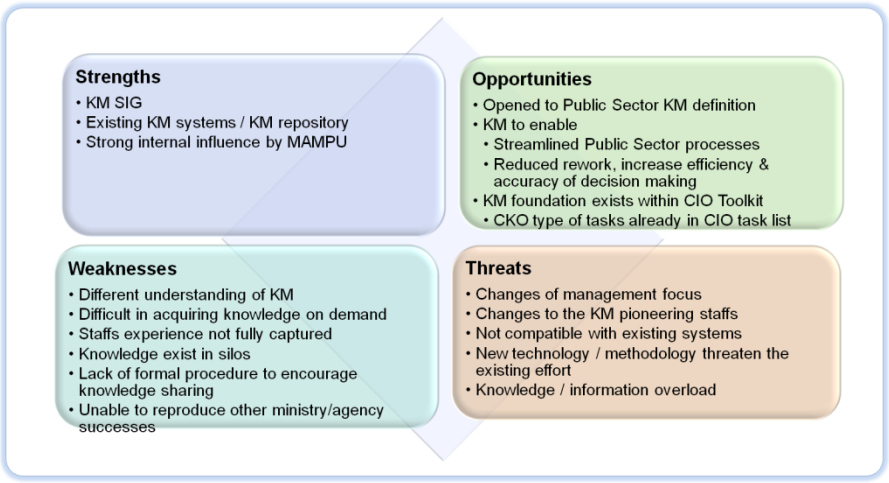

Figure 32 : Public Sector KM Strengths, Weaknesses, Opportunities and Threats

- **Strengths**
  - The public sector has taken the first steps by setting up a knowledge management Special Interest Group (SIG) to get all the interested parties together to lay down the ground work for public sector knowledge management.

  - Most of the systems that exist in the current environment (such as the application systems that resides in the Enterprise Wide Application) are actually already part of knowledge management, or information repository for knowledge management (for example, document management systems, performance management systems, staffs online forums). Therefore, this will make it easier for the implementation of knowledge management in the public sector as most of them will already be familiar with some of the knowledge management tools.

  - MAMPU, who is in charge of administrative modernisation and management planning for the public sector understands the importance of knowledge management and gives strong support in encouraging knowledge management initiatives such as setting up an informal Knowledge Management Special Interest

Group (SIG) and introducing the knowledge bank concept within the public sector ICT framework for year 2003. Therefore, this makes it easier for the public sector to start a knowledge management initiative to further improve on its current knowledge bank initiative.

- **Weaknesses**
  - Different understanding of knowledge management may lead to lack of understanding of what is knowledge management. Based on the facts finding session conducted in the "As-Is" report, this is due to the perception of the agencies that only if an agency has a knowledge portal, therefore only then does the agency has a knowledge management strategy, even though it has adopted other knowledge management tools such as a document management system.

  - It is currently difficult to acquire knowledge amongst the government agencies based on demand due to the extra effort and time needed to gather the knowledge before delivering it to the respected party. This is due to the fact that most government information are still stored in either softcopy (words or spreadsheet format) or hardcopy and therefore, it takes time for the agency involved to vet through the information before delivering it to the agency who requested for it.

  - Currently there is no proper method to capture the knowledge of experienced staff during and even as they are about the leave the government agency. It is noted that experiences that are vital in smooth running of operations are lost when the staff leaves the government agency as most agencies rely on other methods and the *Nota Serahan Tugas* instead of conducting a critical incident interview or questionnaire where staff will be interviewed and will have to fill in a questionnaire on how to handle all possible critical incidents that may arise that requires his or her

knowledge and expertise. It is imperative that the public sector must be able to capture the knowledge and experience of their employees to be able to change their tacit knowledge into organisational knowledge, so that the knowledge remains within the organisation even after the employee is no longer with the organisation.

- Knowledge exists in silos across the government agencies as there is currently a lack of knowledge sharing within the government agencies. Hence, before knowledge can be found, one must first identify where the required knowledge is stored and then obtain access to the said application.

- There's a lack of formal procedure to encourage knowledge sharing as currently there is no formal governance structure as well as recognition and rewards structure in place to encourage staffs to share knowledge.

- Due to the lack of knowledge sharing amongst government agencies, it will be difficult to reproduce the successes of other government agencies. Thus, knowledge that could have easily been replicated will have to be reproduced or reinvented at other government agencies again.

- **Opportunities**
  - Since knowledge management is still a new concept and has yet to be implemented in most government agencies, there is an opportunity to properly define the meaning of knowledge management for the public sector. Workshops and road shows can be carried out to introduce knowledge management to all government agencies. The public sector agencies that do not understand of knowledge management will be educated on knowledge management ideology that is specifically tailored for the Malaysian public sector.

- Done right, knowledge management will be a vital initiative in supporting the government's vision to achieve Knowledge Excellence as Catalyst towards Effective Service Delivery via a whole of government approach, by streamlining the business processes to reduce rework, increase work efficiency as well as to improve collaboration between the public and private sectors.

- Some of the tasks of a Knowledge Leader (KL) have already been defined as part of the tasks of the Chief Information Officer (CIO) within the CIO Toolkit version1.0 by MAMPU. The initial definition and tasks for a knowledge management and knowledge broker have also been defined within the CIO Toolkit version1.0. Therefore, this will be a good foundation for setting up the role of the Knowledge Leader, knowledge manager and knowledge broker in the future within the public sector as it may be considered as an enhancement of the current tasks that have already been defined.

- **Threats**
  - Change of management focus during the development or / and implementation of knowledge management may cause the implementation of knowledge management to slow down or halt altogether as vital resources for knowledge management may be channelled away to be allocated for other projects; thus this will impact the success of the knowledge management initiative.

  - Change of knowledge management pioneering staff during the implementation of knowledge management initiatives also poses a great threat as it may cause the implementation of knowledge management to slow down or halted altogether.

  - Future knowledge management that are developed and implemented in silos may be incompatible with current existing

systems if no standard knowledge management is proposed within the public sector.

- Emergence and adoption of new technology such as mobile technology, might introduce compatibility and integration issues to existing initiatives if it is not properly addressed. These new technologies will threaten the existing effort and render the existing knowledge management initiative obsolete.

- If the knowledge is not managed carefully, it may cripple the knowledge management initiative as well as cause an information / knowledge management overload. This will cause staff to abandon the usage of the knowledge management as it will be too cumbersome to find the exact knowledge that they want or need.

5.2 Gap Analysis

In assessing the current knowledge management environment in the public sector, it is imperative to understand and conduct environmental scanning of the current situation and assess it impact on the future knowledge management implementation. This will provide a better understanding of the knowledge management practices and environment as well as the key challenges and issues that deter the development of knowledge management in the public sector. It is also crucial to address the gaps to ensure the public sector aspirations and objectives in achieving the future scenario will be achieved.

The assessment of the gap analysis is based on four (4) key focus areas; namely Governance, People and Culture, Process and Technology (See Figure 33). Key areas of improvements were analysed and the gap was identified based on the criticality analysis as highlighted in the Table 1 below.

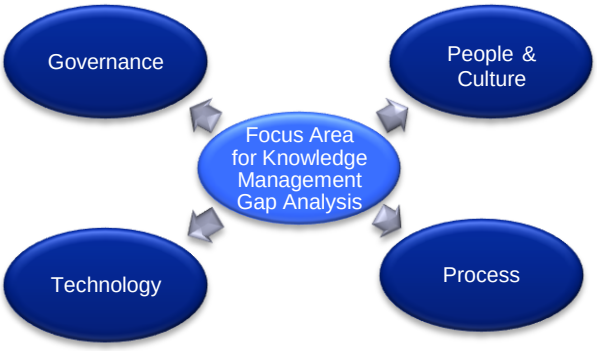

Figure 33 : Gap Analysis Focus Area

Gap		Key Definition
	Slight Gap	Minimum strategies and action plans are required to achieve the objectives.
	Serious Gap	Additional strategies and action plans are required in achieving the objectives.
	Critical Gap	New and additional strategies and action plans are required; failing to do so results in objectives not being met.

Table 1 : Key Definitions of Gaps (Source: KPMG Analysis)

Based on the gap analysis, key preliminary recommendations are outlined to address the identified gaps.

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5.2.1 Governance

Key Focus Area	Key Findings	Impact	Gap	Preliminary Recommendations
Governance				
Policy	• Currently there is a lack of detailed knowledge management policy & guideline for users as there is no standard public sector knowledge management policies and guidelines for the public sector to refer to when they are about to embark on knowledge management.	• Inefficient and ineffective knowledge management implementation.		• To create knowledge management policy & guidelines.
Benefit Management & Realisation	• For those who have implemented knowledge management within their agencies, it is noted that there is a lack of reward and	• Stagnate the nurturing of knowledge sharing culture. • Lack of knowledge management system utilisation.		• To create reward & benefit to encourage staff contribution & consumption of knowledge in knowledge management system.

Key Focus Area	Key Findings	Impact	Gap	Preliminary Recommendations
	recognition for adopting knowledge management practices. Therefore, it is noted that the improvement of knowledge management practices within an agency from knowledge contributors and knowledge expert is only a small percentage (4%) based on the result of the survey conducted for the "as-is" report.			
Organisation Structure	• Currently, there is a lack of a specific role or champion such as a Knowledge Leader to take ownership of the knowledge management within the agencies. However, based on current	• No dedicated role to ensure sustainability of knowledge management initiatives. • Lack of knowledge sharing impacts efficiency and effectiveness service delivery.		• To create a Central KM Advisory Panel to spearhead/drive knowledge management initiative. • To drive knowledge management based on a top down approach through the introduction of a Knowledge Leader and a KM office as well as to ensure

Key Focus Area	Key Findings	Impact	Gap	Preliminary Recommendations
	findings, it is acknowledged that most of the government agencies prefer to have a champion to lead the knowledge management initiative within their respective agencies. • It is noted that currently some of the Knowledge management initiatives within the public sector are driven by either the ICT department, corporate division or the library.			that the knowledge management is to be lead by the Corporate Division.

5.2.2 People & Culture

Key Focus Area	Key Findings	Impact	Gap	Preliminary Recommendations
People & Culture				
Change Management	• Based on the workshop conducted for the knowledge management blueprint, it is shared that the perception that one must pay for knowledge (meaning that the sharing of knowledge freely does not occur naturally and will require something else in return) have resulted in minimal knowledge contribution and sharing efforts. • Agencies believe that the information they have solely belong to them and thus	• Minimal knowledge contribution and sharing.		• To create reward & benefit to encourage staff contribution & consumption of knowledge in knowledge management system.

Key Focus Area	Key Findings	Impact	Gap	Preliminary Recommendations
	place little importance in sharing the information with other agencies. • The concept of "knowledge is power" causing user not willing to share.			

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5.2.3 Technology

Key Focus Area	Key Findings	Impact	Gap	Preliminary Recommendations
Technology				
System	• Lack of awareness that many existing enterprise wide applications such as MyMeeting and document management system are actually already part of knowledge management. However it is noted that not many government agencies are aware that these are part of knowledge management • Some of the reasons for a user to have lack of interest to use the knowledge management within their organisation are due to the	• Creation of knowledge management system with elements that may already exist (duplication.) • Lack of knowledge management system utilisation.		• To create guideline & awareness. • To start with a handful of knowledge to get user excited and contribute. • To ensure ease of use for users to get user buy-in

Key Focus Area	Key Findings	Impact	Gap	Preliminary Recommendations
	user's perception that the knowledge management system is not easy for the users to use.			
Tools	• Few agencies already implementing knowledge management. Each has own knowledge management practices and adopts own knowledge management technology for own usage. • Knowledge sits in silos. • Powerful search engine for knowledge searching that search across multiple knowledge management systems is non existence.	• Knowledge only available inside specific environment. • Non-standardise knowledge management tool poses great difficulty in terms of compatibility to share knowledge across different tools.		• To centralise knowledge management policies, procedures & practices. • To include semantic technology for knowledge tagging.

Key Focus Area	Key Findings	Impact	Gap	Preliminary Recommendations
Knowledge Content	• Due to the fact that there is no standard definition of knowledge management within the public sector, this may result in a duplication of knowledge at two or more knowledge sources or storage (for example, the same document is stored in a document management system and a shared server) due to different understanding of knowledge management within the public sector. • Knowledge content that is not tagged and/or not sieved properly by a knowledge manager who handles the	• Duplication of knowledge may cause confusion amongst the public sector on which knowledge management initiative has the latest up-to-date knowledge • Slow system response. • Users might lose faith on the knowledge obtained from the system.		• To perform routine knowledge screening to remove old or duplicated knowledge. • To create effective searching capability such as a powerful search engine or the idea of maximum of three clicks to get the information or knowledge that is needed by the user.

Key Focus Area	Key Findings	Impact	Gap	Preliminary Recommendations
	content management will cause an information overload by the users of the knowledge management initiative.			

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5.2.4 Process

Key Focus Area	Key Findings	Impact	Gap	Preliminary Recommendations
Process				
Knowledge Management Coordination	• Different opinion on which department should spearhead knowledge management initiatives. • Knowledge management sustainability is still driven externally by system implementer.	• Knowledge management initiative is not aligned to the core business thus reducing the effectiveness of capturing knowledge assets. • Low usage of knowledge management system.		• To create procedures to identify knowledge asset and recommend corporate division as the department to spearhead knowledge management initiatives. • To introduce processes that create a natural supply and demand eco system that naturally drive user to contribute & consume knowledge. • To include user opinion in the early stage of knowledge management initiative.

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5.3 Opportunities for the Public Sector

Based on the Global Best Practices Report, a further in-depth analysis on the United Kingdom as well as United States of America's current public sector's knowledge management initiatives with regards to knowledge management practices as well as their enabling environment such as the tools used and knowledge management friendly organisation structure. The characteristics of these countries and knowledge management initiatives were then compared with the current findings of Malaysia's knowledge management initiatives as depicted in the "As-Is" Report and in this Knowledge Management Blueprint.

From these findings, potential knowledge management initiative opportunities in Malaysia are then identified. Knowing where Malaysia stands amongst these countries and where the developed countries are heading in terms of public sector knowledge management initiative is critical before Malaysia starts it own public sector knowledge management initiative to ensure that Malaysia is on the right track with the rest of the world.

United Kingdom has developed a Knowledge Network as part of its public sector knowledge management initiative with the intention for it to be a government-wide electronic communication tool helping government departments to share knowledge with each other, and work online with colleagues across government. In contrast, United States of America has opted for a decentralised approach to its public sector knowledge management initiative where its knowledge management initiatives is very much focused on its government agency's core function such as the examples (NASA, National Health Information Network) mentioned earlier in this Knowledge Management Blueprint.

Due to the similarities of the government structure of Malaysia with United Kingdom, it is foreseen that one of the biggest opportunity for the Malaysian public sector's knowledge management initiative is to developed a form of knowledge network and further enhance its features

as one of the possible option for it to support the current nation's vision to focus on a citizen-centric government as well as improve its service delivery via a whole-of-government approach.

Examples that are seen from the knowledge management practices in the United States of America can be seen as opportunities on how the public sector of Malaysia can improve its service delivery through a focused approach by leveraging on its public sector's sectoral framework (as depicted in the Economic Planning Unit's definition) to its knowledge management initiatives, which will therefore indirectly improve the public sector's overall service delivery (based on its core business) to the government, businesses as well as the citizens.

Another opportunity that has been identified based on interviews to a few government agencies that have successfully implemented their own knowledge management is the opportunity for other government agencies to learn from each other on how to implement a successful knowledge management initiative.

Therefore, it is concluded that there are plenty of opportunities for the public sector to improve its knowledge management initiatives from a top-down approach via a knowledge network and creating knowledge management initiatives via its business sectoral functions approach. However, it is also acknowledge that for those agencies / ministries that prefer to create its own knowledge management initiative for its own general purpose, it is encouraged for the these agencies / ministries to follow the standard knowledge management framework and implementation methodology mentioned within this Knowledge Management Blueprint to ensure that all parts of the public sector knowledge management elements and components are fully covered.

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6 Knowledge Management Establishment

Problems cannot be solved at the same level of consciousness that created them.

- Albert Einstein

Einstein's statement cannot be truer when applied to organisational behaviour. Knowledge management is essentially revolved around "people" and people ultimately decide the degree of success or failure of a knowledge management initiative. To motivate staffs to collaborate in sharing and creating knowledge, a shift in the way the agencies sees themselves is crucial. In achieving the ICT strategic objectives of the public sector, it is imperative to improve culture, mindset and practice to fully utilise knowledge to aid speedy decision making.

6.1 Establishment of Knowledge Management Vision

The Information Architecture Blueprint's vision is "**Whole of Government Approach: Connected Service Delivery**". This is only one step to towards managing knowledge in the public sector as not only information has to be shared, but the knowledge also has to be shared and managed.

Therefore, the vision for the public sector knowledge management is "**Whole of Government: Knowledge Excellence as Catalyst towards Effective Service Delivery**". The objective is to improve service delivery and decision making in the public sector through an informed knowledge environment.

It is envisaged that service delivery and decision making improvement (via a whole of government approach) in the public sector will increase due to

the active knowledge sharing environment in placed (therefore creating an informed knowledge environment).

Each government agency needs to have a strategic shift of vision where it recognises itself as a knowledge organisation that has a specific core business to perform and at the same time, support the overall public sector knowledge management's vision. Neglecting this step will replicate the experience of many organisations in which leadership's commitment to KM boils down to changing the ICT architecture. Strategic shift in the vision of the organisation to one in which it sees itself as a knowledge organisation should be championed by a leader and communicated down to all levels of from the start. To do that, agencies may also need to undergo an audit of its culture and values to ensure that the new knowledge-oriented vision is not stifled by an adverse culture.

6.2 Knowledge Management Framework Overview

The knowledge management framework overview represents the generic model of all available knowledge management frameworks in the market today.

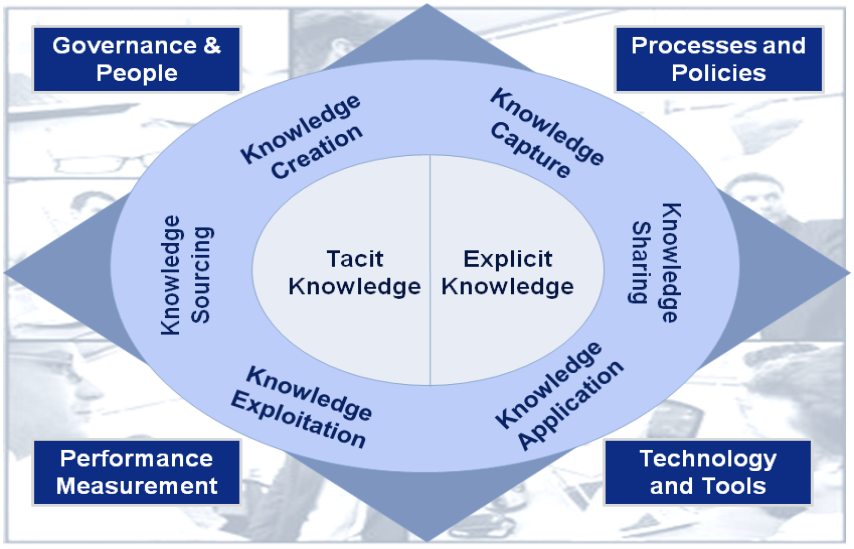

Figure 34 : Knowledge Management Framework Overview

Figure 34 shows the knowledge management framework overview based on a high level perspective that consists of three (3) major categories:

1. **Knowledge content**, which is divided into two (2) separate type;
   a. Tacit knowledge – non-documented knowledge; and
   b. Explicit knowledge – documented knowledge.

   *(Please refer to section "*4.1.1Type of Knowledge*" for further explanation of tacit and explicit knowledge)*

2. Six (6) **knowledge processes** that are represented in the form of a cycle. It shows the cyclic nature of managing knowledge.
   a. Knowledge create – create knowledge with existing knowledge;
   b. Knowledge capture – collect and store knowledge;
   c. Knowledge sharing – distribute knowledge to all required user;
   d. Knowledge application – apply knowledge to gain benefits;
   e. Knowledge exploitation – use and reuse knowledge; and
   f. Knowledge sourcing – search for new knowledge.

   *(Please refer to section "*4.1.2Knowledge Management Processes" *for further explanation with regards to the six (6) processes)*

3. Four (4) enabling elements that is vital to the success of a knowledge management initiative.
   a. Governance and people – organisation structure and people culture;
   b. Processes and policies – processes and policies that support knowledge management initiative;
   c. Performance measurement – measure the effectiveness of knowledge management initiative, integral part of whole knowledge management initiative; and
   d. Technology and tools – ICT tools that support knowledge management.

6.3 Overall Public Sector Knowledge Management Framework

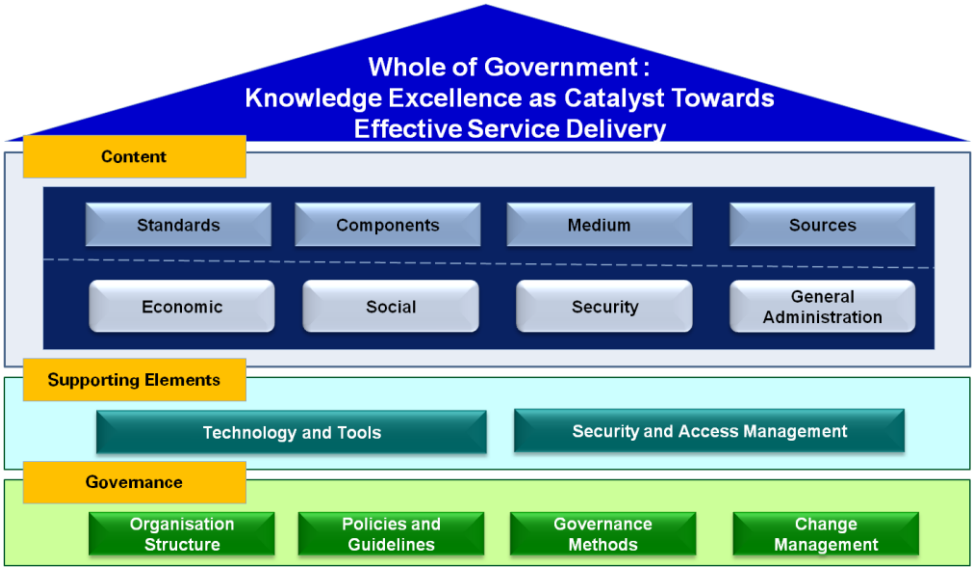

Figure 35 : Overall Public Sector Knowledge Management Framework

The Overall Public Sector Knowledge Management Framework (Figure 35) covers the building and managing of the knowledge management initiative in the public sector towards achieving its' vision in Knowledge Excellence as Catalyst Towards Effective Service Delivery via whole of government approach.

The core of the framework is the content management, which is essential to ensure the right and accurate knowledge assets are captured, shared and disseminated for the public sector knowledge management.

Guided by the vision of the public sector's knowledge management, the "Governance" and "Supporting Element" (see Figure 35) will be the pillar to support the formulation of the conceptual approach and the foundation to aid the successful implementation of the overall knowledge management framework.

KM Content Management

This conceptual approach delved into the four known business environment sectors as the main content categories which are defined by EPU (Economic Planning Unit) as the Malaysian government sectoral framework (economic, social, security and general administration) (See Figure 36 : Malaysia Public Sector Sectoral Framework).

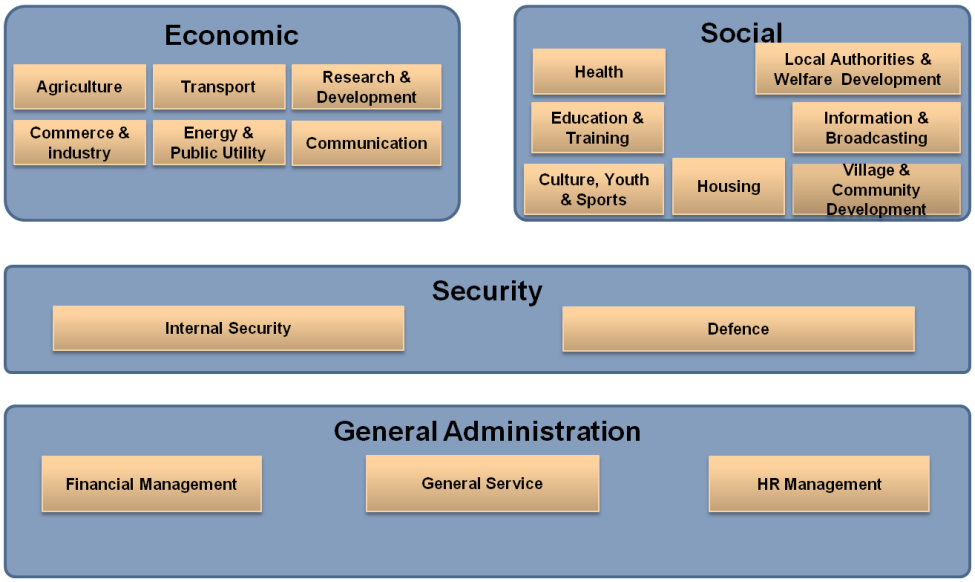

Figure 36 : Malaysia Public Sector Sectoral Framework

Each sector is then divided into sub sectors based on core functionality with the intention to enable the public sector to focus on execution of their core functions. With that focus in mind, knowledge will also be segregated in the same way to allow maximum usability.

This sectoral framework will act as the knowledge taxonomy for the public sector's KM. The first level of taxonomy will be:

- Economy;
- Social;
- Security; and

- General Administration.

The second level of knowledge taxonomy will consist of sub-sectors for each sector (See Figure 36).

The next level of knowledge classification will be set by user in the form of free flow text; this is what popularly known as “folksonomy”. The advantage of this mixed mode of knowledge classification is to enable easy user knowledge tagging and at the same time, maintain a certain degree of structure in knowledge classification.

With regards to content management, it is identified that there are four (4) main components identified to manage the public sector content, which are:

- **Standards**
  Standards are knowledge that are static (rarely change) and commonly shared and needed in the public sector such as national mission and strategic plans, templates (*Nota Serahan Tugas*) and policies (Refer to Table 2 for sample data classification).

- **Components**
  Components are information or knowledge that are considered as dynamic (change as time progress) knowledge assets (knowledge that is of value to the target audiences’ core business function) of the public sector such as statistics and indexes (Refer to Table 2 for sample data classification).

- **Medium**
  Medium outlines the various formats that knowledge can be stored. It comprise of three (3) major formats; Text, Audio and Visual.

- **Sources**
  Sources describe the list and type of sources (external and / or internal) from the knowledge management environment that is

needed such as newsfeed from external media, feedback from citizens and internal information.

Standards	Components
• Policies	• Statistical Data
• Acts	• Budget
• Laws	• Human Resource Information
• Regulations	• Indexes
• Circulars	• Related news
• Industry Standards (ISO, etc)	

Table 2 : Sample of Standards and Components Knowledge Classification

Supporting Elements

The supporting element covers the proposed technology tools and type of security that can be considered for the development of a knowledge management strategy

- **Technology and Tools**

  Technology and tools describes the type of technology tools that are available to suite the type of features desired for the knowledge management such as blogs for capturing and sharing tacit related knowledge (example, article on personal working experiences); document management system for capturing and sharing explicit related knowledge; type of technology needed to ensure faster and easier search on knowledge such as ontology-based knowledge management and folksonomy (community-based tagging); and types of gateways that can be leveraged on such as mobile knowledge management system to allow ease of access.

- **Security and Access Management**

  Security covers the type of security that has to be in placed when implementing the knowledge management such as security matrix.

Governance

KM literature deals with the need for the alignment of strategy with organisational aims and objectives, and for leadership of that strategy. This process is supported by information and communications technology (ICT) and operates in the organisational context of the corporate governance principles. In the Overall Public Sector Knowledge Management Framework (see Figure 35), the governance framework in the bottom layer presents the functions of KM as supporting the aims, objectives and governance processes of the organisation in the context of the broader environment of its external stakeholders which includes the public sector staff and external users and the also the regulatory environment. KM governance is the layer exercising the authority processes and principles that act as a framework for examination, regulation, supervision and revision of KM strategies. The interaction between the development of the strategy in this blueprint and governance is twofold. The governance process develops the principles and rationale for the impetus and momentum of the strategies, the management of risks, the control and accountability for stakeholder response. The governance process will also evaluate KM activities according to previously defined and articulated performance measures.

The governance element within this framework represents the public sector's governance structures with regards to knowledge management. The components that are covered within this section are:

- **Organisation Structure**

  Organisation Structure describes the organisation chart for knowledge management including the terms of reference for the newly introduced posts such as Knowledge Leader and roles such as knowledge manager.

- **Policies and Guidelines**

  This covers the recommended policies and guidelines to be created in supporting the implementation of KM initiative, focusing especially in terms of governing the process of knowledge sharing and the knowledge itself.

- **Governance Methods**

  The governance methods will cover the processes of knowledge management implementation approach.

- **Change Management**

  Change management describes the change management initiatives that will be needed to assist the adoption of knowledge management within the target audience.

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7 Knowledge Management Strategy

Based on the current assessments with regards to the current knowledge management initiatives in the public sector, it is foreseen that certain strategies has to be in place to address the issue of the application of knowledge management in the public sector is not fully optimised due to the lack of sharing culture and different understanding of its concept. Therefore a standardised approach of knowledge management within the public sector is recommended to tackle these issues.

A knowledge sharing culture must be developed in order to improve the public sector's service delivery and decision making through an informed knowledge environment. By having an informed knowledge environment, this in turn, will support the "Strategic Reform Initiative 4 : Strengthening the public sector" where the public institutions must be re-engineered as mentioned within the public sector's New Economic Model (2010). Hence, it is identified that two strategies are needed in order to create a knowledge sharing culture in the public sector which are; inculcate the culture of knowledge management and strengthen knowledge management initiative in the public sector. The programs to support each of the strategies are outlined in the figure (Figure 37) below.

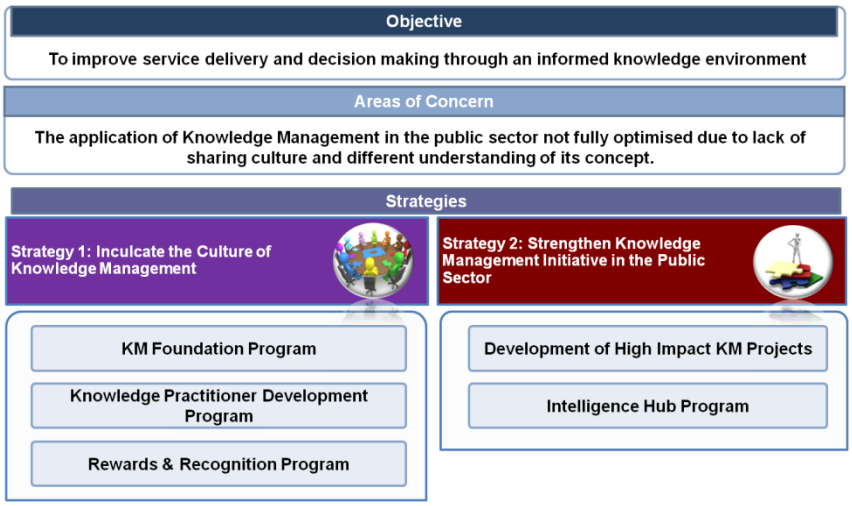


Figure 37: Knowledge Management Strategy

Clarification with regards to these two strategies and the programs are further explained in the following subchapters.

7.1 Inculcate the Culture of Knowledge Management

The "Inculcate the Culture of Knowledge Management" strategy is devised in order to instil the good habit of knowledge sharing within the public sector.

Three programs have been identified for this strategy; the Knowledge Management Foundation Program to create awareness and encourage the public sector to begin developing their own knowledge management initiatives based on the sectoral functional areas within the public sector, the Knowledge Practitioners Development Program to initiate the practice of knowledge sharing culture through connecting the relevant individuals to knowledge experts within the public sector, and the Knowledge Management Rewards and Recognition Program to further encourage the respective government agencies personnel involved to continuously contribute as well as apply the knowledge with each other.

7.1.1 Knowledge Management Foundation Program

With the explosion of digital connectivity, government agencies all over the world are using ICT applications to increase productivity, improve accountability, enhance transparency and facilitate public sector reform. Improved knowledge management (KM) is essential to governmental agencies at the national, regional or local levels, because governmental organizations are basically knowledge-based organizations. KM has also become one of the initiatives within most countries' e-Government Plans. Nonetheless, the public sector agencies still require steps to facilitate their initiative to develop an effective knowledge management system or processes. The purpose of this program is to help agencies in initiating their knowledge management initiative. The detail of the program is elaborated below.

Program Profile

This program will help spreading KM foundation awareness as well as guiding agencies in identifying and managing key components that will facilitate KM implementation. The key target audience and implementer of the program will be the public sector agencies themselves and will be supported by MAMPU. The objectives of the Knowledge Management Foundation Program are:

- To assist agencies in developing their knowledge management initiative; and
- To create and increase awareness, participation and usage of KM within the public sector.

On the whole, the program will benefit the public sector agencies where they will be able to develop their own knowledge management initiative by using the following approach prior to building knowledge management in agencies within the public sector. The key approach towards operating this program is by using the Awareness, Interest, Desire and Action (AIDA) approach. AIDA characterises a promotion strategy and stands for creating awareness, interest, desire, and action, which would show itself finally in applications of KM initiatives. Within this approach, agencies are able to identify what are the key components that are needed to build a strong KM foundation. The components that are essential towards a successful KM initiative are as follows:

i. **Component 1:** Create the organisation-wide urgency for change and communicate clearly about the benefits of proposed knowledge management program.

   Many studies have recognised organisational culture as an essential factor affecting the success of knowledge management efforts (Kotter-Heskett, 1992)[14]. Anderson and Anderson suggests (Anderson-

[14] *J. Kotter and J. Heskett (1992), Corporate Culture and Performance, Free Press, New York.*

Anderson, 2001)[15] that when a change is significant and requires a new way of being, working or relating, in order to operate the new environment, leaders are required to change cultural norms for the change to succeed. As a result, there is a need to transform the mindsets of the employees otherwise they would continue to operate in their old ways, thus stifling the organisation's ability to implement the change. Ultimately, change boils down to people because it is people that make things happen and it is those within the organisation that will be executing the changes.

Therefore, before implementing the knowledge management program, the management team of the organisation needs to clearly communicate the proposed programs and their related benefits to each employee within the organisation. Also at the same time the management team needs to create urgency for change within the organisational culture. Because people's response to change depends largely on their perception of the proposed change and on the effects they think the change will have on their needs and aspirations. The more the individual benefits of change are communicated, the more individuals' ego will be addressed and their willingness to change encouraged.

ii. **Component 2:** Obtain the top management & stakeholder support and assurance on the program

Knowledge management, although being apolitical nature, the heads of different government organisations and agencies that are planning to engage in such programs still need to manage their stakeholders well and to seek inputs and supports from those key players. The involvement of senior management in the process will effectively send signals to the organisation about the priority of change. Different stakeholders will have different and sometimes even conflicting, priorities and interests. If not handled well, this kind of situation may

[15] *D. Anderson and L. Anderson (2001), Beyond Change Management, p.26, Jossey-Bass/Pfeiffer, San Francisco.*

lead to disastrous outcomes for any specific government programs. Compared with their counterparts in the private sector, managers in government organisations always have less control over the resources at their hands. For public organisations, the annual budgetary process is actually also a very complicated political negotiations and compromises. However many managers within government organisations tend to forget or are not willing to consider the budgetary aspects during their routine works, thinking that this process is none of their business. Without financial support no knowledge management initiatives could be successfully implemented. So before the implementation, the management team has to be clear that enough financial resources have been specifically allocated to the knowledge management programs.

iii. **Component 3:** Select and empower the champions of the proposed program.

Organisations are increasingly aware that knowledge management cannot be effectively implemented without the active and voluntary participation of the communities that are its true owners. Just like any other change management programs, for knowledge management programs the top management also needs to select champions who are true believers and really zealous about the future and promises of the proposals. At the same time these people need to be delegated and empowered so that they can function well in leading the new initiatives. In this blueprint, we have proposed a post of Knowledge Leader (KL) to drive all KM related initiatives in the agency. Ideally, the champion (Knowledge Leader) selected by the agency needs to be able to run and drive all KM-related initiatives by the agency and ably supported by the knowledge managers as proposed in Section 8.2.2

Managing the KM Function of the report. Ideally, agencies should chose someone from the top management with the skill sets and competencies as listed in Figure 59 (Skills and Competencies of a

Knowledge Leader) to ensure the KM initiative are capably administered and well run.

iv. **Component 4:** Establishing proper milestones and rewarding systems

Like all projects, proper milestone should be predetermined at the very beginning so that project progress can be clearly measured and controlled. Proper intrinsic or extrinsic rewarding system also needs to be established to motivate participations from members of the organisation. Agencies can developed the rewards and recognitions program in order to encourage the usage and participation of public sector employee in the knowledge management initiatives. The approach and steps to be taken in order to identify and administer an effective can be done by following the steps in the next program in "Section 7.1.3 Knowledge Management Rewards and Recognition Program" of the report.

v. **Component 5:** Advocacy and user awareness and participation

Ultimately the purpose of the knowledge management initiative is to serve the interest of the users which is the staffs of the public sector. Like any other public sector programs and initiatives, it should not feel strange to promote users' awareness and seek users' participation during the process of designing and implementing knowledge management programs in public sector organisations. Efficiency and effectiveness within agencies will eventually translate into a more efficient and effective society. This step in the program may run concurrently with the proposed KM development and implementation approach in "Section 8.1 Knowledge Management Development and Implementation Methodology" of the report where the step of creating user awareness is explained thoroughly.

vi. **Component 6:** Building new skills and mindsets

Knowledge management is still a relatively new concept. Certain new skills such as towards knowledge capture and how to codify tacit

knowledge effectively need to be introduced and cultivated among employees within public sector organisations. Although not everyone has to become expert in this area, at least they should get themselves familiarised with related terms and concepts. Most importantly, certain mindsets such as unwillingness to share knowledge needs to be abandoned and new ways of thinking that are tailored toward the new nature and characteristics of this knowledge era need to be accepted by everyone within government organisations.

There are four phases in this program which is the Awareness, Interest, Desire and Action phase. In each of these phases, activities with regards to all four phases will be listed in order to assist agencies in promoting the use of knowledge management among the public sector employees. The phases and its activities are listed below:

i. Phase 1: Awareness

This phase may begin with awareness where a KM champion recognises the value of using the knowledge asset in a public agency. KM can only thrive in a culture of collaboration where members are motivated and free to share and learn from one another. At this stage, recommendations range from tips on how to share the vision and demonstrate the value of KM through to interviews, surveys and others tools to measure the readiness of the organisation and identify areas of opportunities in which KM can be applied. A seminar or workshop to stress the importance of the six essential components as explained above will also help the staff to better understand and contribute towards a successful implementation of any KM program. Guest speakers from an experienced and knowledgeable agency such as MAMPU of even the KM Advisory Panel themselves where the involvement of senior management in the process will effectively send signals to the organisation about the priority and importance of change.

ii. Phase 2: Interest

In this phase is where the strategy formulation which marks a turning point where individual interest becomes an organisational initiative. The main activities at this phase are geared toward generating more interest in knowledge management. This is where the lead agency or experienced agencies in KM will demonstrate their KM system to the interested agencies to put emphasis on the benefits of having the KM programs in place at their agencies. Speakers from agencies whom have implemented KM will also share their success stories of even issues to further prepare the inexperience agencies on how to go about developing their KM programs where the agencies may be able move through the KM development stages quickly, learning from these early adopters.

iii. Phase 3: Desire

This phase is engineered towards changing the interest towards desires of having a KM program which will be beneficial to the corresponding agencies. As the agencies progresses along its journey towards developing KM, different tools, techniques, templates and survey questionnaires are provided to steer agencies throughout the whole KM program development processes. In this phase, other agencies and also related Community of Practice (CoP) may be able to guide the relatively inexperienced agencies in implementing these KM programs. Commencing collaborative ventures with participations from other agencies that have the potential to achieve win-win outcomes is an approach that should be considered by all Knowledge Management practitioners.

iv. Phase 4: Action

In this final phase, other experienced agencies will help addressing issues about the criteria for expansion as well as seeking approval for deployment of the KM programs. The reason for experienced agencies to be involved is so that they can use it to help other agencies to better

understand where they are at in their KM journey, the possible gaps that need to be addressed, and also best practices from other agencies that can be leveraged. This phase will lead eventually to enterprise integration and full deployment of KM in the organisation.

A successful knowledge management program, before achieving all goals, besides some of the necessary techniques, also requires devoted top management support, vigorous collaboration from all stakeholders, and long-term endeavours for those long-term effects. Using this approach towards developing knowledge management, public sector agencies will be able to implement their KM initiative more effectively.

7.1.2 Knowledge Practitioner Development Program

This program is designed to connect the individuals in the public sector with the relevant knowledge provider to explore ways of working in a specific area of knowledge together. The objective of this program is to instil the habit of knowledge sharing practices within and across the public sector by connecting people to people.

By establishing the knowledge practitioner development program, the key benefits that can be obtained for the knowledge practitioners will be learning from shared experience through best practices by the knowledge experts via the community or practice, a more personalised approached that can be practice in the office via direct knowledge transfer from mentor-mentee and as an entry point for connecting people to people, people to document and document to people via a knowledge forum.

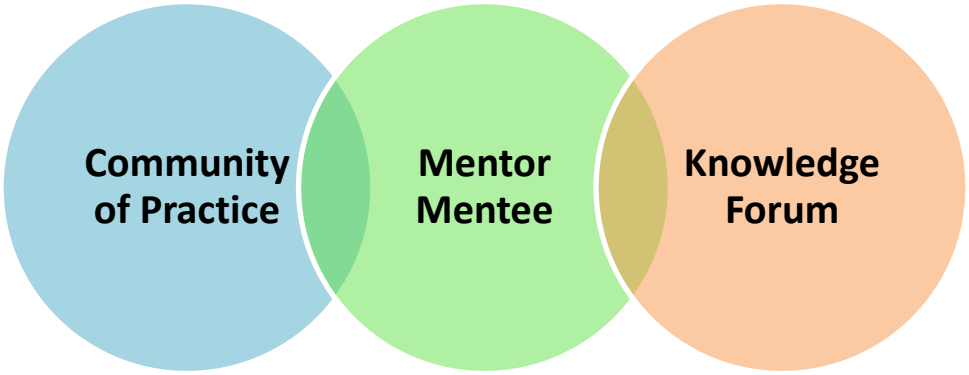


Figure 38 : Conceptual Model of the Knowledge Practitioner Development Program

Community of Practice

The idea of the community of practice in the Malaysian public sector is a / several grouping of individuals who share a common core business interest (based on the EPU's sectoral framework) working together over an extended period to explore ways of working in a specific area of knowledge. This can be done via periodic meetings / workshops, publishing best practices (such as presentation slides, workshop video recordings, journal of excellence) and even an online secured chat room.

Mentor-Mentee

The mentor-mentee needs to be established to allow first-hand knowledge transfer through direct contact to the knowledge expert and accessing the organisation's knowledge base. Input and insight from experts / other people outside the team can be gained to reuse, apply and exploit existing knowledge and experience before embarking on a project or activity by partnering the knowledge seeker with the knowledge provider (expert / mentor). By allowing an avenue for the knowledge seeker to connect to the knowledge provider directly about the best way to approach new

projects / activities as well as exchange unique knowledge to allow others to capture it (the knowledge) before the staff leaves, it allows for the public sector to save time and money as well as avoid repetitions of past mistakes as well as build the organisation memory. This is to ensure that the knowledge gained within a ministry or agency will stay in the ministry or agency even after a staff leaves. It will also create strong links across teams and relationships between people.

Knowledge Forum

The knowledge forum is intended to create a virtual place for connecting people to people, people to documents and documents to people through means such as a public sector private community of practice web forum and search people directory. It is expected that the sharing process could be in the form of formal (such as posting of abstract of knowledge documentations) and informal (such as snippets of online comments or conversations such as a comment left on a blog) means where the all the conversation via electronic means will be captured and made available according to user security setting.

The key target audience for this program will be the whole Malaysian public sector and the key implementer suggested for this program will be the public sector with the support of the recommended KM Advisory Panel (please refer to section 8.2.3 Proposed Overall Public Sector KM Governance) as the supporting body. The role of the public sector will be to identify and developed potential community of practice, mentor-mentee or / and knowledge forums that are needed based on the government's sectoral framework. The role of the KM Advisory Panel will be to support and advice the respective government agencies involved in the development and implementation of the community of practice, mentor-mentee or / and knowledge forums.

In general, the recommended implementation approach for the knowledge practitioner development program is as per the figure below.

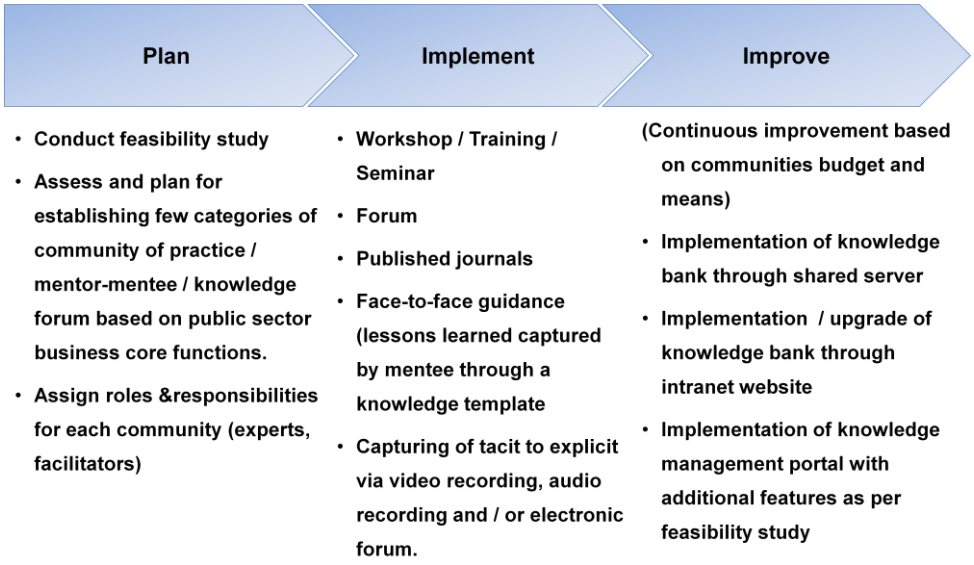


Figure 39 : Implementation Approach for Knowledge Practitioner Development Program

7.1.3 Knowledge Management Rewards and Recognition Program

The use of reward and recognition schemes is viewed as a tool that can contribute to the performance of 'good practices' and allow organisations to illustrate their social interest and corporate social responsibility. They work to recognise good performance and to encourage others to improve their performance. These schemes therefore are not merely about following guidelines or conforming to legislation, but should be viewed as a holistic process that is intrinsic to the management and culture of an organisation. Creating appropriate reward mechanisms for good performance in the public sector is a challenging task. There is not the same freedom as in the private sector to introduce bonuses or offer 'perks' such as extra leave. The definition of what constitutes as outstanding performance can be difficult. Much good performance comes down to

effective team work rather than necessarily that of individuals. Poorly constructed reward schemes may distort performance achievements. For these and for other reasons, rewarding performance in the public sector is not straightforward. Rewards are inter-linked with motivation. There is a need to motivate and promote the concept of job enrichment within the employee in the public sector, and also the identification and differentiation of extrinsic and intrinsic rewards and their role in motivating staff. Extrinsic rewards are usually defined in the workplace as salary, fringe benefits and working conditions. Intrinsic rewards refer to feelings of competence, achievement, responsibility, challenge, accomplishment and the independence that tasks generate. With regards to the above statements, a rewards and recognitions program needs to be developed in order to encourage the usage and participation of public sector employee in the knowledge management initiatives. The details of this program are explained below:

Program Profile

The idea of this program is to list the key approaches in building a reward and recognition program to create a positive work environment and drive performance of Knowledge Management initiative. The target audience and also the key implementer of this program will be the individual agencies within the public sector themselves. The objectives of the Knowledge Management Rewards and Recognition Program are to help agencies in encouraging the usage and participation of users in knowledge management initiative where the key benefit will be in creating a positive work environment, improve employee morale, and motivate user high performance to drive KM initiative in the agency and also to contribute their knowledge to the agency. The question is; how can public agencies successfully encourage their employees to share what they know? For one thing, the public sector has some advantages for encouraging a knowledge sharing culture as agencies within the Government are working for the same cause and generally does not view each other as competitors. Below are some of the examples of ways to

persuade the public sector employee to use and participate in the knowledge management initiatives:

Performance Appraisal

- Getting the employee to contribute to KM is no simple task. Measures such as the usage of Rewards and Recognitions method can be implemented to instill the culture of contributing knowledge to the system. One form of incentive that seems to work well in both the private and public sectors is the simple act of recognition. Tokens of appreciation such as letters of achievement, awards ceremonies or small gifts for coming up with good suggestions give employees a sense that their contributions matter and are being noticed by supervisors and upper management. To many workers, these measures mean just as much as cash rewards. One other form of appraisal in through the inclusion of KM-related KPIs to keep the employees on their toes and keep the contribution going. For example, the role of a Knowledge Leader is already embedded in the CIO roles in the MAMPU-developed CIO toolkit. As such, the requirements and responsibilities of a Knowledge Leader and managers alike can be tied to KPIs in order to track and measure their effectiveness and performance.

A Sense of Mission

- One of the strongest incentives is intangible: unlike employees in private enterprise, most civil servants are not directly profit-motivated. Rather, their jobs are devoted to providing service. Public sector workers are apt to respond positively to an initiative that they perceive as contributing to the organization's overall mission. A successful and widely deployed knowledge management program must link strongly to their organization's goals.

- As an example, in Toronto, the Workplace Safety and Insurance Board of Ontario (WSIB) underscore the importance of its employees' mission by encouraging them to think of themselves as experts in their

chosen field, whether it's automotive, mining or healthcare. Exemplary individuals are profiled regularly in an in-house newsletter distributed to all employees. Because the practice promotes a sense of pride and of being valued, workers are more likely to pass along knowledge if they know they will get positive feedback from colleagues. They're also more willing to use information from others to advance the primary goal of preventing workplace injuries.

Author Tagging

- Employees should be recognized on two fronts: for contributing to the knowledge base in the first place and for how that knowledge grew and was used by others in the organization. For example, in team efforts, it's important to track how group members use one person's contributions. For example, every piece of content in the agency's knowledge repositories is should be tracked by author and by how often others view it.

Agencies can develop their own rewards and recognition program below by following the program 5-step approach as explained below:

i. **Step 1:** Link Rewards to Agency's Strategies and Goals

Reward and recognition programs must connect the needs and expectations of the workforce with the agency's overall goals and strategies. A program that reinforces important organisation values and goals will encourage employees to act in line with such goals and emphasise the importance of achieving these goals. Alternatively, rewards which do not connect with organisational goals may convey a misleading message and encourage employees to act in a manner that does not facilitate the agency's objectives.

ii. **Step 2:** Communicate and Promote the Program

Even well-designed programs will not accomplish their goals if they are not properly communicated and promoted. When properly communicated, employees will understand the behaviours being

reinforced and the logic behind reinforcing such behaviours. Additionally, a relevant rewards system will encourage employees to achieve the agency's goals and engage them in the processes. To ensure that programs are communicated effectively, agencies can place publicity posters around the office and train managers to communicate the program and its goals.

iii. **Step 3:** Give Personalised, Immediate and Innovative Awards

Rewards should be personalised and meaningful rather than standard off-the-shelf gifts. In particular, awards should not be cash; 32% of employees responding to an American Express Incentive Services study stated that cash rewards do not improve their work performance (Odell Patricia, 2004)[16]. Moreover, cash does not reinforce the company's message or convey a thoughtful message. Cash rewards also run the risk of creating high employee expectations that become difficult to meet. Some examples of personalised rewards (Garvey Charlotte, 2003)[17] are detailed below:

- Personalizing Awards through a Book Program — Another component of Boeing's rewards system is their book program, which enables managers and employees to reward employees with a personally selected book. Books can cover a range of interests including cooking, travelling and running.

- Personalizing a Day—At ARAMARK, employees have days named in their honour. On an employee's day, the employees who know the honouree best are allowed to decide how to celebrate the individual's day. Thus, the individual's award, which can range from a department-wide morning greeting or a private gift given and selected by the individual's spouse, will suit the honouree's preferences.

[16] *Odell, Patricia, "Running a Successful Recognition Program," Premedia Insight (8 December 2004)*

[17] *Garvey, Charlotte, "Employees Appreciate Recognition Programs."*

Reward and recognition should be given as soon as possible following the recognizable action; otherwise it loses its relevancy and risks offending employees. Gifts should also be innovative and fun to keep employees engaged in the program.

iv. **Step 4:** Enable Peer Recognition

Research suggests that companies increasingly include peer recognition in their rewards programs. In fact, Mercer Human Resource Consulting estimates that approximately 35% of large companies have some type of peer-recognition program, up from around 25% five years ago (Juergens, 2004)[18]. Although peer recognition typically involves smaller and inexpensive rewards, they tend to effectively motivate and retain employees as they feel a sense of importance to the agency.

v. **Step 5:** Continually Re-evaluate the Program

Agencies should continually re-evaluate their reward and recognition program to ensure that they remain relevant and aligned with the company's goals and values. Agencies should also survey employees, hold focus groups, measure participation rates, and evaluate the company's successes to determine if they were impacted by the program. Additionally, agencies can re-evaluate programs routinely to identify new and innovative rewards that maintain engagement in the program.

7.2 Strengthen Knowledge Management Initiative in the Public Sector

Due to the fact that there are a few government agencies who have already implemented a knowledge management initiative, the "Strengthen Knowledge Management initiative in the public sector" strategy is needed to strengthen the knowledge management initiative in the public sector

[18] *Juergens, Jennifer, "Recognize, Reward, Retain: The Three R's of Performance Management."*

based on the sectoral business function as well as the government agencies who are either planning to develop their own knowledge management initiative or are still new to the concept.

Two programs have been identified for this strategy; the Intelligence Hub to link all the relevant current as well as future knowledge management initiatives in the government agencies for the benefit of the public sector as a whole, and the development of high impact KM project program to identify knowledge management initiatives that has yet to be implemented that would assist the whole public sector to enhance their knowledge sharing capabilities.

7.2.1 Intelligence Hub

An Intelligence Hub is essentially an entity that links all Knowledge Management (KM) initiative into one interconnected knowledge network. Users will access the hub through centralised portal where an advance search engine can search through numerous independent KM systems that are attached to the hub. Users will then access the knowledge directly from the source KM system through the link provided by the search engine (See Figure 40).

The search result will be organised based on 4 sectors (Economy, social, security and General Administration; See Figure 41). Each sectoral node will be dividing into sub sectors to further group all related KM systems together. This sub sector grouping can be a KM system by itself or a group of related KM systems (See Figure 42). It is important to note that although this grouping of KM systems appears as a hub in the figure, no physical hub is actually created. Grouping is done based on the pre defined classification labelled onto the individual KM system prior attaching it to the Intelligence Hub.

The target audience for this hub is the whole of public sector, including agencies that do not have the need to create KM system(s) but need to refer to knowledge own by other agencies. For agencies that need to

create a new KM system but are having difficulty to gauge how the system will look like or how it will work, the Intelligence Hub will provide a template and hosting services so that an agency can test deploy a KM system without involving a huge cost. After a fixed period of time or after the agency is satisfied with the test results, this test system can then be replaced by other system of agency choice or took ownership of the test system and start building the full scale KM system on top of the template system.

Under the advisory, and monitor by KM Advisory Panel, the Intelligence Hub will be the implemented by MAMPU. MAMPU should have dedicated resources (people and funds) that solely concentrate on developing and evolving the Intelligence Hub. (See 8.2.3 Proposed Overall Public Sector KM Governance for more details in the governance structure) The objective of the Intelligence Hub is to create an integration point that combined all public sector KM effort into a single access point to maximise KM system usage and value. Through this hub, a healthy knowledge sharing culture can be and will be created and at the same time, encourage perpetual learning culture among the staffs.

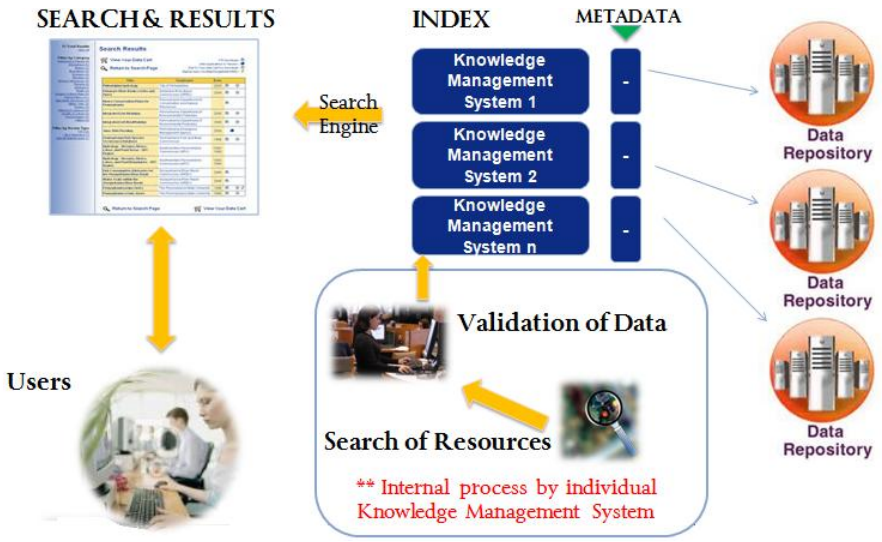


Figure 40 : Intelligence Hub Overall Process

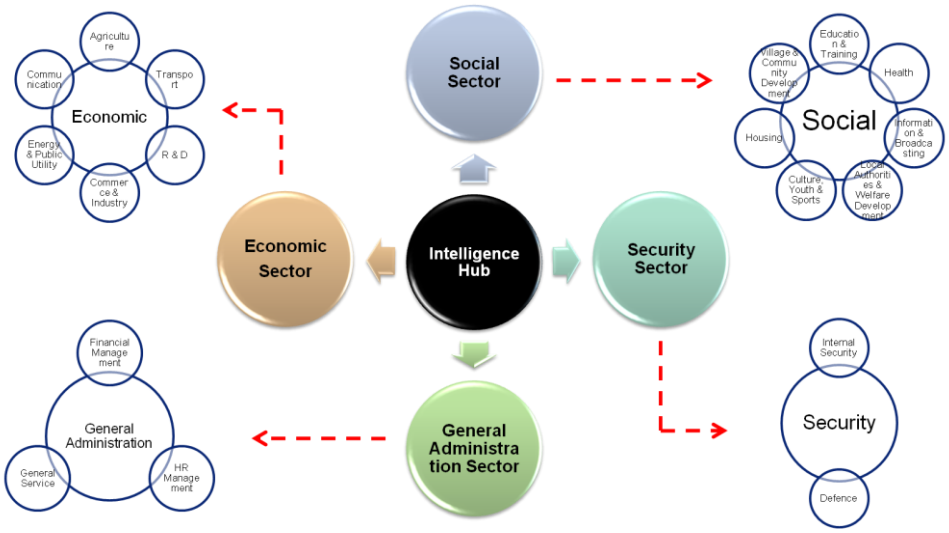


Figure 41 : Intelligence Hub

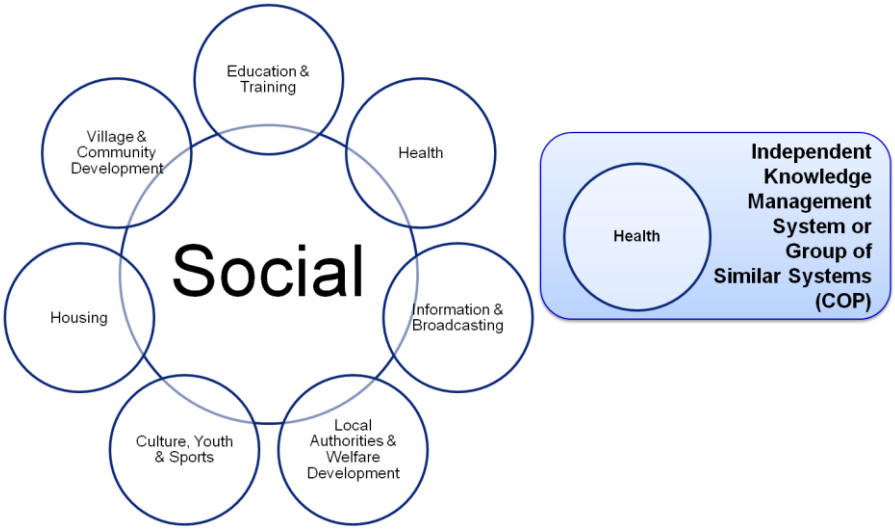


Figure 42 : Sample Intelligence Hub Sectoral Node

Phase I (Short Term Goal)

Deploying a new Intelligence Hub is a learning experience. The KM team can learn from the users' perceptions about the system, study it functionality and the suitability of the chosen interface, and discover unanticipated changes that must be made. Phase I of the Intelligence Hub is a pilot implementation (1 – 2 Years) based on existing KM initiative on a small scale that can lead to insights that might prove to be invaluable

before new development of individual KM system at agency level and also before full-blown system is implemented at public-sector-wide level. For example, users in particular group might feel that user-friendly interface that the KM team designed is not actually all that user-friendly. Knowing this ahead of time provides a time buffer for appropriate changes.

This pilot test will reveal significant and often fundamental design flaws early in the deployment process. At this stage, it is still possible to rework the problematic aspects of the design to meet the need of the users and the initiatives objectives without major expense of significant rework. This pilot will be headed by KM Advisory Panel. Other members of the team will include representatives from respective KM system selected for this pilot.

Selecting Intelligence Hub Candidate

To maximise the potential impact of Intelligence Hub right from the pilot stage, careful selection of existing KM systems to be included into the Intelligence Hub is important (See Figure 43 for sample Intelligence Hub configuration).

Figure 43 : Sample Intelligence Hub Configuration

Follow these tips for evaluating potential KM systems and their viability as part of Intelligence Hub:

- Select KM system that contains knowledge that other agencies required for daily operations; or
- Select KM systems that are easily expanded in terms of knowledge content.

At this stage, the central node at the Intelligence Hub will focus on connecting different KM initiative into a network. Below are the main criteria of Intelligence Hub at this stage:

- A portal that connect all and is focus on user interface design; and
- Core functionality of knowledge searching and access right authentication is still maintained by individual KM system.

The objective of Intelligence Hub at this stage is to gather as much experience as possible for the KM team. Below are the objectives aimed at the end of this pilot;

- Gather users' input on usability, designs and features required;
- Identify and solve possible integration issues;
- Design the specification for searching and displaying knowledge search results;
- Design the specification and security matrix for using one login to access all KM systems; and
- Implementation of an empty, basic KM system for agency to use as template for new KM system deployment or a test platform.

Phase II (Long Term Goal)

After the successful conclusion of Phase I deployment, the Intelligence Hub will shift into wide scale of development in the second phase (See "7.2.2 Development of High Impact KM Projects Program" for further detail). Prior to the starting of this phase, it is vital to ensure the hub will not run out of resources to grow. This can be done by deploying the Intelligence Hub into a Cloud Computing environment.

In this phase, new KM initiatives will be added into the hub. The new KM systems that are deployed by agencies will also be deployed into Cloud Computing Architecture to ensure the efficient connectivity to the hub and ease of future maintenance.

The hub itself will go through a phase of transformation to become more than a linking point of all KM system. Below are the main criteria of Intelligence Hub at this stage:

- Continue enhancing of user interface to meet user expectation.
- Development of independent, advance search engine that can search through the entire network. Below are the important characteristic of the search engine:
    - Search results will be display based on four (4) government sectors (social, economy, security and general administration). For example, a keyword search "worms" will show results grouped under the "Economic" sector where the knowledge found may be about worm farming or worms issue in agriculture and under the effects of worms within agricultural crops. However, the results grouped within the "Security" sector may produce a result with regards to computer viruses instead and the results grouped within the "Social" sector may produce a result

with regards to hazardous medical condition due to tape worms; and

- Searching is based on keywords search on the knowledge title and content or based on the taxonomy / folksonomy classification of knowledge.

- Deployment of integrated login system (single sign-on) to access all KM systems.

- Creation of other features based on user request and evolves the portal into a KM system. Some of the suggested features that can be included into the hub are:

  - Ability to access database directly (e.g. SQL server, Oracle);

  - Creation of feature rich dashboards and reports;

  - Create forum and online help desk to support agencies in KM initiative and for users to seek help and share knowledge; and

  - User specific customisation to suit user usage style and preference.

- KM template and hosting services for agencies to test KM implementation.

Creation of New Knowledge Management System

At this stage, new KM systems that are required will be identified. Agencies that are tasked with it development will start the development based on the steps and framework outlined in Chapter "8.1 Knowledge Management Development and Implementation Methodology" of this

document, as well as other processes and specification identified by the KM team during the Phase I of Intelligence Hub implementation. These steps also apply to agencies that are not currently identified to implement new KM system but interested to have one. Other than steps mention above, agencies can also refer to template KM system provided by the Intelligence Hub.

Below are the summary for few important points for agency to follow through while implementing KM system;

- Align KM initiative with business objective.

  This step is to ensure the KM initiative is executed at the knowledge that have the highest impact and can benefit the agency the most.

- Use the six (6) knowledge processes when working with knowledge.

  The knowledge processes is the trial and true process when managing knowledge. (*Please refer to section "*4.1.2 Knowledge Management Processes" *for further explanation with regards to the six (6) processes).*

- Create taxonomy and folksonomy for knowledge.

  Taxonomy and folksonomy are important in order for knowledge searching to be effective. On the highest level, there will be four (4) classification based on sectoral framework (economy, social, security and general administration). It can then be further segregated into sub-sectors and into any classification that the agency deems fit for their knowledge. For each sector and / or sub-sector, it is foreseen that there will be a community of practice (a panel or pool of experts within the particular sector or sub-sector) who are in charge of the particular sector of subsector.

- Develop extra steps to capture tacit knowledge.

  Through interviews and questionnaire, it's acknowledged that public sector is currently facing problem in term of losing knowledge when staffs leave the agency. Special care need to be taken to ensure the knowledge of the soon to leave staff knowledge is kept within the agency. For example, new step such as "15 minutes free flow talk about the job" video recording can be put in place and shared in the KM system.

- Create supporting structure (e.g. KM Functional Area) for KM initiative.

  Supporting structure is important to ensure the continuity in the face of obstacles and securing of resources for a successful initiative. Without it, the initiative will soon lost momentum and halted.

- Process and specification to link to Intelligence Hub.

  Special care need to be taken to ensure minimal effort is required when the KM is ready to be integrated into knowledge hub.

At the end of this stage, the hub can be considered complete. However, it still need to evolve constantly, become more users friendly, provides more features and ultimately become an integral part of working process for all related public sector services.

7.2.2 Development of High Impact KM Projects Program

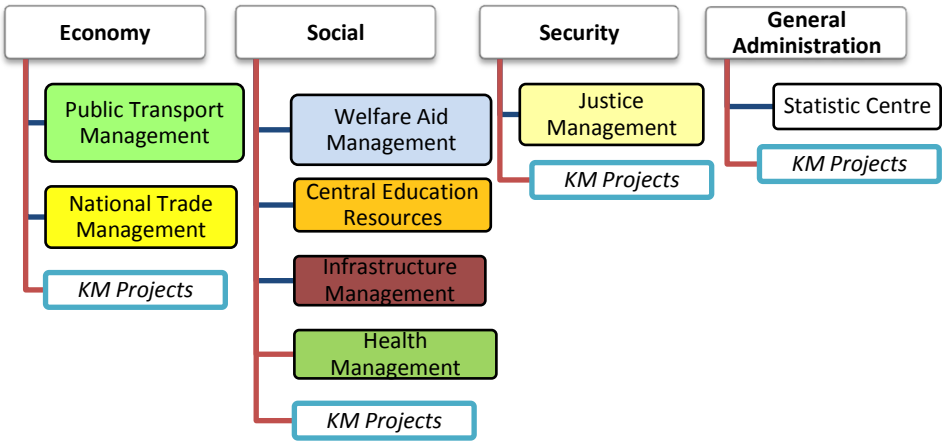
This program is designed to assist the public sector to identify potential high impact knowledge management projects that will be beneficial for the public sector as a whole to ensure that every angle for knowledge sharing is covered and optimised from a top-down approach as well as individual agencies. The core selection criteria is to select projects that will support various government initiatives that are listed out in National Key Result Area (NKRA), National Key Economic Area (NKEA), Government

Transformation Program (GTP), 10th Malaysia Plan (RMK10) and also projects to track various foundation projects that are required for successful KM implementation such as broadband and other infrastructure projects.

The objective of this program is to increase the usage and appreciate on knowledge management within the public sector due to its relevancy to the public sector's core business functions and to maximise the potential knowledge management usage.

The key benefits for this program are that all crucial areas of knowledge management within the public sector are covered from top to bottom (based on the recommendations from the KM Advisory Panel as well as the requests made from various government agencies) and therefore indirectly will optimise the knowledge management initiatives within the public sector once the projects have been implemented successfully.

Based on Figure 44 below, the main approach towards identifying the potential high impact knowledge management projects are based on the government's sectoral function which covers economy, social, general administration and security as well as the nation's long term goal (such as the 10th Malaysia Plan and Government Transformation Programme).



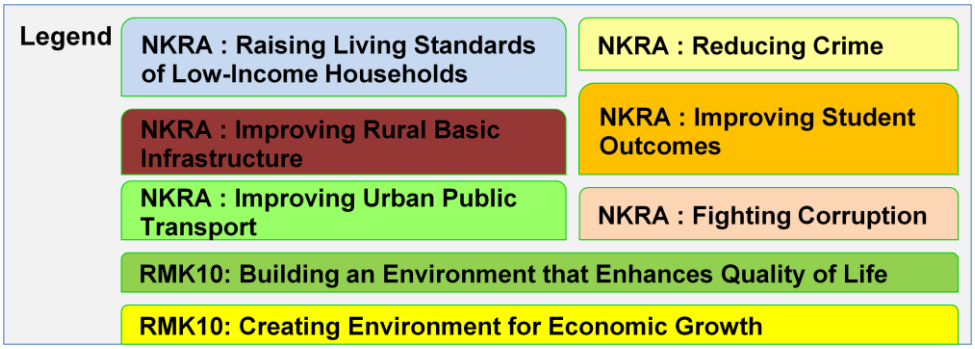


Figure 44 : Conceptual Model for Development of High Impact KM Projects

The key target audience for this program will be the whole Malaysian public sector and the key implementer suggested for this program will be MAMPU and the recommended KM Advisory Panel (please refer to section 8.2.3 Proposed Overall Public Sector KM Governance). The role of the KM Advisory Panel will be to identify potential high impact knowledge management projects based on requests made by other government agencies and also through their own council and devise a plan to assist the respective government agencies that will be involved in the development and implementation of the suggested knowledge management project. The role of MAMPU will be to assist the KM Advisory Panel in assessing the amount of work need to be done to create the suggested knowledge management project and to assist the respective government agencies involved in the development and implementation of the knowledge management project to link it to the public sector's intelligence hub.

To set the program in motion, some of the recommended high impact projects based on the Malaysian government's sectoral categories are as follows:

Economy

Public Transport Management

It is recommended that a one stop centre for Public Transport Management to be implemented to assist the government with regards to achieving its goal on one of its national key result area, which is to

"improve the urban public transportation" by developing a *rakyat*-centric public transport system. Via this form, the type of knowledge that is managed will be the study of streamlining capacity limits, traffic management, and attracting people to use public transport by managing public demand, request as well as complaints on infrastructure (such as potholes and public transport capacity) and traffic congestion (inclusive of public transport schedules). Based on the knowledge gathered from the example above, the government will then be able to exploit the knowledge to plan and develop a more systematic public transportation as well as infrastructure (for example, setting up more LRT systems, enticing more bus companies to ensure that the public transport is able to arrive on time) that is suited according to the needs of the *rakyat.*

National Trade Management

It is recommended for the public sector to set up a one source centre for management of national trade that includes import, export and domestic trade as well as managing business entity information extracted from existing individual applications such as MyGovXchange and National Single Windows for Trade (NSW). This supports the 10th Malaysia Plan to create an environment for economic growth.

Social

Welfare Aid Management

It is identified that one of the National Key Result Area (NKRA) is raising living standards of low-income households. To support this NKRA, it is recommended that a one source centre for national poverty eradication and aid distribution analysis (such as statistical distribution analysis or trend analysis based on current data extracted from the e-Kasih system via a business intelligence feature) be created to enhance the current e-

Kasih initiative by the government in order to optimise the best possible solution to eradicate poverty in Malaysia. This can be achieved by collecting information and knowledge from different sources such as e-Kasih and other national (e.g. poverty eradication related news reports and cabinet reports) as well as international sources (e.g. United Nation Development Programme's case study) that are later used as a guidance and possible benchmark to reduce poverty in Malaysia.

Central Education Resources

It is identified that one of the National Key Result Area (NKRA) is Improving Student Outcomes. To support this NKRA, it is recommended that a one source centre for teaching materials, lesson learned and teaching strategies as well as best practices (Central Education Resources) to be developed. One of the other possible methods to consider for improving the student outcomes is also by linking the Central Education Resources knowledge management to the current National Broadband Community Initiative where educators in both urban as well as rural areas will have the same opportunity and access to the Central Education Resources for the benefit of all the students.

Infrastructure Management

It is recommended that a one source centre for best practice and repository for the nation's Infrastructure Management to be developed in order to support the current identified National Key Result Area (NKRA) which is to improve the Rural Basic Infrastructure as well as the current identified National Key Economic Area (NKEA) which is Communications Content and Infrastructure. Features that are recommended to be included in the Infrastructure Management will be Infrastructure related research, solutions and issues such as history of current rural infrastructure conditions, best practices in resolving infrastructure issues in the rural

area, research on rural infrastructure maintenance being practiced within the nation as well as overseas and suppliers' reliability/history.

Health Management

It is noted that the government intends to transform healthcare to improve quality and provide universal access to its citizens within the 10th Malaysia Plan and also New Economic Model (NKEA: Healthcare). This is done by restructuring the healthcare delivery system to increase the quality and capacity of care and moving from strategies that emphasise treatment to one that emphasise wellness and disease prevention. For this reason, it is suggested that a one source centre for health knowledge exchange for the whole nation to be developed so that all government hospitals and clinics will be able to access to the knowledge with regards to the latest and up-to-date case of a disease as well as how to treat it and prevent it in an instant.

Security

Justice Management

It is noted that currently there is a system for the civil law as well as syariah law. However, this can be further improved by creating a knowledge management system that covers the entire justice system in Malaysia for the reference of all relevant parties by enhancing and including the native law (which is commonly practiced in the rural areas of Sabah and Sarawak) as well as crime information sharing through a Geographical Information System-based (GIS) mapping in order to have a whole of government approach. Currently, the suggestion for developing a crime information sharing through a GIS-based mapping has already been stated within the 10th Malaysia plan under its "Reducing Crime" National Key Result Area.

General Administration

Statistic Management

The United Kingdom government has a knowledge management system called StatNet (UK Government Statistical Service Intranet site) function which is used by government statisticians to improve communication across government and provide links to important Government Statistical Service documents and facilities. Similar to this knowledge management initiative, it is proposed for the Malaysian government to have a one source centre for up-to-date statistical information for the public sector in order ensure that all government agencies have consistent knowledge and information with regards to all the relevant nation's statistics (for example, number of internet users in Malaysia) that are relevant to their work.

For each of the projects identified, the recommended implementation approach for the high impact knowledge management projects are as per the figure below.

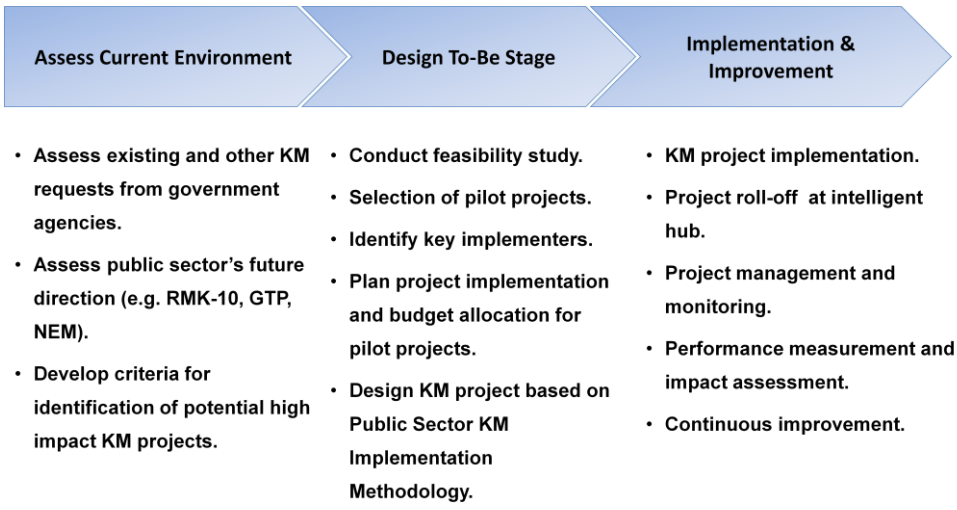


Figure 45 : Implementation Approach for Development of High Impact KM Projects

7.3 Public Sector Knowledge Management Roadmap

The recommended public sector knowledge management roadmap is depicted in Figure 46 below.

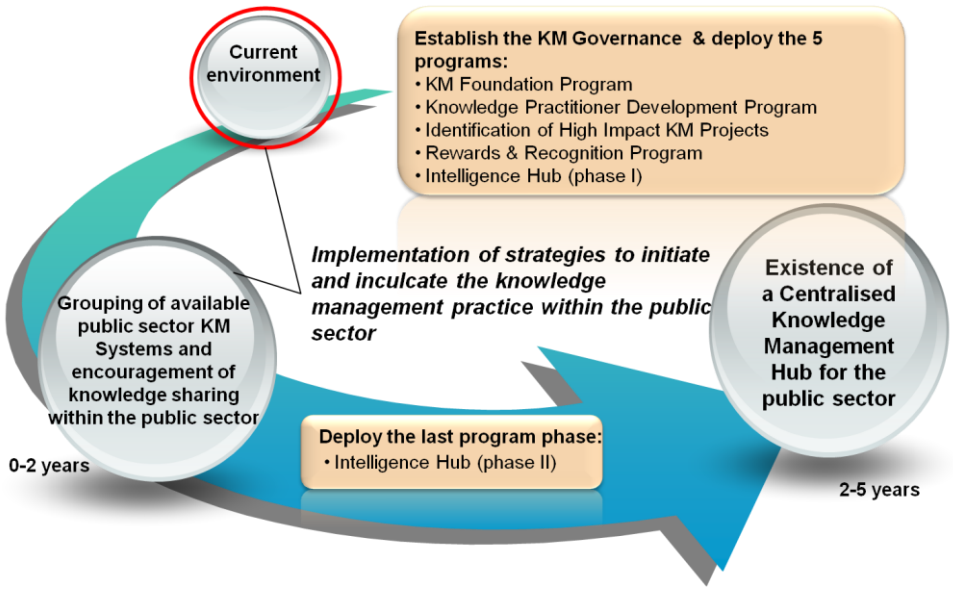


Figure 46 : Public Sector Knowledge Management Roadmap

It is foreseen that the grouping of currently available public sector knowledge management systems and the establishment of knowledge sharing culture within the public sector will occur within 2 years of the knowledge management blueprint implementation. The grouping of knowledge management systems is done through the Intelligence Hub Program where at least one high level intelligence hub has been created and categorised based on the public sector's sectoral categories; namely social, economic, general administration and security. The establishment of knowledge sharing within the public sector is created through the KM Foundation Program, Knowledge Practitioner Development Program, Knowledge Management Rewards and Recognition Program as well as Development of High Impact KM Projects Program where these programs are intended to support the knowledge management initiatives in the

public sector before, during and even after the knowledge management initiatives have been established.

The existence of a matured centralised based on the public sector's needs and demand will occur in 3 years time after the first major milestone of the public sector knowledge management roadmap has been achieved. This is to allow for further enhancement of the public sector's Intelligence Hub via cloud computing and the additions of sectoral as well as sub-sectoral Intelligence Hub that are linked to the centralised Intelligence Hub in order to include the other knowledge management initiatives that have been developed by other agencies or ministries via the Development of High Impact KM Projects Program in the previous major milestone.

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8 Knowledge Management Implementation Approach

Having a knowledge management framework and strategy is not sufficient to equip the public sector to start developing its own knowledge management initiative or / and system. Therefore, a standardised knowledge management implementation approach (which comprise of knowledge management implementation methodology and knowledge management governance) has to be in placed to further strengthen the public sector's understanding of how to implement a knowledge management initiative.

8.1 Knowledge Management Development and Implementation Methodology

The Overall KM Implementation Methodology approach is depicted in Figure 47 below:

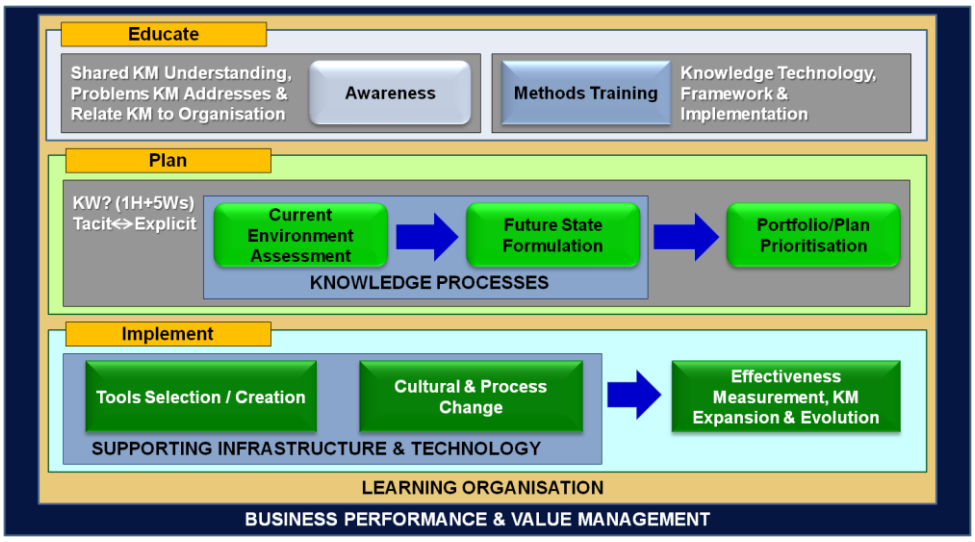

Figure 47 : Overall Implementation Methodology

This implementation methodology is created based on the combination of KPMG Public Sector KM Framework (Figure 48) and TMS Asia

Transknowformance Framework (Figure 49. See section 11.3 TMS Asia Transknowformance Framework for more details) specially tailored to suite Malaysia public sector. It is designed to create a Business Performance and Value Centric organisation on top of a Learning Organisation where Knowledge Management acts as the core.

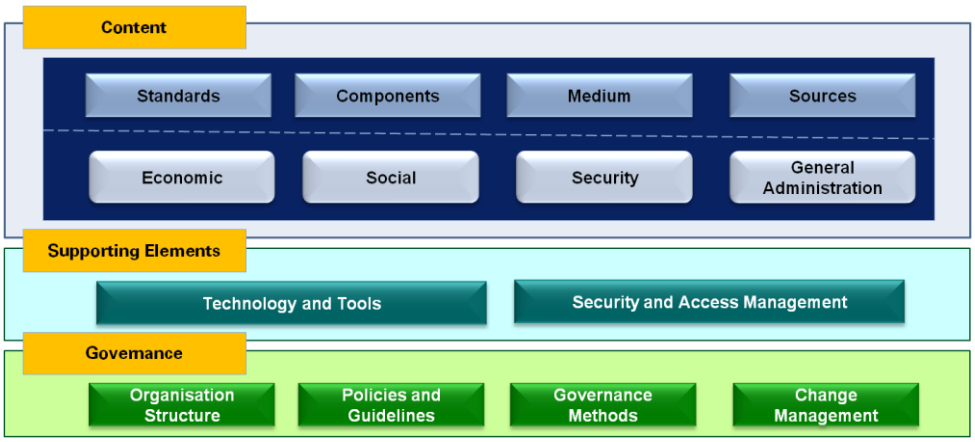

Figure 48 : KPMG Public Sector KM Framework

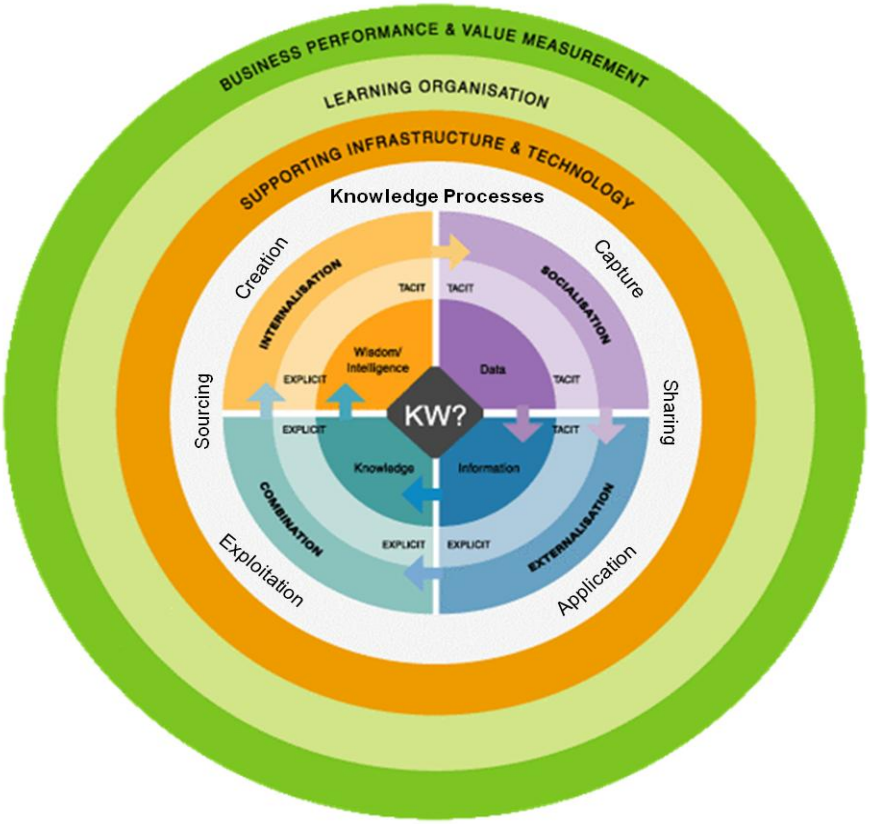

Figure 49 : TMSAsia Transknowformance Framework

8.1.1 Knowledge Management Implementation Methodology - Educate

The participation of all the stakeholders (decision makers, Knowledge Management (KM) implementers and end users) are the most important factor in ensuring the successfulness of a KM initiative. Not only people must participate willingly, they must also continue pouring energy into the initiative, and in the process, gaining momentum and evolving the initiative and ultimately embedding KM into business model.

Currently, most government agencies faced the problem of losing important knowledge that may not be captured when staffs transfer, retire or resign. There will be a serious need to quickly instil the necessary qualities and knowledge into the new staff to ensure the continuity of the KM initiative.

There are two (2) types of activities to cater for the above situation.

1. Awareness (Seminar / Workshop / Road show); and

2. Methods Training.

At this stage, the Knowledge Leader and Knowledge Manager (Intelligence, Risk & Analytics) that have been appointed in the KM Functional Area will be responsible for creating awareness (See 8.2.3 Proposed Overall Public Sector KM Governance for more detail with regards to the governance structure).

8.1.1.1 Creating Awareness

There are two (2) categories of the awareness events.

The first category will be put under the supervision of agencies Knowledge Leader and conducted as needed. It is conducted at the start of Knowledge Management (KM) initiative and can be treated as a pre-sales

activity to promote the idea of KM. The target audience will be decision makers and KM implementers.

The second category is aimed at creating awareness, educate new staffs and promote buy-in from end users. This is an important step because the active participation of users in KM is one of the key success factors in KM initiative. It is under to supervision of Knowledge Leader of each ministry / agency and should be conducted on a regular basis. This seminar can also be used to gather user input on KM initiative.

Both types of awareness events are a short full day or half-day interactive event that aims to help delegates understand what knowledge means in public sector context. At the end of the session participants will have:

- Developed a shared understanding of and vocabulary for KM;
- Understood the range of problems KM addresses and the range of solutions it proposes; and
- Related KM to their own organisation by identifying the problems and solutions most likely to be applicable to them.

8.1.1.2 Implementation Methods Training

An education courses will need to be created to provide training to Knowledge Management (KM) implementation personnel in the models, methods, tools and technologies of KM. This course will be generally divided into 5 major modules.

1. **Knowledge technologies module**: looking at the role of ICT, the logical ICT architecture and the applications and technologies available. For example (not an exhaustive list):
    a. Data mining and data warehousing for KM;
    b. Integration of existing system;

c. ICT infrastructure; and

d. Taxonomy and/or ontology based for KM classification.

2. **KM Framework module**: instruction in public sector approach in applying KM Framework.

3. **KM Implementation module**: focusing on the implementation methodology.

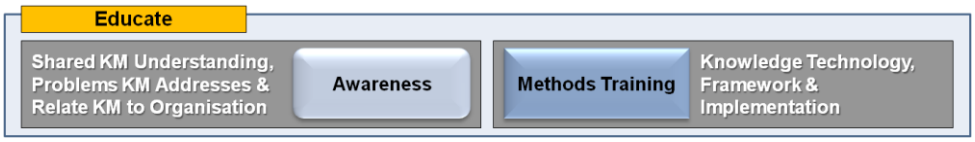

Figure 50 : Knowledge Management Implementation Methodology - Educate

8.1.2 Knowledge Management Implementation Methodology - Plan

Before the implementation, a "Prioritised Portfolio/Plan" (Figure 51) will need to be created. This portfolio will be the primary document that draws out the detail directions for the whole Knowledge Management (KM) initiative. Among the items in this portfolio are:

- Understanding current environment where the KM will be implemented; and
- Formulate the future (To-Be) stage for KM implementation.

This step will consists of identification of tacit to explicit, tacit to tacit, explicit to tacit and explicit to explicit knowledge as well as application of knowledge processes (See section 4.1.2 Knowledge Management Processes for details) and provides answers to Knowledge-Ware (1H+5W) questions which consists of Know-How, Know-What, Know-Why, Know-When, Know-Where & Know-Who. All the meta-knowledge (Knowledge about Knowledge) will then be organised based on the

"Content" section in KPMG Public Sector KM Framework (See Section 6.3 Overall Public Sector Knowledge Management Framework for more details).

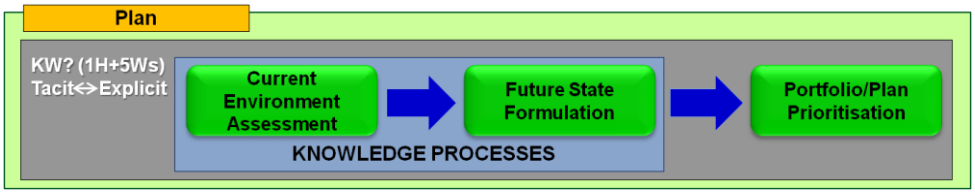

Figure 51 : Knowledge Management Implementation Methodology - Plan

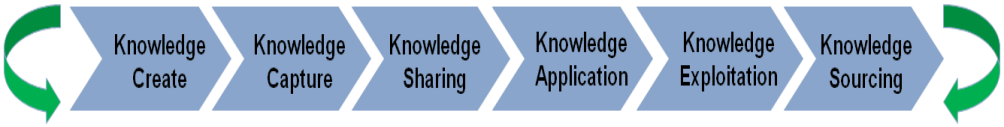

Figure 52 : Knowledge Processes

8.1.2.1 Current Environment Assessment

In the realm of the public sector, there is countless knowledge. From employee office extension number to meeting minute to how to react when certain situation arises; to simply put it, everything is knowledge. Naturally, some knowledge is more important to the core business than the rest.

In this step, the Knowledge Management (KM) implementer will need to identify all the important knowledge and include it into the KM initiatives to reap the maximum benefit. This cannot be done without having the clear understanding of the functions of the agency and how it performance is measured. At this stage, the corporate division and top management of each department in the agency will be heavily involved since they are the persons who are most knowledgeable about the agency as a whole.

1. Identifying KM Vision

KM vision will be set based upon the full understanding in combination of the Public Sector's KM vision and of the agency's / ministry's / group's vision. As a general rule of thumb, the KM vision

should not be something new that stands alone. It will be based on something that aims to assist the agency / ministry / group to reach its vision.

2. List Out Agency Core Business and Key Result Area (KRA)

Under the current government administration that aims at creating a leaner and efficient public service, key result areas (KRAs) have been identified to measure its performance. These carefully designed KRAs are directly related to the performance of the core businesses of a ministry / agency and can be used as a vital input for setting the KM focus and direction.

3. Knowledge Audit

From the figure below (Figure 53), the next step is Knowledge Audit. By having the KM vision and Key Result Areas in hand, the next step is to identify what knowledge needs to be included into the KM initiative, such as knowledge that is required to perform core business efficiently and to support daily operations. In general terms, any knowledge that is related in assisting the ministry / agency to achieve its KRAs should be considered to be included into the KM initiative. For example, in order to reduce the processing time for tender applications, “Supplier Status List” must be accessible instantly. Also, by discovering what knowledge is available, it is then possible to find the most effective method of storage and dissemination.

Once the required knowledge is identified, the current status of all the required knowledge will need to be identified by answering the following questions:

- Who has the knowledge? (Department or individual)
- What is the knowledge type? (Tacit or explicit knowledge)

- Is the knowledge exists in system? (Explicit knowledge)
- Which knowledge exists in hard copy and will need to be captured into the system? (Explicit knowledge)
- Which knowledge is tacit knowledge that will need to be captured into the KM system later during implementation?
- How does the knowledge flow within the organisation?

4. Technology Audit

From our interviews and questionnaire answered by selected agencies, it is a fact that there is a big difference in defining what KM is between agencies. In fact, KM has such a wide scope so it is wise to reiterate that all systems in the agency are either a knowledge system (or partially) or should be treated as information repository for KM.

By having this in mind, an initial assessment of all current systems in the agency will be conducted to answer the following questions:

- The required knowledge is stored in which system?
- Is the system robust enough to support KM requirement of searching and retrieving of knowledge? (explicit knowledge)
- If not, what is the effort required to add in the supporting feature?
- What is the current popular and preferred knowledge sharing method? (List down only those utilising ICT facilities, e.g. forum, e-mail)

The end product of all the steps above is a “Knowledge Strategy” that encompasses the following objectives:

- KM initiative direction and its primary usage;
- Knowledge to be included into the initiative;
- Knowledge readiness to be included into the initiative; and
- Current system readiness in supporting the KM functions.

5. Understanding the people and culture

Getting an organisation's culture (including values and behaviours) 'right' for KM is typically the most important and yet often the most difficult challenge. KM is first and foremost a people issue. The success of KM initiatives depends upon people's motivation, their willingness and ability to share knowledge as well as use the knowledge of others.

Public sector traditions of respecting knowledge and passing wisdom through verbal communication have positive influences in knowledge sharing practices. This practice of information sharing is already deeply embedded into the current work practices; therefore this practice can be further encouraged by bringing it forward into the realm of KM practice where knowledge is shared in advanced or based on up-to-date information instead of based on request from other parties.

Cultural factors have significant impact on an individual's decision to share or hoard knowledge. However, people do share knowledge in general for reasons such as reputation and prestige.

Therefore, to ensure the creation of a self-sustainable KM ecosystem, the following questions must be addressed:

- What is the suitable method to kick start knowledge sharing? (In this phase, a suitable "Rewards and Recognitions" tactic is required);

- How to create a self sustainable KM ecosystem in the long run? (An environment that naturally support the supply and demand nature of knowledge sharing); and

- What changes are required to current organisation structure to support the KM initiative?

Figure 53 : Understanding Knowledge Status

8.1.2.2 Future State Formulation

In KM, people are the most important deciding factor in influencing the success or failure of the initiative. Another side of same "success" coin is the understanding the Knowledge Management (KM) framework to be implemented in the public sector.

1. Understanding & Apply KM framework

The KM framework is very important for the public sector that intends to implement the KM system in their agency. It will used as the guidelines in order to avoid the errors, gain other benefits in terms of time and effort as well as cost involvement.

(Refer to section "6.3 Overall Public Sector Knowledge Management Framework" for details on the proposed KM framework)

2. Identifying Problem and Opportunities

Due to different organisation structure and nature of business, each and every agency will face different problems and hence different opportunities. It is imperative that each agency to address this in its own context and taking steps to identify these issues early in the stage.

In general context, problems and opportunities will arise from these few directions:

- Organisation Structure/ People

  It is vital to understand that for the KM to be successful in the public sector, it needs to be driven top down even during the early stage of development itself. Changes to existing organisation structure to properly support KM initiative must be properly planned if not put in place.

- Technology

  During the technology audit in Stage 1, weaknesses in existing system would have been identified. This is especially true in terms of ability to capture tacit knowledge in the form of audio / visual format where most available systems are not designed for. This is the best time to plan for upgrades by adding new features or overhaul the existing systems. This process is not only specifically for the sake of KM implementation, but also to further enhancing the current system to better support business process as a whole.

- Process

  Armed with the knowledge on KM Vision, Organisation Mission and Vision, and current business process, the KM implementer team might be able to quickly identify business processes that can be modify to quickly increase efficiency. With this in mind, KM initiative can be directed towards supporting these new and improve business process.

  The implementer can also integrate business processes with the six (6) knowledge processes (knowledge create, capture, sharing, application, exploitation and sourcing). Once this is done, KM will become part of a day to day working process and no longer need extra effort.

3. Identifying Business Case

This section presents a business benefits case assessment methodology for KM projects. There are many areas of linkage between the creation of a benefits case and the knowledge audit/strategy process:

- Identification of the business value of knowledge should be an important part of the knowledge audit/strategy process, to enable targeting of the best opportunities;

- Most benefits case models will require a detailed analysis of the processes to be improved by KM - which should be done as part of the knowledge audit/ strategy process;

- The knowledge classification used in the audit process needs to support a family of generic solutions for each class, so that costs and scale of improvement of the process can be modelled.

This methodology incorporates steps taken before, during and after the knowledge audit. In addition to providing a benefits case framework for KM projects, it produces a value-oriented "knowledge map" of the client business.

Figure 54 : Understanding Success Factors

8.1.3 Knowledge Management Implementation Methodology - Implement

The goal in this step is to create supporting infrastructure & technology to support, expand and evolve KM initiative and ultimately integrate it into business processes.

At the beginning this stage, the agency Knowledge Management (KM) Functional Area will be further expanded to include Knowledge Managers (Content Management) and Knowledge Brokers. These people will be responsible in managing the content of the KM system once it is deployed. (See 8.2.3 Proposed Overall Public Sector KM Governance for more details in the governance structure)

At the end of this stage, it is important to measure effectiveness of the KM initiative by using business case identified and applying Performance Measurement Method. Based on the results, existing processes / tools can be tweaked and/or new process / tools can be introduced and

coverage of KM in terms of knowledge area and functionality will go through the process of expansion and evolution.

Figure 55 : Knowledge Management Implementation Methodology - Implement

8.1.3.1 Tools Selection / Creation

Where KM is concerned, technology is certainly not the single point of focus. According to the Delphi[19] research report, KM is not viewed so much as a technology as it is as a cornerstone of an organisation's business practice and culture. The fact still remains that, if there is one thing that can transform KM from a conceptual entity to a business reality, it is technology.

In order to pick the right tools for the right job, public sector need to adopt the following approach:

- Understand what technologies have to offer in terms of functionality;
- Understand in what way they could form the underpinning of overall KM solution; and
- Leverage on existing systems

Due to the nature of technology, it has the highest influence over three (3) out of six (6) of the knowledge processes, namely knowledge capture, knowledge sharing and knowledge exploitation.

[19] *Knowledge Management 97, Market reference point, Delphi research note, October 9, 1998.*

Knowledge Capture

Whether it is in the form of information storage or systems that pre-process knowledge that can be use by KM system, technology plays important roles in capturing and storing knowledge.

Tacit knowledge is normally difficult to capture in writing, thus making technology tool such as video and voice recording important when capturing tacit knowledge. This way, tacit knowledge can be shared in the form of audio or visual material.

To enable a meaningful capture and storing of knowledge within the public sector, knowledge is defaulted to four (4) sectoral knowledge classifications (based on the economic planning unit's sectoral classification – economic, social, general administration and social). Knowledge will also be tagged semantically by the author (the knowledge contributor). The search engine will then have two searching algorithms to effectively retrieve the stored knowledge, search by text (title or content of document) or search by semantic tags. Therefore, based on current available technology, it is recommended that the technology to be used for easier and fast searching is based on the ontology-based KM.

Knowledge Sharing

When knowledge is to be shared over wide landscape, one of the first aspects to be considered will be the networking infrastructure. This is vital in public sector because each agency is tasked to implement own KM system and become a node in the public sector Intelligence hub.

In this architecture, each agency will be responsible solely on its own knowledge. The agency will decide what knowledge that it wants to share and what knowledge is more suitable to be kept within the agency only. Nodes on higher level will also have control over nodes below in terms of knowledge to be shared to the level above.

Knowledge Exploitation

A user friendly web portal is required for the knowledge author to contribute and other users to search for knowledge. This is the important component where existing knowledge can be use and reuse to maximise it value.

In order for the knowledge been use and reuse to it maximum potential, a powerful searching technology is required to provide fast response in locating useful knowledge.

Like all ICT systems, access right is a vital component that ensures only authorise users are allowed to access the system. This is especially true for the KM system implemented in the public sector where some of the knowledge is classified. Security features that are KM specific include:

- Ability to tag knowledge with different level of authorisation (for example, top secret, secret, internal use and for public); and
- Ability to tag knowledge so it is only available to specific group(s).

8.1.3.2 Cultural & Process Change

Public sector has already embarked on a number of initiatives to achieve its objectives which will enable it to serve the citizens better. Below are a few important initiatives that KM can link up to:

- Knowledge sharing acculturation to create a culture of knowledge sharing in the public sector;
- Improve customer service through changing current work process to include KM system as part of work process;
- Customer care and managing relationship through proving fast effective response to cater for citizen needs; and

Public sector-wide integration to combine all KM initiative and made available to all.

8.2 ICT Governance

There are many barriers to implementation of knowledge management (KM) strategies. These include a lack of time and financial resources allocated to sharing knowledge, a lack of organisational understanding of the philosophy and the benefits of KM and a lack of skills in KM. These obstacles reveal a problem in the implementation of an organisational KM strategy. The problem lies not in the implementation of a given strategy per se, but in the lack of governance of that strategy.

The governance process is a framework of authority that ensures the delivery of anticipated or predicted benefits of a service or process (Farrar, 2001)[20]. Governance process ensures that the strategy is executed in an authorised and regulated manner. Governance mechanisms must be invoked to guide both the initial implementation and the ongoing control and authority over of KM strategies. A governance framework will provide management of risk, review mechanisms and fiscal accountability in leveraging tacit knowledge and sharing explicit knowledge within an organisation. KM governance centres the decision-making authority as an executive framework to deliver the expected benefits of the strategy and for these benefits to be delivered in a controlled manner. This is achieved by the establishment of checks and balances in the implementation of the strategy. It ensures that evaluation measures feedback that enables deliberate adjustment of the delivery of the strategy and ensures that needs and expectations are being met. If the needs and expectations of the organisation cannot be met then the governance process should then be able to establish and manage the cause.

[20] *Farrar, J. (2001). Corporate Governance in Australia and New Zealand. South Melbourne: Oxford University Press.*

8.2.1 Background

Leadership Role

Executive management leads and establishes the culture and consequent ability of an organisation to capture, share, and manage its knowledge. In the past leaders in organisations were empowered to order changes and then all that was required of the organisation was to implement the plan (Bridges and Mitchell, 2000)[21]. The culture of an organisation is developed by the structure, by the attitude and example of management. Where there is a strong commitment at the level of executive management to change organisational culture an organisation is able to begin to create the values that lead to knowledge sharing across boundaries. Currently interpretations of knowledge management leadership endow the leader with the responsibility not only to direct, to conduct but also to guide functions in the implementation of such a strategy.

The terms knowledge champion, leader or sponsor are used interchangeably in the knowledge management literature. The terms variously indicate a person who initiates a KM strategy, or one who supports and promotes the initiation of such a strategy. Therefore the person or persons responsible for the implementation of a KM strategy may have the sole responsibility for the development and implementation of a KM strategy.

Governance Principles and Practice

There are a number of current contending uses of the term governance. In this blueprint, governance refers to the governance processes of control or regulation within the organisation, interpreted as the implementation of authority through a framework that ensures delivery of anticipated or predicted benefits of a service or process, in an authorised and regulated

[21] *Bridges, W., and Mitchell, S. (2000). Leading Transition: A New Model for Change. Leader to Leader*

manner (Weill and Woodham, 2003)[22]. This approach forms a context for analysis, management, risk management and the ongoing development of strategies to manage organisational knowledge for the whole public sector. It is also a means of developing measures of the effectiveness of those strategies. Governance will be affected by the composition of the membership of the governing body or committee, the personal characteristics and history of the individuals involved and also the visions and principles embedded in the organisational structures and processes of any ministries/agencies in the public sector. The delivery of a KM strategy in an agency or ministry provides services to, and exists to meet the needs for the creation, dissemination and utilisation of tacit and explicit knowledge to fulfil organisational objectives. How this function is fulfilled is reflected in the timeliness of service delivery and the satisfaction levels of the internal and also, potentially, of external clients. The processes and principles that act as a framework for examination, regulation, supervision and revision of KM strategies fall under governance. Governance in Knowledge Management functions as those of monitoring and facilitation of knowledge related activities within the implementation process. Knowledge management governance processes determine organisational knowledge access conditions, quality maintenance, decision making processes and means of resolving KM obstacles.

8.2.2 Managing the KM Function

Although many public and private-sector organisation leaders have accepted the need and rationale for knowledge management activities, not everyone agrees where management of the function should fall in the organisation. Ideally, the proposed KM organisation structure implemented by KM staff and supported and promoted by champions in the agencies should be as in Figure 56. In each agency, the KM initiatives will be driven by the Knowledge Leader (KL) and supported by its KM Functional Area. Whereas the organisation needs to have an appreciation of the role ICT

[22] *Weill, P., and Woodham, R. (2002). Do not Just Lead, Govern: Implementing Effective IT Governance (White Paper No. 326). Boston: CISR.*

can play in knowledge management, as an important enabler, for collaborative working, capture, storage, easy retrieval, sharing and re-use of knowledge, KM should not be equated with ICT. Ideally, the KL post will be taken by the senior management in the corporate division or any other division which serves the same function. The KL needs to demonstrate business and strategic perspective and an ability to integrate into KM all relevant types of enablers. In general, the KM Functional Area would drive the KM initiatives with the ICT Division supporting in terms of the tools and technologies. More details with regards to the roles and responsibilities of KLs and the KM Functional Area will be described further in the Governance section of the Knowledge Management strategy in Chapter 7.

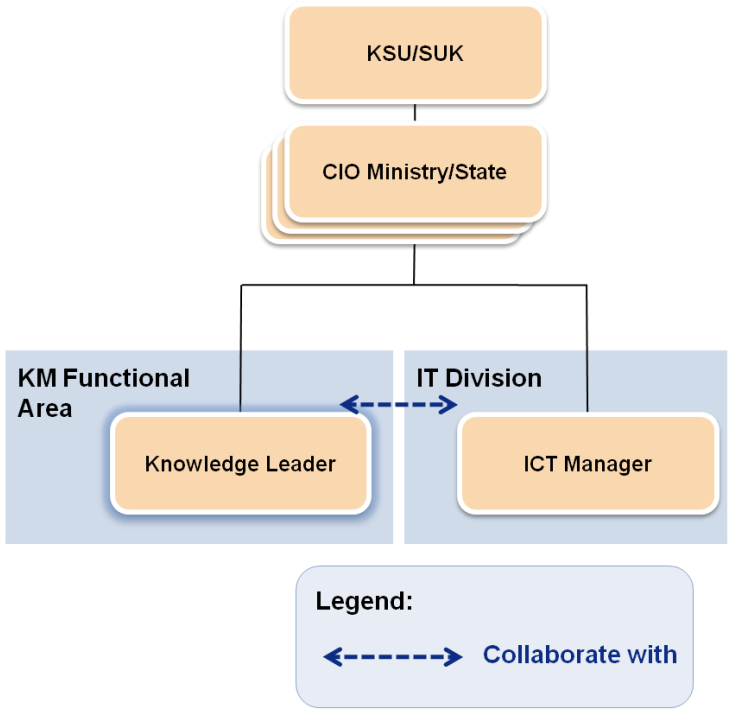

Figure 56 : Proposed Organisation Structure in Agencies to support KM Initiatives

Organisations that rely on or utilise KM for the transfer of strategic knowledge such as the public sector as a whole should work to establish KM governance committees including stakeholder representation. There are two fundamental objectives in this governance process. These are:

- To ensure that KM delivers value to the identified stakeholders. This value is derived from the value proposition of the organisation and the organisational strategies put in place to achieve those ends; and
- To control and to minimise the risk to the KM strategy. The strategy must be capable of adjustments required in response to perceived flaws in its capacity to effectively transfer knowledge.

In acknowledging knowledge as the organisation's strategic asset and differentiator, it can be seen that the ultimate responsibility of the KM governance process is to ensure the governance of KM as a means of pursuing success in the implementation of a KM strategy in the agency. Governance processes operate to manage the risks of KM to acknowledge and contend with the cultural issues, structural obstacles and other relevant issues as they arise during the implementation and ongoing operation of that strategy. The management of these risks will assist in the resolution of such issues and in turn strengthen the strategies to manage knowledge that are employed within the public sector. Acknowledging knowledge as the organisation's strategic asset and competitive differentiator is not the ultimate responsibility of the governance process. The effective governance of KM may be a means of pursuing success. However governance of KM implies more than this. It implies and demands strategic thinking about the strategies in place for long term and medium term planning. Such strategies should not be regarded as linear in direction but incorporate feedback both in the positive and negative aspects of the KM strategy that will in turn improve existing plans and practices. In a nutshell, KM governance functions operate to ensure that KM delivers value to the identified stakeholders and provides a control mechanism to minimise risks to the successful implementation of a KM strategy. The proposed governance framework given for these processes and practices may better enable an effective and coordinated outcome for KM strategies that ensures the delivery of anticipated benefits in an authorised and regulated manner.

Although there are still government agencies in which Knowledge Management are not found in full-blown operation, the management function known as knowledge management has been widely embraced by a wide variety of organisations in the federal government. In those agencies where KM is found, it is often considered an important if not absolutely necessary management tool; implementing KM will enable the agencies to meet their service and performance requirements in spite of the many challenges government faces in this new century. Moreover, proponents of KM believe that by enhancing the collection, codification, storage, transmission, and sharing of knowledge, government agencies are able to succeed in their missions despite declining budgets, demands for more and improved services, and a skilled, knowledgeable workforce that is disappearing into retirement. KM is far less visible in either state or local government, however. At the local level, many of the tasks of KM are managed under the auspices of a chief information officer, or similar ICT-oriented managers. Because of the still-sparse adoptions of KM in state and local governments, the bulk of the discussion in this chapter must refer to KM as it is found in federal agencies, departments, and functions, with the few state and/or local applications added as they are found.

A number of uncertainties continue to negatively impact the practice of knowledge management (KM) in both the private and the public sectors. These uncertainties may be exercising a braking effect on more widespread adoption of KM departments and functions. Among the more salient ambiguities is lack of consensus on exactly what KM is, and where in an organisation the function should be located. Despite these still-unsolved difficulties, a consensus is emerging on the responsibilities and critical skills of the individual or individuals selected to guide its functioning in organisations. Government managers, administrators, and knowledge users are rapidly discovering what KM can do to improve government products and processes. Although KM is now a widely understood concept in most high-level government agencies, it is still not widely adopted in state or local government organisations.

Establishment of the Knowledge Leader Position in Ministries and Agencies Level

The position title of Knowledge Leader (KL) appears to have surfaced as one of the preferred title for the person or persons who are charged with leadership of the function. However, many other titles are still extant. In government and non-profit organisations, KM function leaders are still known by a wide variety of titles. To name a few: such diverse positions as Chief Knowledge Officer, Chief Learning Officer, Special Advisor on Learning and Knowledge Management, Director of Information Services, Knowledge Management Director, Knowledge Management Technologies Program Manager, Knowledge Management and Technology Transfer Director, and many others. The KL title may have been a logical extension or emulation of the already accepted organisational positions of Knowledge Leader (KL), Chief Executive Officer (CEO), Chief Operating Officer (COO), Chief Financial Officer (CFO), and Chief Marketing Officer (CMO). However, it is more likely an evolution of the Chief Information Officer (CIO) position title that is common in information technology functions. Nonetheless, there needs to be a clear distinction between the roles of a Chief information officer (CIO) and a Knowledge Leader (KL). This distinction is not universally recognised, however. In agencies where KM is under the direction of a CIO, the organisation tends to see KM as an application of information technology (ICT). The CIO literature appears to be supporting his position, whereas the approach accounts for the fact that many ICT trade publications, such as CIO magazine, have embraced KM as one of their own, and now routinely treat it as though KM is nothing more than the latest trend in ICT.

Terms of Reference of the Public Sector Knowledge Leader (Ministry / Agency)

If some voids in the framing of the KM function still remain, it is no wonder that establishing the focus of leadership and responsibility for the person

charged with carrying out the function is still somewhat fuzzy. However, steps are being taken to rectify this state of affairs. To be successful in the role of knowledge manager, a public-sector KL has to exercise competency in the following management processes: leadership and management, communications, strategic thinking, ICT tools and technologies, personal behaviours, and personal knowledge and cognitive capabilities (intelligence). These include the fundamental roles, skills, knowledge and intellectual capacities, and performance responsibilities of the typical public-sector knowledge officer.

There is a need to emphasise that a public sector chief information officer (CIO) is not the same thing as a public-sector Knowledge Leader (KL). The government CIO is typically focused on management of the organisation's ICT programs and strategies. The KL, on the other hand, is more likely to be concerned with a complex set of activities that reflect human behaviours in organisations. These include, but are not limited to, such actions as work processes, reward systems, knowledge collecting and sharing, information dissemination, and similar social actions. Consequently, the role of the public-sector KL involves the following primary activities:

- Participating in forging and implementing a knowledge management strategy;
- Developing leadership skills in managers and workers;
- Determining best practices and/or processes within and without the organisation;
- Fostering a knowledge-sharing culture among individuals, groups and teams, and the organisation as a whole;
- Identifying and promoting establishment of communities of interest and communities of practice within and without the organisation;

- Recommending and administering rewards and other incentives for knowledge sharing, innovation and creativity, and learning within the organisation;
- Specifying ICT tools and related technologies to leverage the existing intellectual base in the organisation;
- Identifying and rationalising taxonomies (classification schemes) of organisation information; and
- Managing the organisation's education, information, and communication technology resources.

The recommended skills, knowledge, and abilities of a public-sector knowledge officer is summarise by stating that the function of the Knowledge Leader is first to create and maintain an environment and atmosphere within which all workers deliver value to the organisation. (Adding value occurs with the collection and application of existing and unexploited explicit and tacit knowledge resources.) Second, KLs must be engaged in identifying, charting, and discovering connections and networks in organisational and information processes, classification schemes, and tools to access and use existing data, information, and explicit and tacit knowledge in a manner that promotes sharing across time, space, and boundaries. An example of the roles of a general Public Sector KL is shown in Figure 57.

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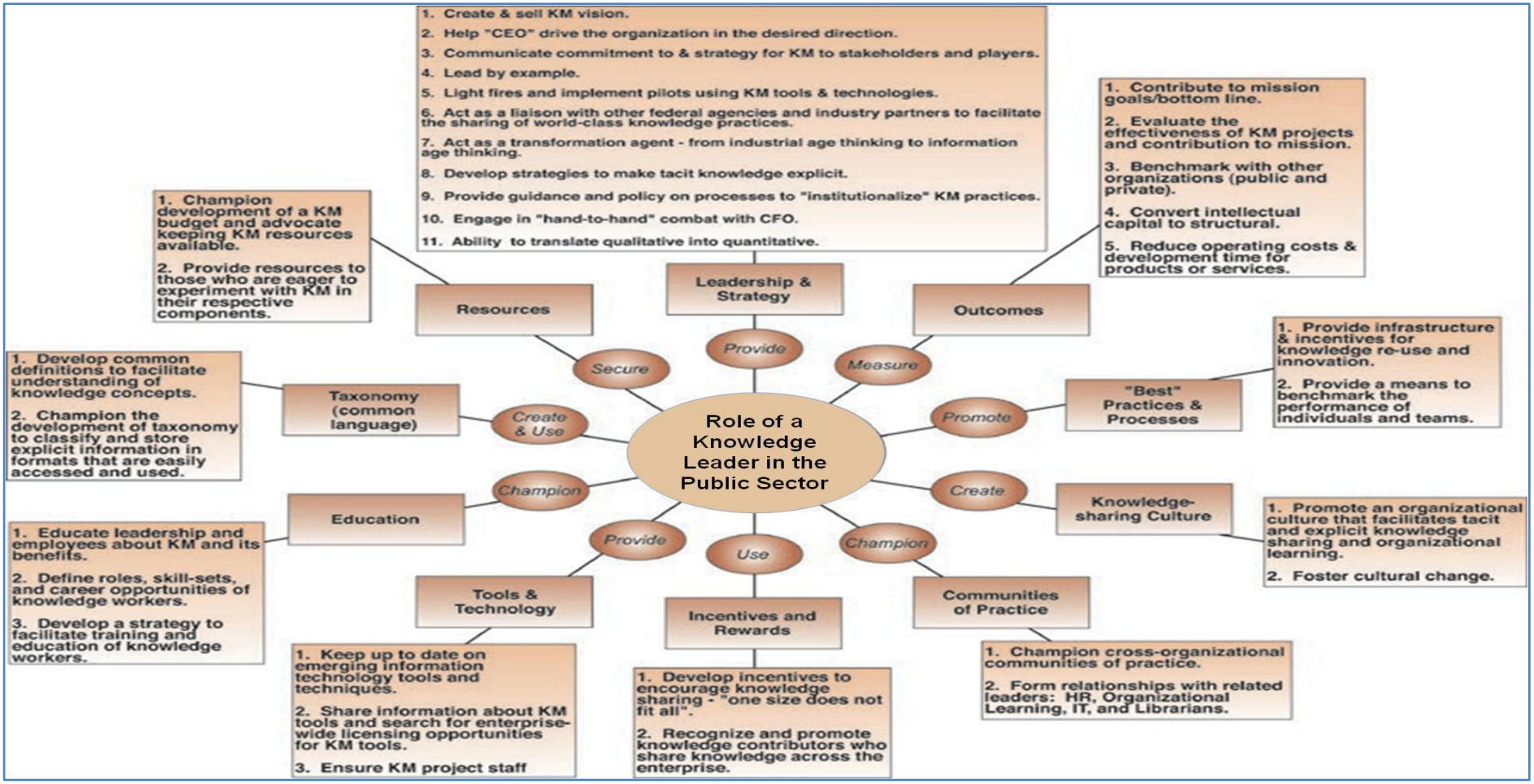

Figure 57 : Example of Roles of a Knowledge Leader in Public Sector Ministry or Agency

Characteristics of a Public Sector Knowledge Leader (Ministry/Agency)

Based on a research by Michael J. Earl and Ian Scott (1999) a series of in-depth interviews with chief knowledge officers (CKO) in North America and Europe to determine which common characteristics, if any, are held by CKOs. Earl and Scott found that the KM managers had at least two chief characteristics in common: First, they were all highly knowledgeable in information and communications technology. Second, they also exhibited strong organisational environment skills and awareness. Their technical knowledge included understanding what information and communications technology (ICT) were needed in their organisations to capture, store, manage, organise and interpret, and, in particular, share knowledge within and without the organisation. Anecdotally, they also found that most of the Knowledge Leaders in the study were firmly entrenched in the ICT operations of their organisations. The organisational skills may be grouped into the more recognisable category of people skills. A common thread found to exist across the sample of Knowledge Leaders was a mix of activities that could be grouped together under the category of "conceptual design." This included designing knowledge directories (who in the organisation knows what and where to find them), knowledge-intensive business and management practices, and events where knowledge exchanges can occur. In addition, Knowledge Leaders were involved in the design of physical spaces to facilitate knowledge sharing (such as "in-house coffee shops" and the like). Finally, Knowledge Leaders also designed methods, policies, and processes for knowledge protection. According to Stankosky (2005), a general consensus exists on what should be considered the fundamental tenets of KM. He added that, despite the confusion that remains in many areas of the concept, widespread agreement has emerged on most of the basic principles of KM. He identified the following four fundamental principles as forming the core of all knowledge management applications and, therefore, necessary characteristics for holders of the Knowledge Leader position: leadership, which must frame organisational culture, vision, strategic planning, and

communication; organisation, which involves the forming of such operational aspects as which functions, processes, procedures, and formal and informal structures are best for the organisation; technology, which, of course, means the information and communication technologies (ICTs) that make knowledge sharing possible in organisations, including such tools as e-mail, data warehousing, search engines, content management programs, and similar technological functions, hardware, and programs; and learning, which includes such behavioural aspects of operations as innovation, creativity, invention, teams, shared information and results, exchange forums, and other activities. Stankosky added that subsequent developments in the discipline, including a growing list of published professional and academic literature, suggest that these four pillars of the discipline have been accepted as the basis upon which all KM programs must be established. An example of attributes and also the skills and competencies of a Knowledge Leader can be seen in Figure 58 and Figure 59 respectively.

Figure 58 : Attributes of a Knowledge Leader

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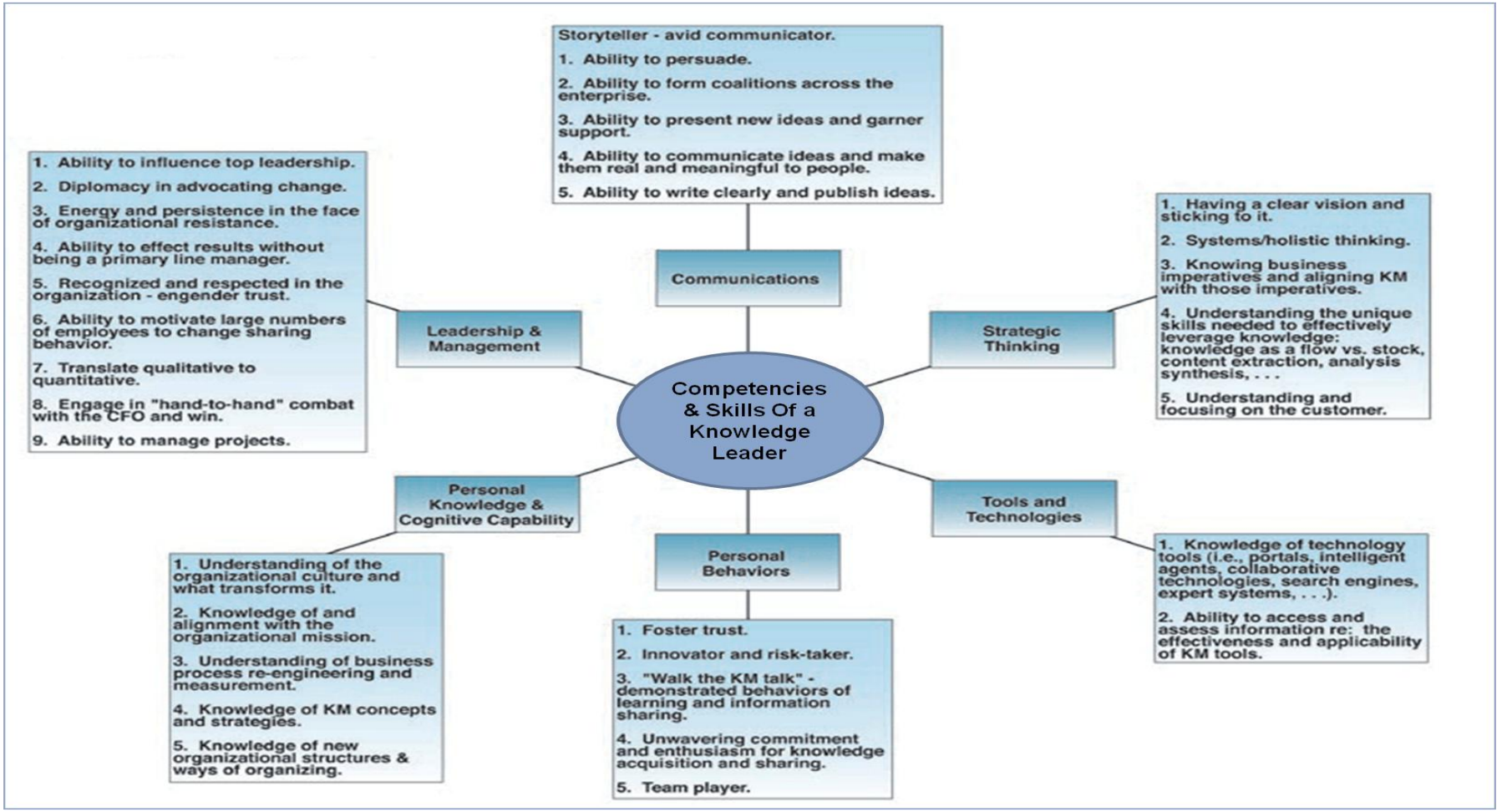

Figure 59 : Skills and Competencies of a Knowledge Leader

8.2.3 Proposed Overall Public Sector KM Governance

More information is being created and held today than ever before. It is fundamental to have this information readily available at hand to be able to deliver services to the citizens effectively and efficiently. To deliver effective public services and guarantee public accountability, government needs to capture, and manage effectively, the information it is creating and receiving. Both knowledge and knowledge management are critically important to the future success of government. In terms of driving ICT initiative and e-Government services, the public sector has established the Government CIO's (GCIO) within MAMPU and has taken steps for the identification and appointment of CIO in all agencies. In order to enhance communication channels between CIO's, several initiatives have been implemented including conferences, the establishment of a CIO panel as well as the publishing of the CIO toolkit. These initiatives have proved to be an effective ground for CIOs to exchange ideas and knowledge and would be a useful channel to implement future strategic directions.

KM Advisory Panel Structure

Nevertheless, a similar structure which can drive and support the implementation of knowledge management initiatives needs to be established. The KL role and KM Advisory Panel are proposed to be established in order to be able lead the government in the better use and management of its knowledge and information, and to support government in ensuring that it has the capability to do so effectively. Through this proposed structure, it can improve the way agencies manage information as a valuable asset, ensuring it is protected, made accessible where appropriate, and used effectively to inform decision-making. Furthermore, a designated post on knowledge management would help to drive and help building a culture that shares knowledge more effectively, and builds capability in handling information of all kinds as well as developing the professionalism of knowledge and information management, and supporting governance, processes and technology. The outputs of this KM

Advisory Panel would supports both the government's Government Transformation Programme (GTP) and New Economic Model (NEM) by providing a strategic focus on all aspects of knowledge and information management. The Figure 60 below shows the proposed reporting flow between public sector CIO Panel, the KM Advisory Panel, Ministry or State KL and also the relationship between the KM Functional Area and the ICT Division where the KM Functional Area will drive the KM initiatives and comes up with strategic approaches and will be supported by technology and tools developed by the ICT Division. The KM Advisory Panel members consist of KLs from prominent ministries with MAMPU as the Panel Secretariat and will report to the CIO panel who in turn reports to the Jawatankuasa ICT Sektor Awam (JISA). The function and role of JISA will be explained in the ICT Governance Blueprint.

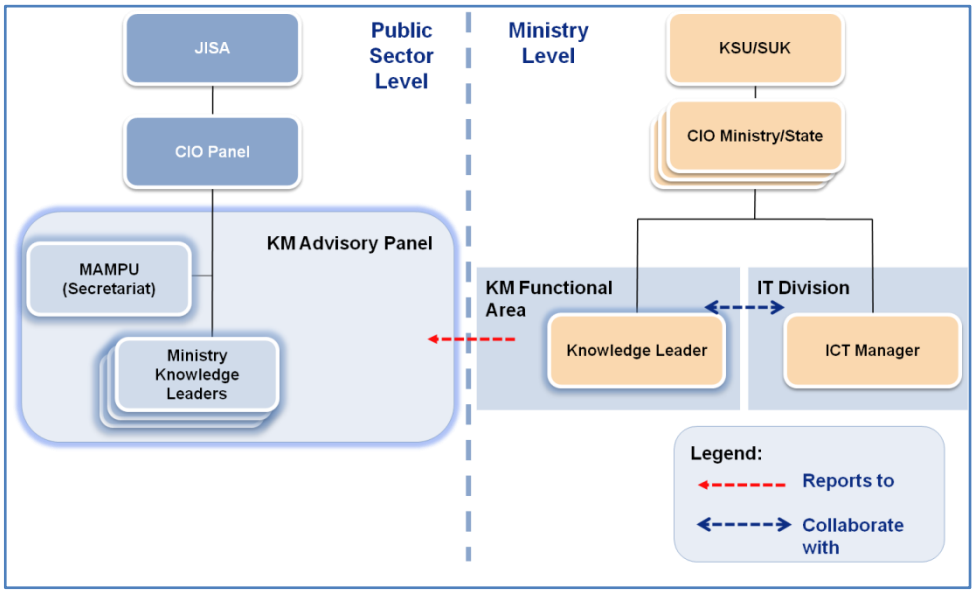

Figure 60 : Proposed Reporting Flow between Public Sector CIO PANEL and Ministry/State Knowledge Leader

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Terms of Reference for KM Advisory Panel

The key characteristics of the KM Advisory Panel are as follows:

i. Reports directly to the CIO Panel with MAMPU as the Secretariat;
ii. Meet up on frequent basis to share knowledge and information about problems and discuss about possible solution faced during KM initiative and also decide and encompass all roles for KL to get collective agreement;
iii. Advise the KLs on knowledge management and information policy and infrastructure issues and, as appropriate, make recommendations through the CIO PANEL to the Government on such matters;
iv. Develop policy advice and coordinate direction in relation to knowledge and information aspects of the public sector's Strategic Plan;
v. Oversee the Government's Knowledge Management Strategic Plan in consultation with the public sector Communities of Practice (CoP);
vi. Provide advice to Ministries and Agencies on the allocation of resources necessary to support implementation of the Knowledge Management Strategic developments; and
vii. Advise Ministries/Agencies on matters relating to quality assurance of information and knowledge management, and of the services that support it.

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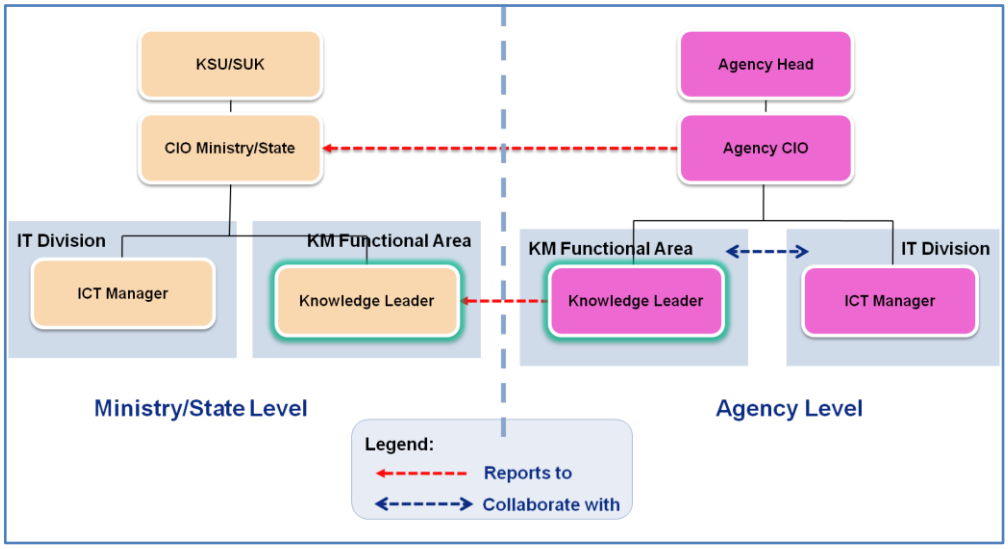

Figure 61 : Proposed Reporting Flow between Ministry/State KL and Agency Knowledge Leader

As in Figure 61 above, the relationship and reporting structure between the ministry/state and agency mirrors the relationship of ministry and overall KM governance that is the KM Advisory Panel. In this structure the Agency KL will report to the Ministry KL and work in collaboration with the ICT Division.

Another addition to the KM Governance is the establishment of a KM Functional Area to support the KLs. The KM Functional Area are proposed to be established in every agency to provide support to the KL and also responsible for delivering a strategic program for knowledge and information management in the ministry or agency. The number of staff in the KM Functional Area is ideally to be two Knowledge Managers and a number of Knowledge Brokers (Point-of-Contact) as needed. As in Figure 62, there are two knowledge managers with the task of supporting the Knowledge Leader of the ministry or agency. The task of these manager is differs from one another where the position of Knowledge Manager in Intelligence, Risk and Analytics is tasked with responsibility for development of a strategic, operational and tactical risk and intelligence capability whereas the Knowledge Manager in Content Management are responsible for the design, develop, implement and maintain the policy

and procedures to ensure delivery of reliable, consistent information disciplines in the agency. There is also the position of Knowledge Broker (Point-of-Contact) which will act as a common focal point in each department in the ministry and to link users and suppliers of knowledge throughout the organisation. The number of the brokers may vary from one agency to the next depending on their needs and available resources. Ideally, the role of knowledge broker may be taken up by someone in every department or division in which they will serve as the bridge or contact person from users of the KM program to the knowledge managers. These roles have also been mentioned and described in the CIO Toolkit published by MAMPU. The summarised roles and responsibilities of each committee and position are illustrated in Table 3.

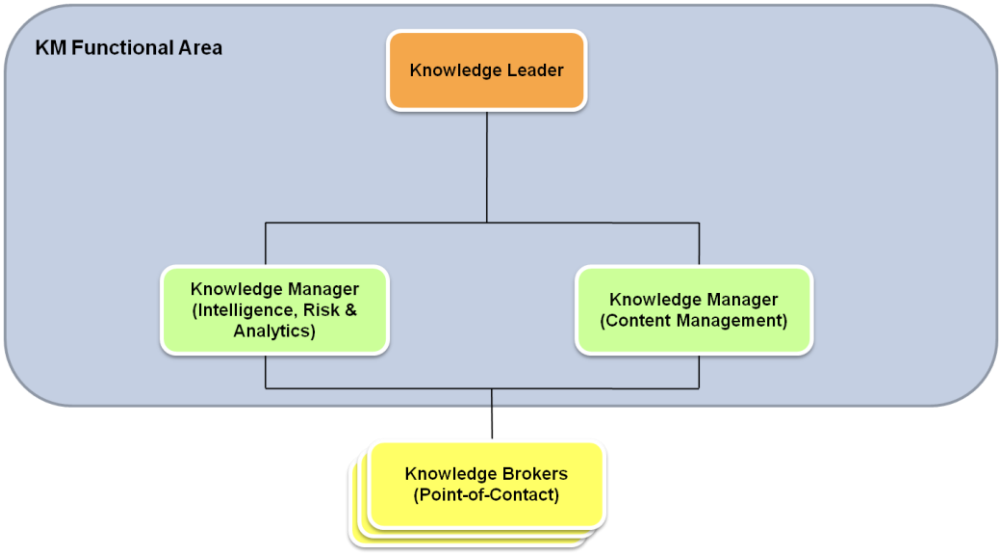

Figure 62 : Proposed Structure of KM Functional Area

Roles	Responsibilities
Knowledge Leader	Responsible for enterprise-wide coordination of all Knowledge Leadership. Tasked with the methods, practices and content comprising knowledge management solutions.

KM Advisory Panel	A council of KL from prominent ministries chosen to give advice, make a decision, and discuss on KM related matters.
Communities of Practices	A tool for cross-organisational collaboration, highlights some success stories, and provides input from end-user perspective to the Panel.
KM Functional Area	Responsible for delivering a strategic program for knowledge and information management in the ministry/agency
Knowledge Manager (Intelligence, Risk and Analytics)	Responsible for development of a strategic, operational and tactical risk and intelligence capability
Knowledge Manager (Content Management)	Responsibility includes design, develop, implement and maintain the policy and procedures to ensure delivery of reliable, consistent information disciplines in the agency.
Knowledge Brokers (Point-of-Contact)	Act as a common focal point in each departments in the ministry and to link users and suppliers of knowledge throughout the organisation

Table 3 : Summary of Roles and Responsibilities

As a side note, many public and private-sector organisation leaders have accepted the need and rationale for knowledge management activities. However, not all agree where management of the function should fall in the organisation. The position title of Knowledge Leader (KL) is the person charged with leadership of the function, although many other titles still

exist, including chief information officer, chief learning officer, special advisor on learning and knowledge management, director of information services, knowledge management director, knowledge management technologies program manager, knowledge management and technology transfer director, and others. Three of the management practices that have contributed the most toward the development of the knowledge management discipline and to the shaping of the KL position are the information management concept, the product/service quality movement, and the growing awareness of the value to an organisation represented in its human capital. The Knowledge Leader (KL) will be concerned with complex set of activities that reflect human behaviours in organisations, including but are not limited to, such actions as work processes, reward systems, knowledge collecting and sharing, information dissemination, and similar social actions. Ideally, the role of a Knowledge Leader should be headed by a senior management staff from the corporate division or any other division with similar function for Knowledge Management initiative to work successfully.

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9 Critical Success Factor

Using the lessons learned from early adopters, many organisations have effectively provided their staffs with the tools they need for managing and sharing knowledge. Yet, it is easy to forget to account for certain critical elements that enable knowledge sharing. Critical Success Factors are the subjects which must be addressed effectively in order for the public sector to achieve its vision and objectives in knowledge management initiatives. It is a simple concept which help focus attention on major concerns; making it easier to communicate and to monitor.

Critical Success Factors (CSF) can also be considered as barriers, which needs early identification and to have ready solutions. Understanding the CSF together with the challenges and key issues would assist the public sector in materialising their vision statement more realistically.

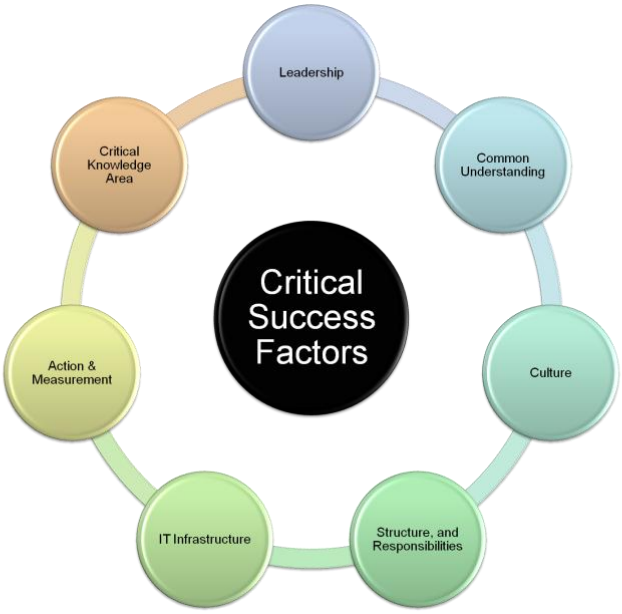

Figure 63 : Critical Success Factors

Figure 63 above shows the seven (7) critical success factors that have been identified:

- **Common Understanding**

  All staffs in the public sector must agree on the common definition of the terms “Knowledge Management” and “Knowledge Sharing” and how to apply to their situation and need. An agreement on these key terms is important so that the whole public sector will have a common agreement on what need to be done and how each KM systems will interact with each other.

- **Leadership**

  Public sector thrives in a highly structured environment. Leadership play a key role in terms of success in knowledge management initiative. Often than not, initiative will only proceed smoothly with the backing and support from the top management. Nothing makes greater impact than a leader that models the behaviour they are trying to promote, in another words, “lead by example”. Leaders need to see knowledge as knowledge as a strategic asset, and recognise and rewards people and teams accordingly. Another form of leadership that is needed is a knowledge management “champion”. A champion is needed to lead and instil the knowledge sharing culture to all organisation levels, and take ownership on the KM initiative.

- **Culture**

  Knowledge management is all about human. Aside from leadership, culture probably having the highest importance in knowledge management initiative. Culture is the combination of history, unwritten rules and social custom that compel staffs behaviour in the public sector. If agency harbours a knowledge-hoarding culture, combat it by removing negative consequences to sharing. Naturally, people want to share their knowledge, they want others to know they are knowledgeable and in the same time, they want to be rewarded. Break down some of the existing barriers to knowledge sharing, and

give people the tools and environment they need. By designing KM initiatives around your culture, you will be initiating a cultural change.

- **Structure, Roles and Responsibilities**

  Research has found a few common elements among successful knowledge organisations: A steering committee, a knowledge management support group and owners of knowledge management throughout the organisation. Therefore, it is important to have a clear definition of the operating structure, roles and responsibilities for people involved in knowledge management jobs, and how they interact with the business. This includes identifying whether there is central, local or combined facilitation of knowledge management.

- **ICT Infrastructure**

  Without a solid ICT infrastructure, public sector cannot enable its staffs to share information on a large scale. Yet the trap that most organisations fall into is not due to lack of technology, but rather too much focus on technology. A knowledge management initiative is not solely focusing on a software application; having a platform to share information and to communicate is only part of a knowledge management initiative. Clear supporting processes and a standard architecture are required to ensure content and structure is relevant and usable. The technology needs to be easy to use and supported by appropriate, ongoing training and education, and a good communication plan.

- **Actions and Measurements**

  It is important to correlate knowledge management activities with business outcomes to measure its success and evolve the initiative, while not claiming a pure cause-and-effect relationship. It is important to identify what activities are adding values to the agency's performance. This can be done at either an organisational level, or for

individual performance, projects or processes. For example, increased customer satisfaction due to reduced processing time per customer may be a result not only of the staffs having more information, but also of the less overall customer that need to be served at that time. Due to the inability to completely isolate knowledge-sharing results, continuous tracking of the correlations over time is important.

- **Critical Knowledge Area**

  Critical knowledge area can be considered as another critical success factor and important for management decision making and the formation of competitive strategy. By examining the connections between the critical knowledge area and the points of competitive differentiation (differential capabilities and value creation ways), specific actions can be identified to leverage those points and enhance competitive advantage. A critical knowledge area can be a unifying factor in the development of an integrated strategy for enhancing competitive advantage. It can also be used to align infrastructure, policies, practices, systems, and processes to achieve fulfilment of competitive strategies. Failing this, time and effort will be wasted on trying to manage knowledge that have little value and reduce the efficiency of knowledge management

There is a final imperative concerning critical success factors, which transcends knowledge management and applies to all interactions: Listen to users, customers, and managers-whichever audience for which the knowledge management is for. They will ultimately decide on the successfulness of the knowledge management initiative.

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10 Conclusion

Over the years, the Malaysian public sector has made extensive investments in information technology. It has reaped and continued to reap many benefits from these investments; however, there is a sense that we have not been able to exploit their full potential. The technology for accessing and using information has changed, but the public sector ability to use that knowledge to support it work has not. More intensive use of knowledge has created a corresponding awareness that it is the people who use the knowledge, and not the knowledge itself, who are the primary source of value. This vision and strategy consequently should address not just knowledge systems and technology, but also the skills, experiences, and informal connections - in short, the knowledge of people in the public sector.

> *Knowledge management is a dynamic, continuous organisational phenomenon of interdependent processes with varying scope and changing characteristics.*

Public sector are increasingly realising that the knowledge that supports all their operations is their most valuable, most under-managed asset. But knowledge is a different kind of asset to the more tangible ones that public sector are more used to managing such as computers hardware, stationeries and office furniture. Knowledge that is currently being managed by public sector is nothing but a tip of iceberg. A great deal of it is still invisible since it is unarticulated, being hidden in employee's minds; as such, it leaves the organisation's premises every night and is subject to being easily lost.

Knowledge management is a new endeavour undertaken by the public sector. Alavi and Leidner, in their oft-cited Review of Knowledge

Management and Knowledge Management Systems (2001)[23] bring this conclusion to the fore:

It is of utmost importance that public sector understands the nature of knowledge management initiative, constantly assess the effectiveness of its knowledge management initiative and seek opportunity to improve and evolve the knowledge management.

If public sector are to excel, thrive and achieve in its vision to become a citizen-centric through a whole-of-government approach, it must be able to provide real value through their inherit strength. If given the opportunity, the future for Knowledge Management within the public sector may even go as far as to become a complete suite that may include features such as Corporate Analysis (via Business Intelligence, Decision Support System) and even Performance Management that will be able to provide forecasting capability based on past knowledge and current trends. A successful knowledge management implementation will be a major victory, but it is not the end. The journey has just begun.

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[23] *Alavi,M.,&Leidner, D.E. (2001). Knowledge management and knowledge management systems: Conceptual foundations and research issues. MIS Quarterly, 1(25), 107-136.*

11 Appendix

11.1 List of Abbreviations

Abbreviation	:	Detail
APQC	:	American Productivity and Quality Center
CIO	:	Chief Information Officer
COI	:	Community of Interest
COP	:	Common Operational Picture
COP	:	Community of Practice
EHR	:	Electronic Health Records
EPU	:	Economic Planning Unit
EU	:	European Union
FCO	:	(United Kingdom's) Foreign & Commonwealth Office
GSI	:	Government Secure Intranet
GTP	:	Government Transformation Programme
GSI	:	Government Secure Intranet
GSS	:	Government Statistical Service
HSIN	:	(USA) Homeland Security Information Network
ICT	:	Information and Communication Technologies
ISP	:	ICT Strategic Planning

Abbreviation	**:**	Detail
IT	:	Information Technology
KL	:	Knowledge Leader
KM	:	Knowledge Management
KN	:	Knowledge Network
KPMG	:	Klynveld Peat Marwick Goerdeler
LION	:	(United Kingdom's) Legal Information Online Network
MP		Member of Parliament
NASA	:	(USA's) National Aeronautics and Space Administration
NEN	:	(USA's) NASA Engineering Network
NHIN	:	Nationwide Health Information Network
NIEM	:	National Information Exchange Model
NKRA	:	National Key Result Area
NOC	:	the National Operations Centre
OECD	:	Organisation for Economic Co-operation and Development
ONC	:	Office of the National Coordinator for Health Information Technology
PRISMA	:	Pemantauan Rangkaian ICT Sektor Awam
SBU	:	Sensitive But Unclassified
SME	:	Small and Medium Enterprises

Abbreviation	:	Detail
ST	:	Strategic Thrust
SWOT	:	Strength, Weakness, Opportunity, Threat
UK	:	United Kingdom
UN		United Nation
USDA	:	U.S. Department of Agriculture

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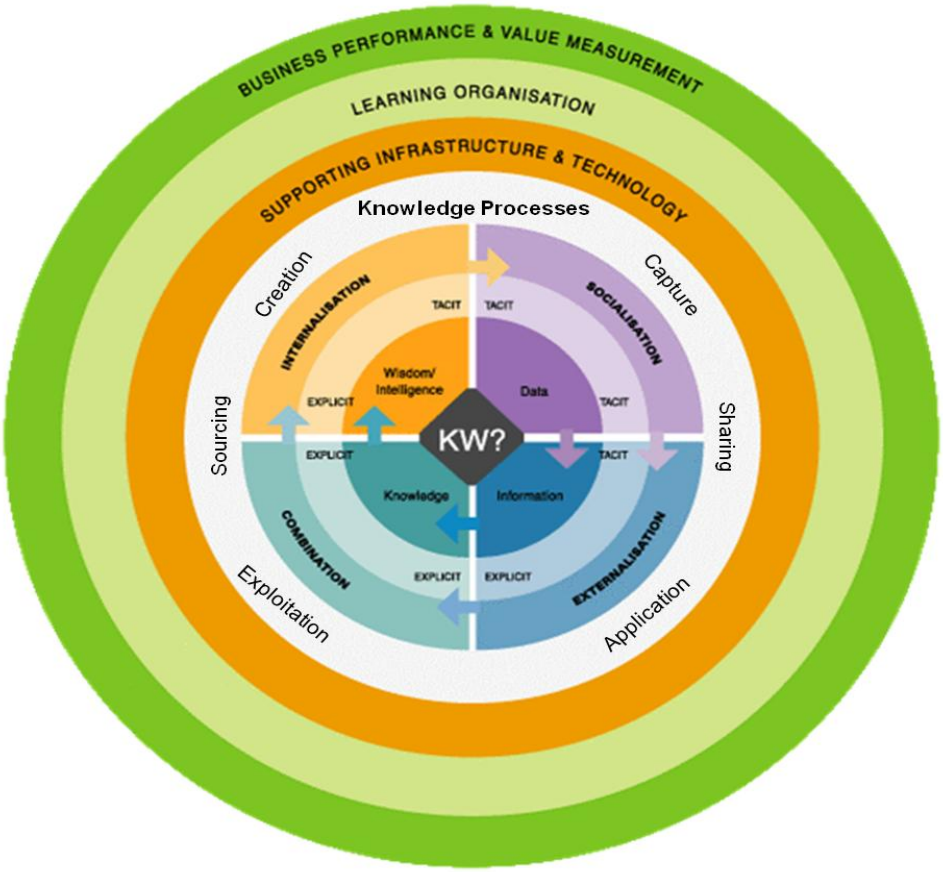
11.3 TMS Asia Transknowformance Framework



The Transknowformance Framework aims to improve business processes and values through implementation of KM. Below are the summary of components within this framework

The Eight (8) Transknowformance Component

- KW?: The core question before implementing KM. Know-Ware comprises of the knowledge questions such as
    - Know-What;

      This will provide answer about what knowledge is important to the organisation

- Know-Why;

  This will provide answer why certain knowledge is more valuable to the organisation than the rest

- Know-When;

  This will provide answer to when the knowledge will be of use

- Know-Where;

  This will answer the question on where the knowledge is kept (systems) and where it is applicable

- Know-Who &

  This is to identify who in the organisation hold the knowledge and are responsible for it correctness

- Know-How.

  This will answer how the knowledge will affect the organisation

- Knowledge Hierarchy: Identifies the level of knowledge in the organisation. Knowledge Hierarchy comprises of Data, Information, Knowledge and Wisdom.

- Knowledge Type: Identifies the knowledge type. Tacit Knowledge & Explicit Knowledge.

- Knowledge Conversion: Identifies the creation & conversion of Knowledge Type (Tacit to Explicit and vice-versa) comprising of

  - Socialisation – Converting Tacit Data to Tacit Information

- Externalisation – Converting Tacit Information to Explicit Knowledge
- Combination – Converting Explicit Knowledge to Explicit Wisdom
- Internalisation – Converting Explicit Wisdom to Tacit Data (Only occurs when the knowledge become so niche and only a selected few are able to understand it in their head and also find difficult to articulate to other people. The knowledge process for this niche knowledge will then start over from "Socialisation" stage)

- Knowledge Processes: Identifies KM cycle & processes to handle knowledge which comprising of Capture, Sharing, Application, Exploitation, Sourcing, & Creation of Knowledge

- Infrastructure & Technology: Identifies the infrastructure and technology needed to enable and support KM. (e.g. Intranet, Groupware, Content Management, Knowledge Bank / Repository, Data Warehousing, Data Mining, Forum, KM office, CKO, Knowledge Manager, Knowledge Broker)

- Learning Organisation: Identifies the environment that is supported by KM and based on Peter Senge's five disciplines: Personal Mastery, Mental Models, Shared Vision, Team Learning & System Approach

- Business Performance & Values Measurements: Identifies the measurement needed knowledge management to support Business Performance and Knowledge (Intellectual) Capital.