

Engineering Management
Field Project

**Best Practices in Knowledgebase Implementation
in an Information Communication Technology
(ICT) Service Desk Environment**

By

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Executive Summary

In this research paper, the author concentrated his focus on one specific area of the overall Knowledge Management (KM) field - the implementation of knowledgebase in a Service Desk environment within the Information Communication Technology (ICT) industry. The knowledgebase is one of the most common KM tools that provide the means for collection, organization and retrieval of knowledge via some sort technology-based system (typically computerized database). Service Desk in this context is described as the central point of contact for handling all customer related issues.

Through the author's extensive first-hand experiences and literature research, the author was able to demonstrate that there are four key areas that are crucial to the success of knowledgebase deployment in the above-mentioned environment. The major key success factors are in the areas of management, human, process and technology. The important of the inter-dependency of these success factors are further explained in author's "Three-Legged Stool of Successful Knowledgebase Implementation" model. It is revealed that the three legs (human, process and technology factors) of the stool are all equally important. Balance has to be achieved in all there legs in order to achieve a solid foundation for success. This was represented here by the stable and balanced stool. The management factors are the most important area that served the important task of guiding the three factors (legs) in the proper directions and locked it into position to form a stable stool. Without this capstone sector, the whole structure (KM initiative) will simply fall apart. A solid and balanced stool here represents a successful knowledgebase implementation. As demonstrated through this model, the failure in one of these four key areas will mean failure of the knowledgebase implementation.

Based on these four key success factor (KSF) areas, a series of recommended best practices are developed by the author, and validated via personal experiences and literature research. The author hopes that these best practices will serve as useful guidelines for similar service desk type organizations in the ICT industry who which to deploy knowledgebase as part of their overall knowledge management initiative.

Introduction

Knowledge is increasingly become one of the major component of today globalize economy. This is especially crucial for the developed countries that can no longer compete effectively with the developing countries (such as China and India) on manufactured commodity goods, mainly due to labor cost. These countries were forced to transition their tangible good-base economies to service-base economies. Service-base economies rely heavily on knowledge of its people and organizations. Increasingly, even developing countries are facing these same challenges as their economies developed.

In this context, the foundation of organizational competitiveness in the economy has shifted from physical and tangible resources to knowledge. The key focus of information systems has also changed from the management of information to that of knowledge. Businesses that can efficiently capture the knowledge embedded in their organizations and deploy it into their operations; productions and services will have an edge over their competitors (Wong and Aspinwall, 2005). Therefore, knowledge management is rapidly becoming an integral business activity for organizations as they realize that competitiveness pivots around the effective management of knowledge (Grover and Davenport, 2001).

Knowledge can be describes as “the combination of data and information, to which is added expert opinion, skills and experience, resulting in a valuable asset which can be used to aid decision making” (Sarmiento, 2005). There are different categories of knowledge. Nonake and Takeouchi (1995) categorized knowledge into explicit and tacit knowledge.

Knowledge Management (KM) refers to the practices of identifying, create, represent, and distribute knowledge for the purpose of reuse and learning throughout the organization. The success of any knowledge management (KM) initiatives lies in its ability to turn the above-mentioned KM activities into competitive advantages. Lee (2001) defined knowledge sharing as activities of transferring or disseminating knowledge (implicit and tacit knowledge) from one person, group or organization to another.

Effective knowledge management practices are well-known subject of many literature research and case studies. It is commonly accepted in the literatures that a combination of social and technological approach is ideal (Wong and Aspinwall, 2005). Koch (2003) has stated that the assembly of IT and human resource-oriented tools are necessary to support knowledge production. Knowledge management involves the understanding of and commitment to information technology (IT), it requires the creation of an excellent infrastructure and strong corporate culture in which information sharing, learning, and knowledge creation should be part of the organizational norm (Sabri, 2005). Furthermore, Koe (2005) argued that KM is the only science that aligns business learning and business application, and it is the only art that truly aligns: personal development, career development, and organizational development.

Although KM is a subject that has been thoroughly researched in the last 10 years; the author has found that these researches tend to focus on the overall KM initiatives. The author serves as a manager in a service desk environment at an Information

Communication Technology (ICT) company. The main task of the organization is to provide technical support services to internal and external customers. The capture, storage and re-use of the organizational knowledge are extremely crucial. A few years ago, the author's organization has implemented a knowledgebase system as their KM initiatives. Thus, the author has gained first hand experience in the successes and failures of knowledgebase system implementation. The lack of specific KM related information in the ICT service desk environment was apparent to the author during this period. The author felt the need to document and share his lesson-learned with those who which to implement a knowledgebase at similar ICT service desk organizations.

Research Approach

The author has drawn from his years of personal experiences in knowledgebase implementation. His success and failure experiences in KM have provided him with valuable insight into the world of knowledgebase implementation, and knowledge management in general. Based on the lesson-learned, a set of best practices for successful knowledgebase implementation were developed and proposed.

These best practices were categorized into four major areas (management, human, process and technology). The inter-dependency of these four factors was further illustrated in the author proposed “3-Legged Stool of Successful Knowledgebase Implementation” model. These proposed best practices were then validated by researched data from published research literatures in the knowledge management area.

Literature Review

The Human Factors

The human factors played a crucial role in knowledgebase implementation. In context of knowledge management includes areas such as trainings, culture, team building and values/ beliefs.

Wong and Aspinwall (2005) identified training and education as one of the key success factors in KM. Akhanvan (2006) has also stressed the importance of training in preparing the users to knowledgebase implementation. In a 2006 study by Kwok and Gao, it is found that absorptive capability will positively influence an individual's attitude toward the behavior of knowledge sharing. Absorptive capability is the ability not only to acquire and assimilate, but also to use knowledge (Cohen and Levinthal, 1990); and absorptive capability is positively proportionate to one's level of familiarity on a certain subject. This can be achieved via effective trainings and educations, and this should be done both before the implementation and on a continuous basis post-launch.

Holsapple and Joshi (2000) pointed out that leadership team needs to establish the necessary condition for effective KM. A culture of openness where mistake are openly shared without the fear of punishment should be promoted (Wong, 2005). Mistake should be viewed as a learning and improvement opportunity. According to the Theory of Reasoned Action, an individual's intention to perform a behavior and their actual behavior can be determined by their attitude toward this behavior. Based on this theory, it is expected that individuals may demonstrate more knowledge sharing behavior if they hold positive attitude toward knowledge sharing (Kwok and Gao, 2006). Chong and Choi (2005) stated that KM is a people-based process, not technology-based. Positive reinforcement should be given whenever a knowledge-sharing activity is observed. This will help improve one's attitude toward knowledge sharing. Alternatively, Chong (2005) suggested that top management needs to create a perception of "knowledge is not power; knowledge sharing is power". Wong and Aspinwall (2005), McDermott and O'Dell (2001), Holsapple and Joshi (2000) and Wong (2005) all stressed the crucial role of knowledge friendly culture.

Goh (2005) and Chong (2006) illustrated the role of team building. For successful knowledge sharing to happen, team members must work together and build on each other's ideas and strengths. When employees in ICT companies work in team and share their knowledge, this will allow them to solve work-related problems and create innovative solutions (Chong, 2006). Lee and Choi (2003) had empirically shown that collaboration has significant contribution to knowledge creation in their 2003 research paper. Successful knowledge sharing can only happen when all the stakeholders had developed a sense of trust among themselves.

All KM strategies should provide values to its shareholders. Akhavan (2006) and Walker (2006) argued that values and beliefs are important factors in getting buy-ins from stakeholders. Manimaran Rajakannu of Wipro (one of India largest software services provider) stated in an interview that today's customers fully expected a company to capture and learn from past projects and help drive down the cost; thus passing the saving to them (Chatzkel, 2004). One way of achieving this is to keep all KM strategies relevant to the most critical aspect of the business (Hariharan, 2005). This will ensure lower cost

of knowledgebase implementation while maximizing the return on investment. Doing all the above will ensure we add values to all the stakeholders, and thus obtaining their full buy-ins and supports for the knowledgebase/ KM project.

The Process Factors

Accountability/ measurement, logical activities & well-defined procedures, repeatable/ consistency, and continuous quality improvements are all key areas in the process factors segment.

In many organizations, KM is considered a strategically critical for decision-making that directly impacts the organizational effectiveness and competitiveness. Hence, its measurement is a key for productivity, effectiveness, efficiency and innovation of the organization. The KM initiative performance should be well defined before the commencement of KM activities (Mohamed, et al, 2006). Knowledge sharing should be part of performance appraisals at all levels, including top management. For maximum effect, rewards should be applied to both those who shares and utilize the knowledge (Hariharan, 2005). He also stated that real business results of KM came from replication and not just sharing knowledge.

The Siemens experience shows that combinations of individual and organizational measures drive knowledge contributions (Akhavan et al, 2006). These also help shape the organizational culture toward knowledge sharing. Gooijer (2000) argued that KM-based performance measures must be embedded in the overall business performance model, and not be a marginal “add-on” to the core measures. The importance of proper accountability & measurement systems is further validated, as Wong and Aspinwall (2005) listed it one of the key success factors in KM implementation.

Alavi and Leidner (2001) discussed the positive role of proper procedures and processes. Without well-defined business processes that encourage knowledge sharing, it is impossible to achieve the consistency results. Wong (2005) and Akhavan et al (2006) argued that minimized disruption to the existing processes is crucial. This will reduce disruption and increase user participations in knowledge sharing activities. If changes to the existing business process are necessary, then business process reengineering (BRP) helps the organization decentralize and define a value-oriented structure in a systematic way. This allows KM system to be implemented correctly in the organization (Akhavan et al, 2006). The key to a successful change is always making the new processes/ steps easier to use or provide better values to the users.

Wong (2005) also showed that systematic and structured processes and steps are important. To achieve consistent result, processes and steps must be well-defined and logical. Quality results can only be achieved by reducing errors/ variances. Standardization and repeatable processes played a big role in this achieving this objective.

Knowledge auditing is defined as survey measuring knowledge re-use and communication, cultural receptiveness to KM and valuing of knowledge, KM opportunities, and deficiencies, gaps and problem areas. This served as the crucial feedback loop for continuous improvement process. This key role of continuous quality

improvement processes is discussed by Crause O'Brien (1995) and Akhacan et al (2006).

The Technology Factors

In the technology segment, important areas are knowledge management tools, standards, integrated data sharing, and management reporting enabler.

Almost all knowledge management tools are based heavily on Information Technology (IT). In fact, knowledgebase is one of the most common deployed KM tools. Its popularity is largely due to its ability to acquire and disseminate knowledge by using IT as enabler tools for everyone to reach, share among the members, and use it from any workplace in the world at any time (Alavi and Leidner, 2001; Andriessen, 2002).

Wong and Aspinwall (2003) argued that IT is only a tool, not the ultimate solution. Key characteristics of a successful knowledgebase system were thoroughly discussed by Alavi and Leidner (2001), Andriessen (2002), Luan and Serban (2002), and McAfree (2006). These guidelines should be used when selecting the right knowledgebase system.

Tiwana (2000) suggested that a knowledgebase does not necessarily require huge investment because company can combine their current IT capabilities to support their knowledgebase initiative. But, a good knowledgebase system should have the capability of being integrated into the various existing enterprise systems, such as customer relationship management (CRM) databases, incident management system, and etc. If possible, it should also duplicate the touch and feel of the existing systems (Walker, 2006). Users should not have to learn new ways of working with technology. If people need to change the way they work within the knowledgebase system, participant motivation will be minimal (Moffett, et al, 2004).

The data we obtained from the knowledgebase is only as good as the knowledge entries users entered. To achieve full effectiveness, there must be organization standards in place for the management and maintenance of knowledge management system (Desouza and Awazu, 2006). Schireson (2004) stated that injecting high-quality knowledge entries into the knowledgebase is crucial to the success of the knowledgebase. One of the key components of quality is standardization.

Studer and Stojanovic (2005) stated that ubiquitous access to knowledge is inevitable, sighting a Gartner research analysis. They stressed the importance of integrated and remote data sharing. Divisions of organization may operate very different technological solutions for fostering knowledge exchanges. This requires solution integration and connectivity management. Failure to appropriately integrate the different technological architectures will lead to poor knowledge searches and failed efforts in building a truly global knowledgebase system (Desouza and Awazu, 2006).

Lastly, Okes (2005) discussed the importance of reporting capability and its implications. Okes stated that organization's performance can be determined by looking at how well it manages its critical knowledge. A good knowledgebase system should be build-in reporting capability and is relatively easy to integrate with other reporting systems/databases.

The Management Factors

Management factors are the keystone that cap off the three-legged stool of success in knowledge management. Key areas are management commitment & participation, motivational aids & coaching, strategies, and organizational design.

Koe (2005) stated, “Knowledge isn’t imposed, it’s drawn out; knowledge isn’t dictated, it’s revealed.” Successful KM requires the development of a “grass root desire among employees to tap into their company’s intellectual resources” (Hauschild et al, 2001). Leaders are important in acting as role models to exemplify the desired behaviors for KM. They should for example, exhibit a willingness to share and offer their knowledge freely with others in the organization, to continuously learn, and to search for new knowledge and ideas (Yahya and Goh, 2002). They should also steer the change effort, convey the importance of KM to employees, maintaining their morale, and creating a culture that promotes knowledge sharing and creation (Wong, 2005).

An important criterion for effective KM is to have a clear strategy and purpose. A rational strategy helps to clarify the business case for pursuing KM, and steer the company towards becoming knowledge-based (Wong and Aspinwall, 2005). Good knowledge management initiatives can also create the trust that helps to break down cultural barriers and alter the way individuals and groups share what they know and how they use that knowledge. These strategies will provide the foundation for how an organization can deploy its capabilities and resources to achieve its KM goals (Akhavan et al, 2006).

Walker (2006) stated that KM strategy has to be able to overcome structural barrier for effective knowledge flow and transfer. It is crucial to have an organizational design that is knowledge-friendly and promote the flow of knowledge across the team boundaries. Chong (2005) and Davenport et al (1998) looked at impact of organizational design on KM in their researches. There should be a team of people dedicated to managing the knowledgebase, and the overall KM program. Davenport et al (1998) stressed the need to establish a set of roles and teams to perform knowledge management tasks. Establishing a group of people with specific and formal responsibilities for KM is critical to its success.

Beatty et al (2001) indicated that as in all innovative endeavors in the organization, top management support is important. Leadership must be advocates of the KM strategy in order to gain an organization-wide understanding of the KM vision (Desouza and Awazu, 2006). Top management has the greatest ability in enabling KM in their organizations. They have the ability to influence the other success factors, such as enabling a knowledge-friendly culture, designing KM-based training programs and encouraging employees to attend them, removing organizational constraints to show support to KM activities, involve and empower employees on the job, develop a knowledge-based performance measurement system and so on (Chong and Choi, 2005). Wong and Aspinwall (2005) shared the same view; they agreed that top management commitment is the key to the success of any knowledge management program.

The Three-Legged Stool of Successful Knowledgebase Implementation Model

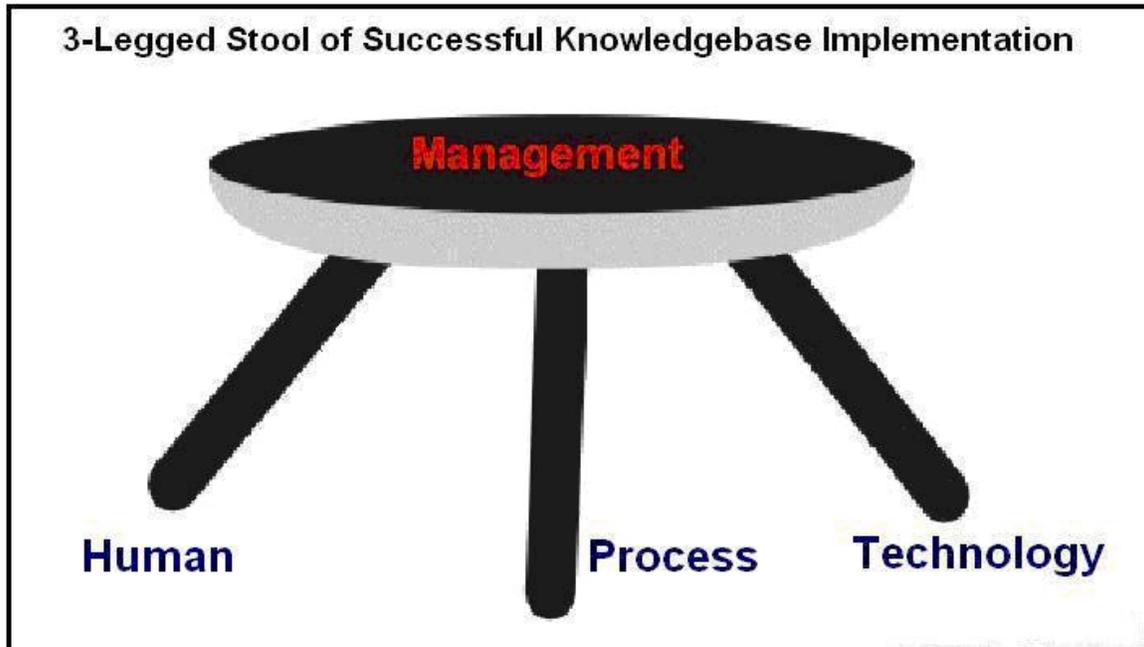


Figure 1

Base on years of first-hand experiences in implementing a knowledgebase system in his organization, the author was able to consolidate his lesson-learned into a set of best practices. These best practices are further grouped into four major categories – management, human, process and technology.

The concept behind the 3-legged stool is to demonstrate the two key points. The first is all three legs (human, process and technology factors) are all equally important to the balance and sturdiness of the stool. This represents the success level of the knowledgebase implementation.

Secondly, the seating surface in this model represents the management. This is the most crucial element in the whole stool structure as it provided the mounting points for the three legs. Without the seating piece to provide correct mounting points to guide and keep the legs in the right position; the whole structure will be simply collapses or become unstable at best. This illustrated the crucial role of the management to provide support and guidance during the implementation of the knowledgebase project. Top management support is considered a prerequisite for every successful KM initiatives (Pai, 2005).

To support the above model, the author reviewed a wide range of KM related literatures. Out of these, the author was able to quantify the number of times each of these success factors appeared in the literatures. A total of 136 sightings from 29 literatures were documented. The following table shows the details.

KSF Areas	# of times listed
Management Factors	41
Human Factors	33
Process Factors	31
Technology Factors	31
Total Sightings	136

Table 1

From the above table 1, we can clearly see that management factors were sighted the most in the research literatures - a total of 41 times from 29 applicable literatures. Human, process and technology factors were at 33, 31 and 31 times respectively. These findings supported the three-legged stool model. It demonstrated that the management factors are most important, while human, process and technology factors are secondary but equally important. Please refer to exhibit C in the appendix for more details.

Next, we will look at the best practices proposed by the author.

Best Practices

The Human Factors

The human factors in context of knowledgebase implementation include areas such as team building, trainings, values/ beliefs, and culture. All these different factors contribute its own unique and combined influences on the success of implementation of knowledgebase strategy.

Best Practice #1:

Provide adequate specific-trainings on the knowledgebase system and general educations on knowledge management strategies and practices.

Wong and Aspinwall (2005) listed training and education as one of the key success factors for knowledge management. Author found this is true for knowledgebase implementation as well. Effective trainings are necessary to provide the team members with the knowledge on KM and knowledgebase. These will serve as the foundation when the project is started. The more one knows about the knowledgebase system and strategy, the more effective one will become. To facilitate spreading of knowledge, employees should become completely and deeply familiar with the knowledge management concepts (Akhavan et al, 2006).

Best Practice #2:

Develop knowledge-friendly organizational culture.

Organizational culture defines the core beliefs, values, norms and social customs that govern the way individuals act and behave in an organization. A culture supportive of KM is one that highly values knowledge and encourages its creation, sharing and application (Wong, 2005). Author's personal experience indicated that one of the single most important action items in knowledgebase implementation is to make sure the organizational culture is knowledge-sharing friendly. Going against the common culture will not yield any positive results. It is important for company to ensure that their KM initiatives fit into their organizational culture, or else they should be prepared to change it. McDermott and O'Dell (2001) highlighted the importance of match KM initiative with the culture, style and core value of an organization in their research paper.

Best Practice #3:

Foster team spirit through team building activities.

Through proper team building activities, one can developed a true team spirit within the organization. A real team collaborates and works together. Collaborative culture is an important condition for knowledge transfer to happen between individuals and groups (Goh, 2002).

Best Practice #4:

Make sure the knowledgebase strategy adds values and consistent with organizational beliefs.

The best way to get buy-ins from everyone is to align the knowledgebase strategy with the values and beliefs of the team. The management needs to be able to answer the “what’s in it for me?” question for all stakeholders. The answers should be simple and be able to communicate easily to others (Walker, 2006). Susan Conway of Microsoft stated that the success of KM project depended upon the behaviors of the individuals who would use it; “This won’t go anywhere unless people feel they are getting something from it” (Akhavan, et al, 2006).

The Process Factors

Key success factors in the process category include accountability/ measurement, logical activities & well-defined procedures, repeatable/ consistency, and continuous quality improvements.

Best Practice #5:

Establish proper accountability & measurement systems.

KM performance matrices should be carefully defined and accountability should be clear to everyone involved. Management team should be careful not to encourage the wrong kind of behaviors as a side effect of the measuring system. It should covers individual and team efforts, knowledge capture, sharing and replication. Levett and Guenov (2000) proposed eight metrics for KM analysis: *motivation, knowledge capture, stored knowledge, personal training, knowledge transfer, creative thinking, knowledge identification, and knowledge access*. The measurement framework should be simple and integrated into existing culturally accepted frameworks of the organization (Walker, 2006).

Best Practice #6:

Developed logical activities & well-defined procedures

There are four major steps in a knowledgebase life cycle; these are creation, storage/ retrieval, transfer and application. The execution of these KM processes lies at the heart of creating a successful knowledge-based enterprise (Alavi and Leidner (2001). The author found that developing logical steps for the knowledgebase usage help increase the participation rate. These steps or processes should also be incorporated into the individual’s daily workflow so they become common practices in the organization (Wong, 2005). By reducing the interruptions, it makes it easier to persuade individuals to participate.

Best Practice #7:

Processes must be repeatable & consistency

The KM processes must be able to provide consistent results via repeatable steps. If results are inconsistent, the users will lose confident and trust in the knowledgebase system. Similarly, if there are no repeatable processes, this disorients the users and they will become discouraged and stopped participation. Therefore, appropriate interventions

and mechanisms need to be in place in order to ensure that KM processes are addressed in a systematic and structured manner (Wong, 2005). Without consistency, continuous quality improvement processes cannot be implemented.

Best Practice #8:

Continuous quality improvement

Similar to all mission critical business processes, continuous quality improvement is crucial to the success of knowledgebase implementation. This process served as the feedback loop and provides important improvement ideas to further enhance the effectiveness of the knowledgebase. This feedback mechanism also helps the team maintain the relevancy of the knowledgebase system as the business or market condition changed. By listening to employees' feedbacks and acted upon it, we can promote their involvement. Employee's willingness to convert tacit knowledge of work process into continuous process improvement and innovation is crucial to a successful performance improvement (Crause O'Brien, 1995).

The Technology Factors

In the technology segment, important factors are knowledge management tools, standards, integrated data sharing, and management reporting enabler.

Best Practice #9:

Selecting the right knowledgebase system

Important factors that need to be considered in the selection/ development of a knowledgebase system include simplicity of technology, ease of use, suitability to users' needs, relevancy of knowledge content, and standardization of a knowledge structure or ontology (Luan and Serban, 2002). The advanced in IT has enabled the modern knowledgebase with the capabilities of rapid search, access and retrieval of information, and can support collaboration and communication between organizational members (Wong, 2005). Quick and easy way to locate accurate info is the key in getting users to use the knowledgebase system. According to McAfree (2006), for any information platform to be valuable, users must be able to find what they are looking for. "Keyword Search" is the most commonly used and effective search technique.

Best Practice #10:

Enforcing standards on knowledgebase inputs

KM involves the use of information system infrastructure to capture and reuse important information; training on how to use the repository is extremely critical. Users need to be trained in terms of writing, editing, and formatting skills, as information has to be presented in a standardized way (Chong, 2006). If standards are not being enforced, it will seriously impact the effectiveness of the knowledgebase ability to return accurate search results. This will cause a decline in user participation and eventual demise of the knowledgebase system in the long run.

Best Practice #11:

Integrated and remote data sharing

There has been a huge demand for anywhere, anytime, to any person-knowledge delivery. This is mainly due to the proliferation of information, mobility of workplace, speed of business changes, and enormous increase in the efficient of the interpersonal communication. Ubiquitous access to knowledge is inevitable. According to a Gartner research (www.gartner.com/1_researchanalysis/research_overview.html), by 2015, users will roam across six networks in a single day and access net services using a wide range of devices, (Studer and Stojanovic, 2005). This means that the knowledgebase system has to be able to support local & remote users across various platforms, systems and from locations across the world.

Best Practice #12:

Management reporting enabler

One way to access an organization's performance is to determine how well it manages its critical knowledge (Okes, 2005). This demonstrated the necessity of reporting capability on the knowledgebase system. This capability can either be built-in and integrated; but it must be able to provide both schedule and unscheduled reports on crucial matrixes (such as system usage, user usage, solutions utilization, etc...). Management reporting capability will also allow management and knowledgebase administrator to run audits to check for compliance and performance.

The Management Factors

The management factors are the keystones that cap off the three-legged stool of success. Key focus areas are management commitment & participation, motivational aids & coaching, strategies, and organizational design.

Best Practice #13:

Motivational aids & coaching

Wong (2005) stated that the right incentives, rewards or motivational aids should be established to encourage users to share and apply knowledge. Giving incentives to employees helps to stimulate and reinforce the positive behaviors and culture needed for effective KM. These should focus on knowledge sharing and contribution, teamwork, creativity and innovative solutions. These systems should reward risk-taking attitudes and emphasize group-based compensation (Yahya and Goh, 2002). Bottom line is, "You must make using the knowledge management system simpler and more rewarding than not using it!" Marc J. Rosenberg stated (Babcock, 2004).

Best Practice #14:

Develop clear corporate strategies on KM

An organization must first determine what knowledge management is and then create a set of questions to evaluate the degree to which it is being carried out (Okes, 2005). This

is the first crucial step of implementing KM initiative. The suitability of knowledgebase system for the organization should be evaluated too. Not all organizations need a knowledgebase; there are other KM tools that can be deployed. The management should also understand that knowledgebase can be expensive; they need to be aware of the cost of training, capturing, storing, and using knowledgebase (Doyle, 2006).

Best Practice #15:

Knowledge-friendly organizational design

Senior management must attempt to remove all organizational constraints that create barrier to successful KM implementation. Sharing should be mandatory from top until the bottom, and across organizational structure (Chong 2005). Segmenting of the KM team should be consistent with the scope and resource requirements of the KM program and have a very senior and powerful sponsor (Walker, 2006).

Best Practice #16:

Management commitment & participation

Wong and Aspinwall (2005) rated the management leadership and support as the most important key success factor to KM success. According to them, successful KM requires proactive entrepreneurial support and leadership from top management. Top management or leaders should devote them selves to promoting a corporate mindset that emphasizes co-operation and knowledge sharing across the organization. The author's personal experience in knowledgebase implementation is consistent with this view. This is perhaps the single most important factor in the success of any knowledge management program. Without the continuous strong support from top management, the whole KM program will simply falls apart as soon as the commitment from the top vanished.

Conclusion

Combining author’s personal experience and literature research, the four most important areas in ensuring the success of a knowledgebase implementation are human, process, technology and management. As demonstrated by author’s original “3-legged stool model”, the management segment is the most crucial piece. Without strong leadership and management commitment, there can never be coherent knowledge management efforts. Without these organized and coherent efforts, maximum effectiveness of the knowledge management system cannot be realized.

A total of 16 best practices were developed and validated by literature research. These are shown in the following table.

Best Practice # 1	Provide adequate specific-trainings on the knowledgebase system and general educations on knowledge management strategies and practices	Human Factor
Best Practice # 2	Develop knowledge-friendly organizational culture	Human Factor
Best Practice # 3	Foster team spirit through team building activities	Human Factor
Best Practice # 4	Make sure the knowledgebase strategy adds values and consistent with organizational beliefs	Human Factor
Best Practice # 5	Establish proper accountability & measurement systems	Process Factor
Best Practice # 6	Developed logical activities & well-defined procedures	Process Factor
Best Practice # 7	Processes must be repeatable & consistency	Process Factor
Best Practice # 8	Continuous quality improvement	Process Factor
Best Practice # 9	Selecting the right knowledgebase system	Technology Factor
Best Practice # 10	Enforcing standards on knowledgebase inputs	Technology Factor
Best Practice # 11	Integrated and remote data sharing	Technology Factor
Best Practice # 12	Management reporting enabler	Technology Factor
Best Practice # 13	Motivational aids & coaching	Management Factor
Best Practice # 14	Develop clear corporate strategies on KM	Management Factor
Best Practice # 15	Knowledge-friendly organizational design	Management Factor
Best Practice # 16	Management commitment & participation	Management Factor

These should served as general guidelines for any service desk type organization in the ICT industry who wish to implement knowledgebase system as part of their overall knowledge management strategies.

Suggestions for Additional Work

The author would like to suggest that additional research be done in the area of improving the search functionality of the knowledgebase. What are the important criteria of a knowledgebase search engine? Can the knowledge entry processes be improved to enhance the search engine effectiveness?

Another area that author would suggest is looking the implementation of knowledgebase system within the ITIL (Information technology Infrastructure Library) best practices guidelines. As more and more ICT service organizations are adopting ITIL standards, it should be interesting to compare the KM and ITIL best practices.

These are two areas that need author would like to see some further research being done.

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Appendices

A] Example of CSF of KM systems at major corporations (Akhavan, et al, 2006):

Critical success factors of KM systems (Main Concepts)	Microsoft	Hewlett-Packard	Siemens	E&Y	Teltech	BusinessEdge Solutions
Training programs	x	x		x	x	x
Knowledge architecture			x	x	x	x
Network of experts		x	x	x	x	
Knowledge sharing		x	x	x	x	x
Transparency		x				
Knowledge strategy	x		x		x	x
Trust	x	x	x			
Organizational structure	x	x	x		x	x
Business process reengineering (BPR)		x				
Pilot	x	x				
Knowledge storage	x	x	x	x	x	
Knowledge capturing	x				x	x
Knowledge identification	x				x	
Knowledge audit			x	x		
Organizational culture	x	x	x	x	x	x
Support and commitment of CEO	x	x		x		

B] Knowledge Sharing and Seeking Barriers (Collison, 2006)

Knowledge Sharing Barriers	Knowledge Seeking Barriers
Tall Poppy Syndrome	Not Invented Here
Shrinking Violet Syndrome	Ignorance is Bliss
On the Web Syndrome	Real man don't ask
Communities of Practically Everything	

C] Key Success Factors for KM (continue...)

Category	Author (2006)	Albino et al (2004)	Babcock (2004)	Benbya & Belbaly (2005)
Human Factors	Make sure the knowledgebase strategy adds values and consistent with organizational beliefs		Accounting for human nature in knowledge management	Knowledge-sharing culture
Human Factors	Foster team spirit through team building activities			
Human Factors	Develop knowledge-friendly organizational culture			
Human Factors	Provide adequate specific-trainings on the knowledgebase system and general educations on knowledge management strategies and practices			
Human Factors				
Process Factors	Continuous quality improvement			
Process Factors	Processes must be repeatable & consistency			
Process Factors	Developed logical activities & well-defined procedures			
Process Factors	Establish proper accountability & measurement systems			
Process Factors				
Process Factors				
Process Factors				
Technology Factors	Management reporting enabler	Technology improve the efficiency of knowledge transfer via higher speed & reduced cost	Addressing key information need by selecting the right technologies	
Technology Factors	Integrated and remote data sharing	Technology enlarge the span of support strategies		
Technology Factors	Enforcing standards on knowledgebase inputs			
Technology Factors	Selecting the right knowledgebase system			
Management Factors	Management commitment & participation		Buy-in from all levels	Leadership
Management Factors	Knowledge-friendly organizational design		Strong leadership from senior management	Reward system
Management Factors	Develop clear corporate strategies on KM			KM-specific roles to drive KM initiatives
Management Factors	Motivational aids & coaching			
Others				
Others				

Key Success Factors for KM (continue...)

Category	Call (2005)	Chatzkel (2004)	Chong (2006)	Coe (2005)
Human Factors		Organizational values and culture	Employee training	Anticipate resistance to changes
Human Factors			Employee involvement	
Human Factors			Team working	
Human Factors			Employee empowerment	
Human Factors			Knowledge friendly culture	
Process Factors	Perform knowledge audit & assessment	Business Processes	Performance measurement	Prioritize KM initiatives
Process Factors		KM Measurement	Benchmarking	define & measure success
Process Factors				
Technology Factors	Appropriate KM tools	Infrastruture	IT system infrastructure	
Technology Factors			Knowledge structure	
Technology Factors				
Technology Factors				
Management Factors	Well-defined business goals	KM vision & strategy	Top management commitment	Senior management commitment
Management Factors	Well-defined KM strategy	KM team	Elimination of organizational constraints	Reward success
Management Factors				
Management Factors				
Others				
Others				

Key Success Factors for KM (continue...)

Category	Desouza & Awazu (2006)	Doyle (2006)	Karlsen & Gottschalk (2004)	Koch (2003)
Human Factors			Culture	Culture
Human Factors				
Process Factors			Systems & procedures	
Process Factors				
Technology Factors	Integrate enabling technologies	Capturing & connecting technology	Information technology	IT systems
Technology Factors				
Technology Factors				
Technology Factors				
Management Factors	Leadership as advocates of KM			Corporate & strategic management
Management Factors				Organizational structure
Management Factors				Office design
Management Factors				
Others				Human resources
Others				

Key Success Factors for KM (continue...)

Category	Koe (2005)	Hariharan (2005)	Hasanali (2002)	Hooff & Ridder (2004)
Human Factors	Anticipate resistance to change	Regular communication		Communication climate
Human Factors		Visible recognition	Culture	
Human Factors		Sustainable knowledge sharing and replication culture		
Human Factors				
Human Factors				
Process Factors	Define and measure success	Corporate standardized KM processes	Measurement	
Process Factors	Prioritize changes	Measuring the impact of KM		
Process Factors		Content under scrutiny		
Process Factors				
Technology Factors		Technology enablement	IT Infrastructure	
Technology Factors				
Technology Factors				
Technology Factors				
Management Factors	Engage senior management	Strategic leadership	Leadership	Organizational commitment
Management Factors	Reward successful change efforts	Relevance to critical business aspects	Structure, roles & responsibilities	
Management Factors				
Management Factors				
Others				
Others				

Key Success Factors for KM (continue...)

Category	Holsapple & Joshi (2000)	Magnusson (2004)	McAfee (2006)	Moffett et al (2004)
Human Factors				Trainings
Human Factors				
Process Factors	Measurement	Find new ways of organizing human interaction to increase the possibilities to create new knowledge & leverage existing knowledge		
Process Factors	Control			
Process Factors	Coordination			
Process Factors				
Technology Factors		Implementing appropriate IT solutions	"Keyword" search capability	Well-maintained, user-focused KMS
Technology Factors				Web-based KMS
Technology Factors				
Technology Factors				
Management Factors	Leadership			Dedicated KM roles to promote technological use
Management Factors				
Management Factors				
Management Factors				
Others	Resources			
Others				

Key Success Factors for KM (continue...)

Category	Mohamed at el (2006)	Okes (2005)	Pai (2005)	Sabri (2005)
Human Factors		Cognition	Trust	
Human Factors				
Process Factors	KM performance metrics	Organizational Learning		
Process Factors				
Technology Factors	Technology that support business strategy	Information Technology		Understanding & commitment to IT
Technology Factors				KM friendly organizational structure
Technology Factors				
Technology Factors				
Management Factors		Intellectual capital	Organizational support	Managmeent push KM-friendly culture
Management Factors			Top Management support	
Management Factors				
Management Factors				
Others				
Others				

Key Success Factors for KM (continue...)

Category	Sharp (2003)	Studer & Stojanovic (2005)	Walker (2006)	Wong (2005)
Human Factors	Communication within the organization		Values	Training and education
Human Factors	Collaboration & teamwork		Cultural sensitivity	Culture
Human Factors	Commitment by employees to the concept and the practice of KM			
Human Factors	Innovative corporate culture			
Human Factors				
Process Factors			Managing performance	Measurement
Process Factors			Knowledge creation	Process and activities
Process Factors			Knowledge structure	
Process Factors			Knowledge review	
Process Factors			Knowledge reuse	
Process Factors			Knowledgebase vitality	
Process Factors			Environmental scanning	
Technology Factors	Application of appropriate technology	Ubiquitous access to knowledge via context-oriented KMS	Technology	Information Technology
Technology Factors		High performance workplace		
Technology Factors				
Technology Factors				
Management Factors	Senior management commitment			Management leadership & support
Management Factors				Strategy & purpose
Management Factors			Organizational structure	organizational infrastructure
Management Factors			Strategic alignment	Motivational aids
Others				Resources
Others				Human resource management

Key Success Factors for KM

Category	Wong & Aspinwall (2005)	Zakaria et al (2004)
Human Factors	Training and education	Culture
Human Factors	Culture	Language
Human Factors		IT Proficiency
Human Factors		
Human Factors		
Process Factors	Measurement	
Process Factors	Process and activities	
Process Factors		
Technology Factors	Information technology	Accessibility
Technology Factors		Reliability
Technology Factors		Compatibility
Technology Factors		Appropriate technology use
Management Factors	Management leadership and support	
Management Factors	Motivational aids	
Management Factors	Organizational infrastructure	
Management Factors	Strategy and purpose	
Others	Resources	
Others	Human resource management	

* - Sourced from 29 literatures.