

Measuring Knowledge Management Capabilities

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Introduction

As business professionals know, creating awareness of a problem and its impact is a critical first step toward the resolution of the problem. That which doesn't get measured, doesn't get managed (Redman, 1998). In fact, measurement is a precursor to improvement. This is true for knowledge management capabilities of an organization. "In today's knowledge-based economy," Alan Greenspan recently said, "70% of organizational assets are knowledge assets." Knowledge assets are intangible capabilities and there is a recognized need to "make a greater effort to quantify the value of such intangible assets" (Teece, 1998b). How does one measure the worth of an organization's knowledge assets? What does one mean by knowledge assets anyway?

In this paper, we afford some formal structure to the idea of measuring knowledge management capabilities of an organization, with the ultimate goal of improving business performance through better management of knowledge assets. We describe a large-scale effort at Intel to assess such capabilities with a view to enhance them. This project started in May of 2002. We describe the different types of knowledge assets identified, the potential capabilities associated with managing knowledge assets, the metrics devised for

their measurement, and the assessment methodology that is being standardized across the corporation. We also provide results of the initial validation of the instrument and its ability to ascertain KM capabilities correctly. Hundreds of knowledge workers have so far participated in this study to benchmark KM capabilities of their units. Some units are already planning the next steps for improving their KM capabilities.

Background: What Is Knowledge?

The direction required to quantify the value of knowledge assets begins to come into focus when one realizes their diversity in an organizational setting. Some knowledge assets are “grounded in the experience and expertise of individuals”, i.e., tacit knowledge, while others can be stored as knowledge objects that exist on their own, i.e., explicit knowledge (Fahey & Prusak, 1998; Teece, 1998a). Therefore, to describe knowledge assets that exist across organizations, domains that encompass knowledge work and can be studied for improving on-the-job productivity must be identified. For this reason, we start with classifying the whole gamut of knowledge residing in an organization into a knowledge asset framework.

We categorize institutional knowledge assets into four areas: Expertise, Lessons Learned, Knowledge Documents, and Data. This categorization resulted from the realization that knowledge in each area has a unique: 1) mix of tacit and explicit content, 2) method of transfer and contextual value, and 3) life cycle (creation to application) including its shelf life. To contrast the unique nature of each knowledge area, its characterization along these three dimensions needs to be understood.

Expertise

Expertise is high in tacit knowledge. Individuals in an organization are often considered experts within a particular domain. The transfer of expertise occurs via consultation, collaboration, mentoring, observation, i.e., through personal interaction. The shelf life of this type of knowledge depends on the currency of the knowledge in the context of its application and can be extended by renewal and learning. The availability of experts and the ability of an organization to locate required expertise for a given situation quickly can result in performance improvement (Dooley, Corman, & McPhee, 2002).

Lessons Learned

Lessons Learned are the essence of learnings from past successes and failures. They represent highly specific knowledge gained while completing a project or task. They lie toward the “tacit” end of the tacit-explicit continuum. Undocumented lessons are in the heads of people who learned them. To the extent lessons are documented, their transferability is improved (in a networked organization), but their applicability remains highly contextual. Recognizing the similarities between the characteristics of the current task with those of an earlier one from which the lesson was learned is an important step in their application. This type of knowledge is created when one recognizes that something substantial of recurring value has been learned. The shelf-life of a lesson depends on its generalizability and the persistence of the context. The more generalized a lesson, the broader is its applicability and the longer can be its life. Organizations that exploit this type of knowledge have reported substantial cost savings (O'Dell & Grayson, 1998).

Knowledge Documents

Knowledge Documents represent explicit knowledge such as project reports, technical reports, policies and procedures, research reports, publications, pictures, drawings, diagrams, audio and video clips, etc. Knowledge Documents encompass internally generated as well as external information (Zack, 1999). Market research reports and operating manuals of complex machinery are good examples. Knowledge Documents contain the background knowledge that can be referred to by a knowledge worker to educate themselves – to increase their awareness / understanding – about an area that they work in. Well-understood taxonomies and archives, as well as ease of access of relevant documents, is important to maximize the transferability and re-use of this knowledge. In contrast to Lessons Learned, the knowledge contained in Knowledge Documents is more permanent.

Data

The most explicit form of knowledge is contained in *Data* used for strategic and tactical decision-making (Fahey & Prusak, 1998). Here we do not refer to operational data generated by the day-to-day transactions of a business, but aggregated / historical data such as that stored in a data warehouse. Such data can be a constant source of useful knowledge when used for analytical processing, detecting patterns, modeling business situations, etc. The quality of metadata (design of structure and descriptions of data) determines the availability and usability of this type of knowledge. Shelf-life of Data as a knowledge source can be very long; many retail corporations have spent millions of dollars on creating large data warehouses that store years of summary data for

discovering trends and patterns (knowledge) that can have a direct impact on strategic decisions.

One may argue that there is a substantial overlap among the knowledge assets described above. While we recognize that the lines separating these knowledge assets are gray, the core characteristics of the knowledge areas differ substantially and therefore the knowledge needs of an organization can be more clearly understood if they are broken up among the different types of knowledge assets. Hansen et. al (1999) describe the differing views of knowledge in different organizations and show how an organization's business strategy drives its knowledge needs. We found that, particularly in large organizations, the functional nature of a business unit emphasizes the unit's knowledge needs.

While each business unit within Intel utilized all types of knowledge, we found that the importance, and therefore the strategic focus of a business unit, varied based on its core functional responsibility. TMG, an organizational unit focused on rapid ramp-up of production operations, required a high level of capability within Lessons Learned. Identifying shortcomings within this unique capability area therefore became critical. In contrast, SSG, a unit responsible for development of system software solutions, required emphasis on different capability areas, namely of Expertise and Knowledge Documents. Being able to assess the existing capability levels in these differing knowledge areas is not only essential for benchmarking, but also for directing efforts to improve them and to monitor progress over time. The importance of KM capability assessment is validated by the actions of the business units subsequent to the assessment; most of the business units have already started investing in planned KM initiatives in those knowledge areas that are deemed important but low in capability level.

What Does Managing Knowledge Mean?

Like any other intangible asset, knowledge needs to be managed in order to maximize its value by fully exploiting its utility. Each type of knowledge asset has its own unique characteristics as described above, however a common framework can be applied to understand how it can be managed. One such framework stems from the concept of *knowledge lifecycle* (Alavi & Leidner, 2001). The four distinct stages of knowledge lifecycle are: creation/capture, storage/archival, retrieval/transfer, and application/reuse. We found that, although these stages seem to apply only to explicit knowledge, they do apply to tacit knowledge as well. For example, in the context of highly tacit knowledge such as Expertise, the capture stage corresponds to the process of identifying domain experts and registering their expertise. This information about specific fields of expertise is then stored in an expertise database. The retrieval stage occurs when a potential user of knowledge searches/locates the appropriate expert and the application stage is the culmination of the lifecycle resulting in a consultation with the expert. The knowledge lifecycle framework can thus be applied to manage both explicit and tacit knowledge.

In assessing KM capabilities of an organization, ascertaining how well each stage of the knowledge lifecycle is managed becomes important. Stages of the lifecycle may be assisted by the necessary technology support and integration of KM related activities into normal business processes. While technology automates parts of the knowledge lifecycle, process integration ensures participation in KM-related activities. In addition, the cultural underpinnings of an organization determine the extent to which organizational knowledge may be shared.

Technology Support

Although technology is not the solution to managing knowledge, it provides the means to participate in certain stages of the knowledge lifecycle. KM systems are a class of Information Systems built around this need. Examples of KM systems that offer support for sharing knowledge in various capability areas are: a form-based registration system for capturing the areas of expertise of experts; a storage / retrieval system for categorizing and searching Knowledge Documents; a data warehouse with decision-support and modeling tools, etc.

Process Integration

If knowledge-sharing activities are made part of normal business processes, it is more likely to result in higher KM capabilities. Purely voluntary participation in KM-related activities is hard to come by because its direct and immediate benefits are difficult to measure. Nevertheless, large and small organizations have started embedding knowledge capture/access activities into workflows. Examples of such practices are: routine engagement in reflective activities after reaching major milestones of projects to capture Lessons Learned or looking for relevant Knowledge Documents at the beginning of a new task or project.

The Role of Culture

Organizational culture plays a significant role in defining the extent to which knowledge may be shared. The environments in which employees work can affect both supply and demand aspect of every type of knowledge. On the supply side, it is the willingness to share Expertise, taking the time to catalog important Knowledge Documents, investing time in post-mortems and debriefings to capture Lessons Learned

from completed projects and tasks. On the demand side, culture can promote looking for and reusing available knowledge.

Existence of a positive knowledge sharing culture is a precondition for an organization to have any capability in KM (Adams & Lamont, 2003). No amount of sophisticated KM systems and process changes can enhance KM capabilities if the culture discourages sharing and promotes hoarding. Organizations that have this problem and recognize it need to work on creating the appropriate environment for their knowledge workers. As a first step, immediate supervisors may encourage regular sharing of work-related problem-solutions and be role models by demonstrating knowledge-sharing behavior. The next higher level in this direction may be reached by recognizing and rewarding knowledge-sharing behavior, instituting training and education on systems and processes instituted for knowledge-sharing. At the highest level, the top management of the company may demonstrate its commitment by having a well-articulated KM strategy and set goals for KM related undertakings.

How Can One Measure Knowledge Management Capability?

Since KM assessment is an opportune topic, a few assessment tools and frameworks have been developed and presented at practitioner conferences / web sites of such companies. Noteworthy among these are two methods, both based on the 5-level Capability Maturity Model of the Software Engineering Institute (Humphrey, 1995). One is from Siemens that divides KM-related issues into eight *key areas* and a progressive maturity level scale (Ehms & Langen, 2002; Langen, 2002) and another is from InfoSys Technologies focusing on three *key result areas* and a maturity model (Kochikar, 2002). However, apart from the terminology and some semantic transformations from software

engineering to KM, there is no detailed description of the model, operational classification of different types of knowledge, and definitions of levels in terms of goals. For example, the general and specific goals of each level and the activities needed to attain the various levels of maturity are not available. Moreover, there is no scientific study reporting attempts made to test for content and construct validity of either the measurement instrument or the process adopted.

Our case study team consisted of experts from Intel Corporation from process management, value measurement, change management, and information technology, in addition to the external academic researchers (authors). We undertook a structured conceptual development process to design a Knowledge Management Capability Assessment (KMCA) instrument. With the identification of knowledge asset areas, a consistent nomological measure across all knowledge areas was needed to identify the capability level achieved within each area of knowledge.

Development of the KMCA Instrument

The KMCA model also adapts the framework of the 5-level Capability Maturity Model to the KM context. The conceptual structure of the KMCA emphasizes the top down design of the measurement instrument. The five capability levels of the KMCA are described in terms of their *General Goals* in Table 1. General Goals indicate the milestones to be achieved in order for an organization (or an organizational unit) to reach the corresponding capability level. These goals are general enough to apply to each of the four knowledge capability areas. One can see that lower-level goals are easier to achieve than higher-level goals. This progression gives the questionnaire the ability to discern between capability levels accurately, an important design aspect of the KMCA.

The KMCA team mapped each General Goals to one or more *Specific Goals* for each knowledge area - Expertise, Lessons Learned, Knowledge Documents, and Data. For example, consider one of the General Goals of Capability Level 3 (see Table 1) – “Systems/tools to enable KM activities exist.” Emanating from this General Goal, one of the corresponding Specific Goals for the Expertise area is “Experts are able to register their expertise in an expertise profiling system.” Such mapping was completed for each General Goal of each capability level (for every capability area). Specific Goals of each capability level of each knowledge area were then mapped to one or more *Specific Practices*, which are work practices that employees could identify with in their day-to-day work life. Specific Practices were, in turn, converted into questions for the first version of the questionnaire. By strictly adhering to this procedure, the team was not only able to include questions representing all levels (Level 1 through Level 5), but also able to maintain the relative progression of levels of questions within each area.

The prototype and subsequent versions of the instrument were developed and validated in four distinct phases over a 24-month period. These phased activities and accomplishments are described in Table 2, which details the deliberate, step-by-step process. The questionnaire consists of sections for each knowledge area and one for the cultural aspects of an organization. Within each section, questions are grouped by the components of that knowledge area. For example, the components under the Knowledge Documents section are: Taxonomy, Categorization Process, Repository, Search and Retrieval Process, and Application/Use Process. Each question is mapped to a capability level according to the Specific Goals of that level. The final questionnaire consists of about 120 questions that can be completed in about 20 minutes.

Instrument Validation

Translation validity which includes both face and content validity of items included in the instrument attempts to assess the degree to which accurate translation of the constructs occurs while operationalizing the instrument (Trochim, 2001). This was a major focus in the early phases of the project, which provided substantial input as to the applicability of the concepts to Intel.

The criterion-related validity assesses the measurement accuracy of the instrument. It checks the predictive capability of the instrument based on the theory of the construct. In our case, this is the ability of our instrument to accurately measure the capability level of an organization in each knowledge area. Because of the strict design considerations, we expected to observe that: For each capability area, all the requirements of a lower level of capability would be fully met before requirements of any of the higher levels are met. Results from the three business units at Intel confirmed this expectation and we conclude that the capability levels are a progression. We also expected the KMCA to be able to compare relative capabilities across knowledge areas within a single organization and across multiple organizations for a given knowledge area. Our results also confirmed this expectation. The overall results thus confirm that the mapping from General Goals to Specific Goals / Practices and then to actual questions was accurately accomplished and that KMCA is able to measure and compare the separate KM capabilities of organizations.

Up to this point, we have focused on item construction and its translation to knowledge areas and levels. The overall goal is one of establishing the four capability areas as measurable constructs. For this final step, we used confirmatory factor analysis

and represented each capability area as a latent factor whose measurement consistency was established using two measurement model forms: 1) General-Specific model and 2) Second-Order model (Chen, West, & Sousa, 2004). The results of both structural equation models provided fit indices for all capability areas indicating models of good fit. The significance of the General factor and the Second Order factor representing the overall capability area provides strong evidence supporting these knowledge assets as measurable capabilities. Using both measurement models within each business unit provided experimental rigor and external validity.

Measurement Results

The results of the KMCA are in the form of capability level scores in each knowledge area accompanied by a report describing the highlights and detailed information concerning the status of KM capability in each area. Figure 1 shows a sample page from the results of the Lessons Learned knowledge area pertaining to one of the business units at Intel. *Usage* summarizes the usage and importance of the knowledge area to the unit. *Observations* are factual statements that convey to the business unit the highlights of the unit's capability in a particular area. *Recommendations* are prescriptions for action. The specificity of recommendations allows a unit to start planning for KM initiatives. Additionally, *Detailed Information* contains capability analysis of each component of the knowledge area (which, in the case of Lessons Learned are: *Capture*, *Taxonomy*, *Repository*, and *Application/Use*), descriptive statistics, and a summary of respondents' qualitative comments.

As a consequence of the KMCA, one of the business units, SSG, has already started major efforts in most of the suggested directions. SSG has constituted five

overlapping teams of knowledge workers to plan and design KM initiatives, one in each of the knowledge areas and one specifically to address organizational culture in the context of knowledge sharing. The long term effect of these efforts needs to be seen.

Future Trends: Impact on Business Performance

Ultimately, the proof of the pudding is in eating. Assessing KM capabilities is an interim step toward the ultimate goal of making a positive impact on business performance. Direct impact of KM initiatives on bottom line performance metrics, such as profit, revenue, market share, is difficult to establish. Nonetheless, efforts need to be made in choosing the appropriate metrics. In the case of semi-autonomous business units, bottom line metrics are not pertinent. In such cases, indicators more relevant to the business of the unit, such as productivity, quality (of product / service), and responsiveness, may be chosen. Complicating the relationship between KM initiatives and business performance is the fact that the gestation period for reaping benefits is longer, unlike installations of new equipment or implementations of business process changes. Thus investments in KM initiatives must be viewed longitudinally.

Of the three large business units that have participated in the KM capability assessment at Intel, one is a manufacturing unit (TMG), another is responsible for providing systems software embedded in chips (SSG), and the third is the corporate quality assurance unit (CQN). The population surveyed within the manufacturing unit was the engineers and technicians responsible for maximizing the yield and quality of semiconductor wafers using the most sophisticated and expensive equipment in its category. By far the most important goal of this group is keeping the machines up and running at the optimum levels. Given the nature of their responsibility, as a relatively

short-term measure of performance, we devised a metric to measure the delay experienced in getting the right knowledge (Expertise, Lessons Learned, Knowledge Documents, and Data) to the right person whenever needed. A longer-term metric of performance is the average down times and ultimately the yield of the particular factory.

In the case of the other two units, although there are no direct measures of white-collar productivity, effects of knowledge sharing and reuse can be observed by way of time saved in isolating a problem, finding solutions, completing projects. Effects of knowledge sharing may also result in better decisions in choosing vendors, arriving at more accurate lab test results, etc. Hence, in addition to the quantitative measures of time spent to get the knowledge, we used qualitative measures such as adequacy of various knowledge sources in satisfactorily fulfilling the requirements of individual managers.

As one moves away from direct impact of KM initiatives to improvements over the long term, confounding factors obfuscate the relationship between KM and business performance. Benefits of KM become harder to assert and investments in KM initiatives become harder to justify.

Conclusion

Knowledge management is increasingly viewed as a way to improve firm performance and potentially to provide a competitive advantage. Successes have been documented in corporate initiatives (sometimes referred to as KM initiatives) by utilizing knowledge in the form of best practices that resides within the firm. The descriptions of success have been predominantly anecdotal. To allay the complexity of the concept of knowledge assets, we identified four distinct types of knowledge assets, each with its own mix of tacit-explicit content, method of transfer, and lifecycle. Through our case

study, we demonstrated that it is not only possible to obtain a realistic assessment of KM capabilities of an organization in each knowledge area, but that the assessment offers specific directions for improving such capabilities. We found that the business units that we analyzed had differing knowledge area emphasis and capabilities based on the business unit's function and objectives. These results have several implications going forward for both business practice and research.

From a business perspective, our study demonstrates that assessment of KM capabilities can be prescribed as a key component of an organization's KM program. Since organizations possess and require varied capabilities in different areas of knowledge, a capability assessment (such as the KMCA) should occur as one of the first steps toward improvement. Additionally, an organization should conduct a macro level review of its business goals and the knowledge needs of its processes to most effectively achieve those goals. Once a review of these goals and knowledge needs is completed, assessment of the capability areas will provide an alignment analysis of the fit with the stated business objectives. Initiatives can then be designed to target those knowledge capabilities that are deemed important but deficient within the organization. Such goal-directed targeting of specific capabilities via well-designed initiatives coupled with tracking of business performance metrics would greatly enhance the effectiveness of a KM program. The ability to correctly measure knowledge capabilities and prescribe improvements thus provides an initial step to capitalize fully on the management of knowledge.

For successfully contributing to research in the area of KM capability assessment, two items need to be kept in focus: the choice of success metrics and the longitudinal

nature of this research. The business performance metrics chosen must be measurable and should be an acceptable measure of success of KM initiatives; they are critical in establishing relationships between KM capabilities and business performance. Since the return on investments in KM initiatives of any kind - systems, processes, or cultural aspects - usually occurs over an extended period, an organization participating in such a scientific study has to recognize the long-term nature of its commitment. A standardized instrument that can measure various KM capabilities consistently over long periods becomes an essential component of the undertaking.

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Concept Definitions

Knowledge Assets – Intangible assets that encompass knowledge as well as the ability of an organization to leverage that knowledge.

Knowledge Life Cycle – The activities encompassing treatment of knowledge as it moves through the stages of creation/capture, storage, retrieval/transfer, and application/reuse.

Knowledge Capability Area (also referred to as Knowledge Area, Capability Area) – A subset of knowledge assets identified below as Expertise, Lessons Learned, Knowledge Documents and Data.

Expertise – Highly tacit knowledge, domain-specific, gained through experience, formal education and collaboration.

Lessons Learned – Knowledge gained while completing tasks or projects, task/situation-specific, also referred to as Best Known Methods, Best Practices and Internal Benchmarking.

Knowledge Documents – Documented knowledge with established extended shelf life, resides in an explicit form and may originate internally or externally .

Data – Highly explicit knowledge derived from the data in databases and data warehouses, used for strategic decision-making after summarizing / analysis/ mining, etc.

Table 1 – Capability Levels

Capability Level	General Goals	Examples of Specific Goals
Level-1: Possible	Knowledge sharing is not discouraged. There is a general willingness to share. People who understand the value of sharing do it. Meaning of knowledge assets is understood.	Previous Lessons Learned can be found with perseverance.
		Some experts are willing to share Expertise when consulted.
Level-2: Encouraged	Culture encourages sharing of knowledge assets. Value of knowledge assets is recognized. Knowledge assets are stored / tracked in some fashion.	Supervisors encourage regular meetings to share knowledge / solutions.
		Experts and their expertise are identifiable.
		The importance of prior Lessons Learned is recognized.
Level-3: Enabled / Practiced	Sharing of knowledge assets is practiced. Systems / tools to enable KM activities exist. Rewards / incentives promote knowledge sharing.	Organizational Leadership understands how KM is applied to business.
		Lessons learned are captured.
		Taxonomies and centralized repositories for knowledge documents exist.
		Experts are able to register their expertise.
		Historical data is available for decision making.
Level-4: Managed	Employees expect to locate knowledge. Training is available. KM related activities are part of workflow. Systems / tools for supporting KM activities are easy to use. KM capabilities and benefits are assessed. Leaderships exhibits commitment to KM. Leadership provides KM strategy.	Senior management sets policy, guidelines, and goals with respect to KM.
		Tools to locate experts are easy to use.
		Capturing, storing and using Lessons Learned is part of normal work process.
		Knowledge Document retrieval is fast and easy.
		Historical Data utilized for decision making is easy to access and manipulate.
Level-5: Continuous Improvement	KM processes are reviewed/improved. KM systems/tools are widely accepted, monitored/updated. KM assessment generates realistic improvement.	Senior management periodically reviews the effectiveness of KM investments to the whole organization.
		Recent improvements in Document access have been implemented.
		Expert and Expertise identification has expanded and refined.
		New tools for Data manipulation are tested and implemented.
		The impact of Lessons Learned on operations is communicated.

Table 2 – Instrument Construction and Validation

	Activities	Accomplishments
<p>Phase 1 May 2002 – Aug 2002</p>	<p>Background research, identification of knowledge capability areas.</p> <p>Conceptual design of the instrument, capability levels and goals, initial survey construction.</p> <p>Focus group of twelve knowledge workers.</p>	<p>Confirmation of knowledge areas.</p> <p>Initial questionnaire with about 145 questions and a 45-minute completion time.</p> <p>Applicability of the survey to the work environment (face and content validity).</p>
<p>Phase 2 Aug 2002 – Nov 2002</p>	<p>Survey administration to 38 volunteers from one business unit.</p>	<p>Ability of the instrument to measure KM capabilities of the unit (criterion-related validity).</p> <p>Survey modification based on open-ended feedback (face and content validity).</p>
<p>Phase 3 Nov 2002 – Aug 2003</p>	<p>Full-scale pilot study administration to a large business unit.</p> <p>Elimination of redundant questions after data analysis, formatting and readability improvements.</p> <p>Inter-rater reliability test utilizing six domain experts on KM.</p>	<p>Final questionnaire with about 120 questions and a 20-minute completion time.</p> <p>Improvement in the instrument’s ability to recommend specific KM practices.</p> <p>Ability of the instrument to discern between capability levels.</p>
<p>Phase 4 Aug 2003 – May 2004</p>	<p>Final version administered to three large business units (population 650 to 1000 employees)</p> <p>Confirmatory factor analysis and other test of capability areas, their components, and measurement accuracy.</p>	<p>Ascertaining the ability of the instrument to measure capability levels in each knowledge area.</p> <p>Response bias test indicated no bias.</p> <p>Ability to make comparisons of KM capabilities within and between business units.</p>

Figure 1 – Sample KMCA Results Page

Unit Name: _____
Capability Area: <i>Lessons Learned</i>
Capability Level Achieved: <i>3 (on a Scale of 1 to 5, with 5 being the highest)</i>
<u>Highlights:</u> Usage <ul style="list-style-type: none">○ 90% of the respondents use Lessons Learned.○ Among the four knowledge areas, Lessons Learned was considered as the least important to the job.○ Individuals use Lessons Learned 3-4 times a week and spend a total of 30-60 minutes a week looking for Lessons Learned. Observations <ul style="list-style-type: none">– Looking for Lessons Learned is part of work practices; Lessons Learned do provide insights that promote successful practices and avoid mistakes.– Although the electronic storage system for Lessons Learned seems to be adequate, it is deficient in terms of ease of use, documentation, accessibility, and search categories. Recommendations <ul style="list-style-type: none">✓ Electronic storage/search systems for Lessons Learned need improvement.✓ A systematic process for capture and periodic review of existing Lessons Learned needs to be instituted.
<u>Detailed Information:</u> Component Analysis: Detailed analysis of each component of the Lessons Learned area, <i>Capture, Taxonomy, Repository, Application/Use.</i> Descriptive Statistics: Detailed statistics regarding response rate, mean, variance, maximum, minimum, etc., for every question. Summary of open-ended qualitative comments made by respondents.