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December 2004

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Sasser, David and Bartczak, Summer, "Identifying the Benefits of Knowledge Management in the Department of Defense: A Delphi Study" (2004). *AMCIS 2004 Proceedings*. 265.

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Identifying the Benefits of Knowledge Management in the Department of Defense: A Delphi Study

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ABSTRACT

Knowledge Management (KM) has been identified as one of several enablers of the current Transformation effort in the Department of Defense (DoD). Several organizations within the DoD have started using KM and are now interested in identifying and, subsequently, measuring the benefits in order to gauge success. While many studies have been undertaken to identify the benefits of KM in the commercial sector, similar efforts to investigate the benefits in a DoD context are lacking. Using a Delphi study involving key DoD KM experts, this research aims to identify the major realized benefits associated with KM practice from a strictly DoD perspective.

Keywords

Knowledge Management, Knowledge Management Benefits, Measuring Knowledge Management Benefits

INTRODUCTION

The U.S. Department of Defense is currently undergoing a transformation which aims to revolutionize the way it fights wars and conducts business. This transformation is “the process whereby the DoD is overhauling the U.S. military and defense establishment to enable it to counter 21st century threats most effectively. Transformation is about new ways of thinking, fighting, and organizing the Department and its operations - as well as about acquiring new system capabilities” (Defense Link, 2003). Several organizations across the DoD are already beginning to identify the application of knowledge management as a key strategic focus in order to affect this transformation (Cuvillo and Michaliga, 2003; Bartzak, 2002).

Academics and practitioners have yet to agree on a single definition of knowledge management. However, Davenport and Prusak (1998) describe it as “the attempt to recognize what is essentially a human asset buried in the minds of individuals, and leverage it into an organizational asset that can be accessed and used by a broader set of individuals on whose decisions the firm depends.” The ultimate goal of KM is to take advantage of this knowledge asset in order to provide some level of benefit to the organization (Davenport and Prusak, 1998; Nonaka and Takeuchi, 1995). However, many in both the military and civilian information resource management communities believe that KM provides nothing beyond what is already accomplished with information management, and is simply “old wine in a new bottle” (Spiegler, 2000; McAdam and McCreedy, 1999). Consequently, leaders and managers would like proof that KM works, and identifying and measuring the benefits of KM is recognized as a key issue for future KM research (Edwards et al., 2003; Firestone and McElroy, 2003).

Given that serious resources are already being committed to KM in the DoD, it follows that identifying the benefits derived from KM from a DoD perspective is highly desirable. Indeed, Bartzak (2002) as well as Bennet and Porter (2003) found that demonstrating a return on investment regarding KM initiatives in the DoD is necessary in order to gain and keep leadership support as well as garner funding commitments. Certainly this would require an ability to measure the benefit such initiatives provide. However, this task cannot be addressed until an initial identification of benefits has been accomplished. While a preliminary literature review identified several studies which attempted to quantify the benefits of KM from a commercial perspective, no similar research taking a strictly DoD perspective was identified.

REVIEW OF THE LITERATURE

This research aims to provide a list of KM benefits that are being realized within the DoD. Such attempts are not new, as a review of the literature provided several examples of studies conducted in the commercial sector which resulted in a list of KM benefits.

Initial reports on the benefits of KM were largely in the form of case studies, with perhaps the most widely reported benefits being an increase in productivity as well as a decrease in costs (Davenport and Prusak, 1998; Nonaka and Takeuchi, 1995).

For example, Hoffmann-LaRoche, a Swiss pharmaceutical firm, credits a knowledge management initiative in 1993-1994 with saving them \$1 million per day. The firm implemented a system which reduced the application time for new FDA drug approvals by several months (Davenport and Prusak, 1998). Similarly, Hewlett-Packard used a KM system to streamline their customer support process, reducing call times by two-thirds and cutting the cost per call by 50 percent (Davenport and Prusak, 1998).

Another strongly reported benefit of KM is the acceleration of internal processes. During a recent effort to build a new oil platform in the North Sea, British Petroleum leveraged a virtual teamworking (VT) tool to deliver the project by its target date at a much lower cost than normal (Davenport and Prusak, 1998). Among numerous benefits, the VT tool's application sharing feature allowed team members spread across the globe to complete joint memos in ten to fifteen minutes. This process previously ate up hours or days of productivity, as drafts were sent back and forth by mail.

More recently, as the KM field has grown and matured, a number of quantitative studies emerged attempting to define a list of benefits related to KM. In a 1999 report, KPMG Consulting surveyed 423 organizations across the UK, mainland Europe, and the US regarding several knowledge management issues, including benefits achieved through KM (KPMG Consulting, 1999). After identifying each organization's expected benefits through the use of KM, the respondents reported the actual realized benefits. The top four benefits included better decision making, faster response to key business issues, better customer handling, and improved employee skills.

A recent study by North and Hornung (2003) investigated KM benefits reported by 34 German companies who qualified to compete for the German Commerzbank "Knowledge Manager 2002" award. Participating companies were divided into three categories: small firms with less than 50 employees, medium-sized firms with no more than 250 employees, and large firms with more than 250 employees. A primary focus of the research was to identify KM benefits for employees, customers, and the organization itself. The evaluation of KM benefits was based upon a balanced scorecard approach with four categories being: business processes, employee satisfaction, customer satisfaction, and financial results. North and Hornung's study found that the benefits knowledge management provided to an organization depended upon the KM approach taken. The three approaches identified were IT-centered, KM applied to specific problem areas, or professional KM. Professional KM was defined as balancing the necessary IT with proper management incentives so that KM is integrated into all business process and projects across the organizations (North and Hornung, 2003). Indeed, this approach resulted in the most reported benefits across all four categories.

The balanced scorecard approach taken by North and Hornung to categorize KM benefits is also supported by a report from Lopez and Raybourn (2003) of the American Productivity and Quality Center (APQC). Under the APQC KM balanced scorecard approach, benefits can be broken down into four categories: financial perspective, customer perspective, internal perspective, and innovation & learning.

Clearly an absolute definitive list of knowledge management benefits has yet to be identified. However, between this existing research, four common categories of KM benefits do seem to emerge: internal or business benefits, customer benefits, employee benefits, and financial benefits (North and Hornung, 2003; Lopez and Raybourn, 2003).

Benefits of DoD KM

Civilian organizations are not unique in their need to identify as well as measure the business benefits of KM. Showing a return on investment of KM initiatives in the DoD is just as necessary to gain and keep leadership support (DoD/CIO, 2001; Bartczak, 2002; Bennet and Porter, 2003). While a list of KM benefits can be generated from research addressing private sector organizations, the same list does not necessarily apply to public sector or, in this case, DoD organizations. A great deal of literature recognizes that the DoD is a unique organization (Bartczak, 2002) with unique KM challenges (Bennet and Porter, 2003; Nissen, 2003). As North and Hornung's (2003) study suggests, the benefits knowledge management provided to an organization depended upon the KM approach taken. Ultimately each organization must generate a list of benefits appropriate to their specific business objectives (Firestone, 2001).

METHODOLOGY

The goal of this research was to identify the realized benefits of KM in the DoD. As stated previously, some research exists that addresses the issue in the context of the private sector; however, there is a lack of similar research that takes into account the unique DoD perspective. Given the exploratory nature of the problem under investigation and the need to establish a baseline for future empirical research, we felt the use of a Delphi methodology was appropriate. Lindstone and Turoff (2002) state that the Delphi method is a particularly valid choice when the problem does not lend itself to precise analytical techniques but can benefit from subjective judgments on a collective basis. Also, it is recognized that KM expertise,

knowledge and “language” has not permeated equally throughout DoD organizations (Bartczak, 2002). As such, beginning this research by consulting a group of recognized DoD KM experts was deemed an appropriate starting point.

Methodology Overview

The first stage of research for this thesis began with a literature review in order to identify the issue and develop the subject background. A list of 16 KM benefits pulled from existing research on commercial organizations was then compiled. Beginning a Delphi study with an initial list of issues was consistent with the approach taken by Keil et al. in their research regarding user perceptions of IT risk (2002). During the second stage, a formal study was conducted to validate this list of benefits from a strictly DoD perspective. The Delphi method was used to identify a consensus among a group of DoD KM experts regarding which benefits were key in a DoD context. Research was conducted using questionnaires sent to the Delphi panel over two successive rounds.

Delphi Committee Development and Participant Selection

Selecting the appropriate members of the Delphi panel is the key to successful application of the method (Gordon, 1992). Since results of the study are entirely dependent upon the expertise and knowledge of the panel members, it is essential to select experts in a manner consistent with the goals of the research effort. For this research, selection criteria was consistent with Holsapple and Joshi’s (2000) Delphi study identifying KM influence factors. The panel consisted of Department of Defense personnel having an active track record in KM leadership and/or practice. In addition, each member has had at least two years of experience working with KM. In order to take into account both an overall strategic as well as a more directly observed perspective on KM benefits, care was taken to include both those who are leading the KM charge in the DoD as well as those who have been directly involved with the implementation of KM projects. To ensure applicability across the entire organization, as well as account for variations across services, it was essential to solicit input from a variety of military branches as well as the overall DoD level.

A total of eleven individuals were identified for the committee, which is consistent with other Delphi studies (Keil et al., 2002). With respect to previous research, there appears to be no clear consensus on the number of individuals required for a Delphi panel. Helmer and Dalkey (1983) used a panel of only seven experts in their original Delphi experiment of 1953 while Clayton (1997) found that a Delphi panel consisting of a homogeneous group of experts from the same discipline (i.e. all electrical engineers) needs 15-30 people, while a more heterogeneous group (i.e. experts from the same area, but different social/professional levels) needs only 5-10 members. The eleven members of this Delphi panel consisted of a heterogeneous group of DoD KM experts representing both the leadership as well as practitioner levels, which allowed for an adequate diversity of inputs. Five DoD organizations with very diverse characteristics and business processes were represented, including the Army, Air Force, Navy, Defense Logistics Agency, and the Defense Information Services Agency.

One of the major goals of the Delphi process is to identify a consensus among the panel members regarding the issues. In fact, when the method was first developed in the 1950s, establishing consensus was seen as the primary goal (Scheibe et al., 1975). However, as time passed and the methodology matured, non-consensus was also seen as a valid result of the Delphi methodology, as was non-consensus with a trend toward consensus (Lindstone and Turoff, 2002).

For this particular application of the Delphi, identifying consensus as well as a trend toward consensus were both desired outcomes. Knowledge management is still a new and emerging practice, especially within the DoD. Given the diversity of organizational goals across the DoD, as well as the differing levels of KM maturity, it is highly unlikely that a heterogeneous group of experts would come to a consensus on each and every KM benefit.

First Round: Questionnaire One

Participants were asked to examine a list of 16 KM benefits and rate each item based upon a 6-point Likert-type scale (1 = no benefit, 6 = strong benefit). Each member was also asked to provide comments regarding each potential benefit’s applicability to their specific organization. Finally, they were asked an open-ended question designed to identify any KM benefits they had observed in their organizations that were not present in the list provided. For both the first and second rounds, the survey was sent as a Microsoft Word attachment via electronic mail. Respondents were asked to return the survey via e-mail within 14 days of receiving the questionnaire.

Second Round: Questionnaire Two

In the second and final questionnaire, panel members were presented with a list of benefits that did not achieve consensus in round one, along with the comments provided by each panel member. Members were asked to review their round one

response for each benefit, taking into consideration the group mean response as well as the group comments. For each item, the respondent could either keep their initial rating or change it to better agree with group consensus. An explanation was required for any rating that didn't coincide with the group mean. In other words, a mean rating of 4 or above would require a respondent to explain an individual rating of 3 or below. Similarly, a mean rating of 3 or below would require an explanation for a rating of 4 or above. All 11 round one and two questionnaires were returned for analysis.

Responses to questionnaires one and two were analyzed to determine group consensus. The mean benefit rating from each participant was computed, along with the standard deviation. Consensus was achieved if at least 10 of 11 ratings fell within one standard deviation of the mean rating. For those items that did not achieve consensus after round two, a trend toward consensus was calculated by comparing the standard deviation of the mean responses between the two rounds. A reduction in the standard deviation of the mean responses was seen as a trend toward consensus.

After the first round, consensus was achieved on 6 of the 16 items in the Delphi questionnaire. After round two, no further consensus was achieved on the remaining items. However, a trend toward consensus was measured on 9 of the 10 remaining items yet to achieve full consensus. The final remaining item indicated an increase in the standard deviation of the mean response between rounds, signaling a lack of consensus among the group on that item.

RESULTS

Analysis of the Delphi questionnaires resulted in seven items being identified by the group as having a benefit related to KM in the DoD. Nine more items were identified as not having a benefit, though one of those items failed to achieve consensus or a move toward consensus. Table 1 represents the list of questionnaire items along with their relevant benefit and consensus data.

BUSINESS PROCESS BENEFITS	Benefit	No Benefit	Consensus - first round	Move To Consensus - second round
Acceleration of processes	X			X
Avoidance of redundancies		X	X	
Re-use of internal knowledge	X			X
Reduction of errors		X	X	
Time savings in doing routine work	X		X	
BENEFITS CONCERNING CUSTOMER SATISFACTION				
Better response time		X		X
Improvements in product and service quality		X		X
Better customer communication		X		X
Increase in customer satisfaction		X		X
Better customer retention		X	X	
Increased information content	X		X	
BENEFITS CONCERNING EMPLOYEE SATISFACTION				
Increased motivation	X			X
Improved teamwork	X		X	
Shorter training periods	Failed to achieve consensus			
Development of job skill		X		X
Enhancement of personal knowledge	X			X

Table 1. Summary of Delphi Questionnaire Analysis Results

Six items immediately achieved consensus among the 11 members of the Delphi panel after the first round. Of these six items, three were agreed upon by the panel as generally having *no* benefit related to KM practice in the DoD. For analysis purposes, an item with a mean rating below 3.5 was seen as having no benefit related to KM in the DoD, since its ratings were generally at the low-end of the 6 point scale. An item with a mean rating above 3.5 was seen as having a benefit, since the majority of its ratings were at the upper-end of the scale. The consensus items that were seen as no benefit, along with their mean ratings, are identified in Table 2.

Potential KM Benefit	Mean Rating
Avoidance of redundancies	3.18
Reduction of errors	3.27
Better customer retention	2.18

Table 2. Consensus Items Identified as Not a Benefit Related to KM

The other three items that achieved consensus were identified by the panel as a general benefit related to KM practice in the DoD (mean rating above 3.5). These items along with their mean rating are presented in Table 3.

Potential KM Benefit	Mean Rating
Time savings in doing routine work	4.09
Increased information content	4.27
Improved teamwork	3.91

Table 3. Consensus Items Identified as a Benefit Related to KM

The remaining 10 items failed to achieve consensus after the second round. Of the 10 remaining items, 9 achieved a reduction in the standard deviation of the mean rating from round one to round two. This indicates a move toward consensus, since it signals that the variation among the ratings being submitted by the panel members is getting smaller. In other words, the ratings are starting to center upon a common number. These items along with their mean rating standard deviations in round one and round two are identified in Table 4.

Potential KM Benefit	Round 1 Std Deviation	Round 2 Std Deviation
Acceleration of processes	1.48	1.34
Re-use of internal knowledge	1.34	1.08
Better response time	1.57	1.49
Improvements in product service and quality	1.66	1.51
Better customer communication	1.54	1.38
Increase in customer satisfaction	1.12	0.81
Increased motivation	1.57	1.25
Development of job skill	1.51	1.30
Enhancement of personal knowledge	1.80	1.42

Table 4. Items Indicating a Move Toward Consensus

Four of the nine items showing a move toward consensus featured a mean rating above 3.5, which according to the definition presented earlier indicates the panel identified them as having a benefit related to KM in the DoD (Table 5). The five remaining items earned a mean rating of 3.5 or below, indicating a general belief that they are likely not a benefit related to KM in the DoD (Table 6).

Potential KM Benefit	Mean Rating
Acceleration of processes	4.00
Re-use of internal knowledge	4.18
Increased motivation	3.82
Enhancement of personal knowledge	4.27

Table 5. Items Moving Toward Consensus and Identified as a Benefit Related to KM

Potential KM Benefit	Mean Rating
Better response time	3.27
Improvements in product and service quality	2.91
Better customer communication	3.09
Increase in customer satisfaction	2.36
Development of job skill	3.09

Table 6. Items Moving Toward Consensus but not Identified as a Benefit Related to KM

The final remaining item, shorter training periods, failed to achieve consensus or indicate a movement toward consensus. The standard deviation of the mean rating for this item increased from 1.41 in round one to 1.49 in round two, while the mean rating increased from 3.00 in round one to 3.27 in round two.

CONCLUSION

This research effort shows that DoD KM experts are indeed seeing some realized benefits through KM practice in the DoD. While employment of the Delphi method worked to achieve consensus or movement toward consensus on many of the issues, the comments submitted were equally important in providing insight into how KM is being applied in the DoD. Despite the fact that all items in the Delphi questionnaire were benefits that were actually being realized in the private sector, only 7 of the 16 items presented to the panel were seen as an actual benefit being realized in the DoD.

Of those seven items, three fell under the *business process benefits* category while another three fell under the *benefits concerning employee satisfaction* category. Only one item belonging to *benefits concerning customer satisfaction* was considered a benefit. Perhaps an explanation for the imbalance when compared to the private sector is provided by North and Hornung’s discovery that the benefits derived from KM are dependent upon the KM approach taken (2003). Indeed, a review of the descriptions each panel member provided regarding the KM programs they oversaw indicated a tendency toward technology-based KM solutions. In other words, it seems that the DoD has applied KM predominantly through technology-based initiatives such as Communities of Practice and Knowledge Repositories. There wasn’t a clear indication that these KM initiatives were being targeted toward specific business objectives or external customers.

Low scores on *improvements in product service and quality* as well as *increase in customer satisfaction* indicate that KM in the DoD is still very internally focused. A fully KM-mature organization finds benefits both internal as well as external to the organization, and finds improvements across all business objectives as well as across organizational boundaries (Ehms and Langen, 2001; Nonaka and Takeuchi, 1995; Davenport and Prusak, 1998).

Ultimately, a reason that so many items were deemed not beneficial could be because KM is still in its infancy in the DoD. This is reflected in several of the comments made by panel members, which were mostly along the lines of, “we don’t see that benefit yet, but we expect to once our initiative matures.” Similarly, respondents made several references to the idea that a culture of knowledge sharing was not yet present in their organizations. Ehms and Lange’s Knowledge Management

Maturity Model (2001) can be used to assess how far an organization has progressed in taking advantage of all that KM has to offer. Each of these stages are defined in Table 7 (Ehms and Langen, 2001).

1. Initial	KM activities are non-systematic and ad-hoc. No language for describing organizational phenomenon from a knowledge point of view exists yet in the org.
2. Repeated	Pilot projects and single activities are labeled as KM.
3. Defined	Standardized processes make creation, sharing, and usage of knowledge efficient.
4. Managed	Creation, sharing, and usage of knowledge is organizationally integrated and improved. Measurement of benefits is happening.
5. Optimizing	KM is developed and continuously self-organized.

Table 7. Knowledge Management Maturity Model stages (Ehms and Langen, 2001)

Judging from the comments provided by the panel, it seems that DoD KM falls somewhere between the 'Initial' and 'Repeated' stages. It is clear that KM initiatives in the DoD are still non-systematic and ad-hoc, and the organization is just starting to develop pilot KM projects (Repeated KM). However, the DoD is still a long way from standardizing KM processes and integrating these activities across entire organizations, which is no doubt hampered by its lack of ability to measure KM benefits (Managed). This limits the ability to obtain increased funding, which prevents the spread of KM throughout the organization.

Finally, the mean ratings for each item seemed to cluster around the midpoint of the ratings scale. While this could indicate that members of the Delphi panel were not completely familiar with the research topic, most likely it is further evidence that DoD KM is still in its early stages. This idea precludes the notion that panel members would feel strongly enough about an item to rate it in the extreme upper- or lower-end of the scale.

As the literature shows, building a culture to support KM is essential for success, and such an effort takes quite a bit of time. The goal of this research was to identify KM benefits that are currently being realized. However, it is not safe to conclude that items that were not found to be beneficial under this research effort will not be benefits realized once DoD KM matures.

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