



# The Relationship Between the Knowledge Management Index and Organizational Performance: A Preliminary Empirical Analysis

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## ABSTRACT

*In an attempt to investigate the relationship between an organization's Knowledge Management Index (KMI) and its performance, 18 managers from 6 European organizations were surveyed. Data was collected about Knowledge Management (KM) practices, and factors thought to be critical to the success of these practices (Critical Success Factors CSF) and ultimately organizational performance (OP). Analysis of the data revealed that: (1) to a significant degree, organizations expect more from their KM efforts than these initiatives have delivered (2) KM realization in government is not significantly different from those in private organizations, and (3) the KMI is positively related to OP. Two important management implications emerge from this study: (1) the KMI is a simple and useful index that can be used to characterize KM, especially when organizations cannot afford expensive benchmarking or other assessment metrics and (2) it can serve as a proxy for and predictor of OP.*

## INTRODUCTION

Although many organizations have embraced the notion that managing knowledge is critical to their success, the benefits of knowledge management (KM) have largely been difficult to assess. One reason for this might be the intangible nature of knowledge. As a result of their inability to measure its benefits, managers may have a difficult time advancing KM within their organizations. It is therefore not surprising that some organizational stakeholders question the worth of KM since they are unable to see tangible proof of its benefits. There are others however, who assume that benefits do result from the implementation of KM efforts. It would be of considerable value to this group if there were available a surrogate measure of the impact of the KM effort. A surrogate measure of the KM effort and of organizational performance may lie in an assessment of the organization's knowledge management index (KMI)<sup>1</sup>.

## Problem Statement

The purpose of this study is to investigate the relationship between an organization's knowledge management index (KMI) and its performance. The KMI is defined as "a measure that depicts the extent to which organizations have accomplished KM"<sup>2</sup>. The KMI is the result of an analysis of four key KM practices (knowledge identification, elicitation, dissemination, and utilization) and four CSFs (technology, leadership, culture, and measurement). In this study, organizational performance

(OP) was assessed as managers' opinions on four non-financial dimensions of performance (goal achievement, enhancing flexibility, employees' development and customer services)<sup>3</sup>.

## Literature Review

Questions concerning the benefits of KM and its value to the organization are of the utmost concern to those considering investing in KM efforts. Our inability to effectively measure intangibles such as knowledge has created opportunities for academicians and practitioners not unlike those opportunities that the introduction of decision support systems presented to the pioneers of those systems designed to improve decision-making effectiveness. Because it is generally believed that what gets measured gets done, management consultants and academicians have devised numerous approaches that focus on surrogate measures of organizational performance as a way of assessing the value of KM. The hope is that by measuring surrogates (directly or indirectly) and relating them to tangibles, organizational stakeholders might be convinced of the importance and benefits of KM. Given this perspective, management consultants and academicians have proposed various measurement metrics. The methods include: knowledge banks, micro lending, subsystem performance, colorized report, brand equity evaluation, etc. Two of the more widely discussed methods include the intangible asset monitor<sup>4</sup> and the balanced scorecard<sup>5</sup>. More recently, Stanfield proposed the concept of "intangible management"<sup>6</sup>. He contends that intangibles could be conveniently integrated into the accounting systems of firms through the adoption and application of various standards. While these and the other approaches mentioned have been found to be somewhat useful, a possible limitation to their wide use is that they are complex and difficult to implement. In addition, they appear to be sophisticated enough to scare the timid and those who are just beginning to initiate KM.

In light of these limitations, some organizations have turned to benchmarking. The American Productivity Quality Center (APQC) a worldwide consortium of organizations engaged in formal KM is actively engaged in the use of this technique (benchmarking). While its members get results of annual benchmarking activities at relatively low prices, non-members must pay premium prices. Recently, the concept of an organizational knowledge management index (KMI) was proposed as a way of helping firms to simply and inexpensively evaluate the performance of their KM effort. According to the authors, the KMI is a "metric

Figure 1: Belardo's Matrix: The basis of the KMI

	Identification	Elicitation	Dissémination	Utilization
Technology				
Leadership				
Culture				
Measurement				

that can be used in measuring the health of organizations from a generic perspective – how they are doing in terms of managing their knowledge assets<sup>7</sup>. The supposition is that the KMI is a readily accessible tool that managers can use to demonstrate the value and position of KM to organizational stakeholders and to help make important decisions to shape the activities of the organization.

**Overview of the KMI Model**

The proposed KMI builds on the idea that although knowledge management is multi-faceted, a simple but holistic measure of the degree to which an organization is engaged or committed in KM is possible when the interaction of KM process - and critical success factors-related dimensions is considered.

The process dimension comprises four key KM processes: identification, elicitation, dissemination, and utilization. The critical success factors dimension includes four key critical success factors of KM: technology, leadership, culture, and measurement. These critical success factors are recognized as KM enablers<sup>8</sup>.

Together, the elements in these two dimensions constitute Belardo's Matrix for KM<sup>9</sup>. This matrix has sixteen cells that are interactions between elements from each dimension (Figure 1). Following an extensive literature review, a research instrument with question items specifically addressing all sixteen cells of the matrix was developed. This research builds on that instrument, and was used to collect data and test the KMI construct (see research problem questions below).

**Organizational Performance (OP)**

Many researchers have pointed out the complexity and difficulties associated with understanding and measuring OP because it is multi-dimensional. For meaningful work, researchers are urged to use a two-step approach that includes: (1) selecting an appropriate conceptual framework, and (2) identifying accurate measures to operationalize OP within the framework<sup>10</sup>. In line with the foregoing recommendations, we selected a framework based on non-financial measures. Our rationale for this selection and the identification of items are discussed under methodology (instrumentation).

**Research Questions**

The research attempts to answer the following questions:

1. What are the expectations of managers about their KM practices and the CSFs that affect these practices?
2. Is the KMI a parsimonious measure of the status of KM in an organization?
3. What is the relationship between the KMI and organizational performance (OP)?

**RESEARCH METHODOLOGY**

**Instrumentation**

Data for the empirical verification of the KMI model was collected using the survey method. We extended and used the survey instrument proposed by Asoh et al.<sup>11</sup>. The original questionnaire had 32 items on KM (2 question per cell of Belardo's matrix, Figure 1) and 6 items on demography. The KM items were measured on a 5-point likert scale running from 1: strongly disagree to 5: strongly agree. We extended this instrument on two levels.

On the first level, we introduced a measure using the same 5-point scale to capture the importance of each of the 32 items to the organization. We introduced this measure because from our experience, organizations place different emphasis on different facets of KM. As originally conceived, the KMI focuses on "what is." We think it is

necessary to consider "what will or should be." The "importance" measure captures this. Another dimension of this measure is that it reflects the value an organization can have on a particular KM practice or CSF. The significance of the "importance" measure is straightforward: one organization may be over-emphasizing a KM activity that is of little or no value; another organization may be down playing a critical KM activity that has much value. Given a measure of "what is," and "what should be" for example, an organization can easily pinpoint discrepancies in its activities and re-orientate them accordingly.

On the second level of extension, we included items to measure organizational performance (OP). Following an extensive literature review we included 16 non-financial performance-related items. We excluded financial measures because we wanted to highlight the validity and relevance of the intangible benefits. Furthermore, financial performance measures are difficult to obtain; and non-financial measures have been recognized as good indicators of performance<sup>12</sup>. Performance measures were drawn from four dimensions: goal achievement (cost reduction, improved speed), enhancing agility (flexibility, responsiveness, proficiency, and adaptability), employees' development (e.g. reward, evaluation, communication, hiring) and customer services (feedback, communication)<sup>13</sup>. The items were measured on the same 5-point scale as above.

**Data Collection**

Six European organizations participated in the study. A purposive sample chosen for the study was made of organizations participating in an executive MBA program in Podgorica, Montenegro. Hard copy and electronic version of the questionnaire were distributed to participants at the beginning of the two-week program. Respondents were asked to return the questionnaire (hard copy form) by the end of the training program, or to submit the electronic version at the same time. Participation in the survey was voluntary and anonymous. Of 24 individuals from 8 organizations that participated in the program, 18 individuals from 6 organizations responded, using the electronic mail option. This gave a participation rate of 75% for both the individual and responding organizations. No follow-up has been made yet, but we plan to do so in the spring of 2004. Unfortunately, we are not able to report response bias at this time.

**DATA ANALYSIS**

Given the large number of items on the questionnaire and a small sample size, we focused on testing the KMI model using simple statistical analyses only.

**Profile of Participating Organizations and Respondents**

In conformity with the idea of the KMI, the unit of analysis for the study was the "organization." Of the 6 responding organizations, 3 were from the public sector — government-based (50%, Gov1-3) and 3 from the private sector (50%, Priv1-3). Demographic information collected included age of the organization, number of employees, budget, job title of respondents and years in services. The profile of the individual respondents were as follows: 3 directors (CEO), 4 R&D managers, 3 marketing managers, 3 business analysts, 2 financial managers, 1 accounts manager, 1 operations manager, and 1 project manager. For all calculations discussed below, data was aggregated in the case where more than one individual responded from a given organization.

**KMI Statistics**

The KMI was calculated for each of the 6 organizations using the formulae proposed by Asoh et al.<sup>14</sup>. This is in essence the mean score of all 32 questions. The results of the calculations are shown as KMI realized (KMIR) in the first column of Table 1.

**Realized vs. Expected Practices and CSF (Realization – Expectation Gap)**

We computed an index depicting the importance that each organization attached to each issue addressed by the 32 questions. We refer to this index as the KMI expectation (KMIE), second column of Table 1. Placed side by side, the KMIR and KMIE depict the realization and

Table 1: Sample Statistics

Organization Type	KMI Realized	KMI Expected	Composite OP
<b>Governmental</b>	<b>3.67</b>	<b>4.61</b>	<b>3.93</b>
Gov1	3.47	4.81	3.89
Gov2	3.94	4.53	3.89
Gov3	3.62	4.49	4.00
<b>Private</b>	<b>4.14</b>	<b>4.28</b>	<b>3.86</b>
Priv1	3.99	4.38	3.50
Priv2	4.30	4.27	4.26
Priv3	4.13	4.19	3.83
<b>OVERALL</b>	<b>3.91</b>	<b>4.45</b>	<b>3.90</b>

expectation gap of KM practices and CSF within each organization. The difference between the measures constitutes a gap that each organization needs to fill. These differences are depicted graphically in Figure 2.

**Performance Statistics**

The performance level for each of the 6 organizations was computed as the mean score for all 16 performance-related items on the questionnaire within the four dimensions. The results are presented in Table 1 (third column). Again, because of the small sample size, we did not investigate the relationship between the KMI and each facet of OP.

**Regression Analysis**

Based on the suggestion that the KMI is a “metric that can be used in measuring the KM health of organizations from a generic perspective – how they are doing in terms of managing their knowledge assets<sup>15</sup>,” we hypothesized that the organizational KMI will be positively related to organizational performance. Therefore our regression model is of the form:  $OP = F(KMI)$ , where  $F$  means “a function of.” The result obtained from the data is depicted in Figure 3.

Figure 2: Realization vs. Expectation on KM Practices and CSF

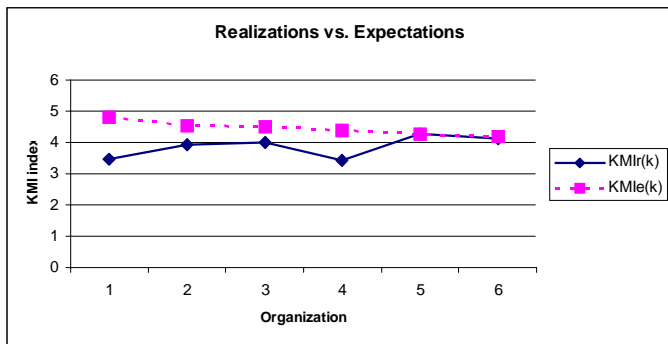
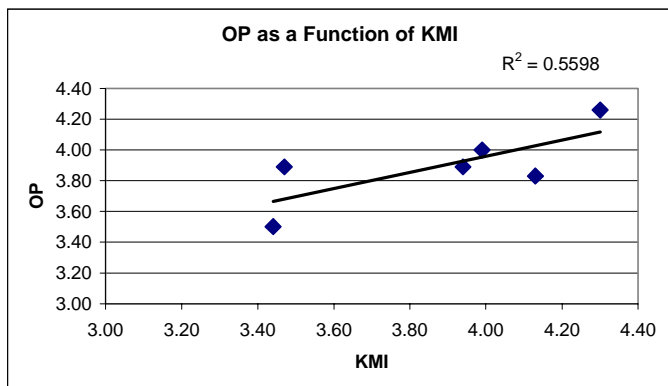


Figure 3: The relationship between the KMI and OP.



**ANOVA Statistics**

Using our dataset, we tested for significant differences in the scores for:

1. The KMIr and KMIe (all six organizations)
2. The KMIr for governmental and private sector organizations
3. The KMIe for governmental and private sector organizations
4. The OP for governmental and private sector organizations

These tests are discussed in the following section.

**DISCUSSIONS AND FUTURE RESEARCH**

In this concluding section of this paper, we discuss our findings in the light of our research questions. We point out some limitations of the study and indicate directions for future research.

**The reality and expectations of KM Practices and CSFs**

Generally, most of the organizations expect more from their KM practices and CSFs than what they have actually realized (see Table 1 and Figure 2). However, comparing the government and private sector organizations, one can see that government organizations relatively overestimate their realizations more than the private sector organizations do. The realization – expectation gap (KMIe minus KMIr) is higher for government organizations than private organizations. Based on our ANOVA test, we obtained evidence at the 1% level that KMIr and KMIe are significantly different for the organizations in our sample. Based on observations of the means, we note that the KMIe is significantly greater than the KMIr.

In examining the KMIr for governmental and private sector organizations, we found a significant difference in KM realizations between public and private organizations; the later being higher. This conclusion is not surprising giving that KM is relatively new in governmental settings.

In terms of KM expectations, we found evidence at the 5% level that the expectations are significantly different in government organizations (higher) compared to private organizations.

One reason why realizations in government organizations are much lower than expectations may be that in these organizations, KM has yet to make significant penetration compared to the private sector. This can be understood from the perspective that formal KM is a movement that originated in the private sector; and government organizations are only getting into it now. When expectations are higher than realizations, our recommendation to organizations (government and private) is that they should review their strategic choices and allocate sufficient resources to KM.

**The Parsimonious Nature and Utility of the KMI**

The KMI as discussed in this research is the result of determining the mean of the scored answers to 32 questions. Because these questions are straightforward and relate the organization’s KM practices and CSFs, organizing a company-wide survey and analyzing the results is relatively simple compared to other approaches cited here. However, the KMI can be appropriately handicapped depending upon the KM practices pursued by the firm.

For example, a firm that chooses the knowledge codification strategy<sup>16</sup> might be more inclined to focus on the elicitation process stage and on technology as the CSF. On the other hand, a firm that adopts a personification strategy might be inclined to emphasize the utilization process stage and the culture CSF. What this analysis suggests is that the utility of the KMI could be enhanced by introducing weights for each element in the process and CSF dimensions of Belardo’s matrix. Applying weights to the elements of the Matrix should not be done in an arbitrary manner. We recommend that organizations organize group decision conferences in which stakeholders can provide input that can subsequently be used to establish the weights.

**The Relationship Between the KMI and OP**

In comparing the government and private sector organizations, we did not find evidence of any significant difference in the performances

of these organizations at the 5% level of confidence. This is in line with the earlier observation of no significant differences KM realizations (KM<sub>Ir</sub>), which we found surprising, and attribute to sample size limitations.

Our regression analysis (Figure 3) however indicates that the KMI is positively related to OP. The correlation coefficient, R<sup>2</sup> value for this relation is 0.56. The relationship implies the KMI can predict about 75% of OP. We caution the reader on the interpretation of these statistics, which are not generalizable, and which are obtained from a small sample size. Nevertheless, we think the KMI is a useful metric for gauging the status of KM in organizations, and it can also serve as a proxy or predictor of OP.

#### Limitation of This Study

Although many limitations can be elaborated concerning this study, we maintain that it is preliminary work that has to be extended. The first limitation stems from the sampling. A random sample would be more useful in future work. This will ensure that the results can be generalized. Another limitation is associated with the sample size. A large sample size would provide more meaningful results, which may even be contrary to what we have found in this study. Furthermore, given a large sample size more elaborate analyses could be performed. For example, control parameters such as industry type, age of the organization, and environmental characteristics, just to mention a few can be introduced.

#### Conclusions and Future Research

In this paper, we reported the results of preliminary work geared toward the validation of the KMI construct. Although our sample size was small, our analyses indicate that most organizations have a high KMI. However, the organizations expect more from their KM practices and CSF than these practices and success factors can actually offer. Furthermore, we noted that the KMI is positively related to OP and could serve as a predictor of OP. As noted earlier, these conclusions should be interpreted with caution.

Our future research would focus on addressing the limitations cited above. In addition, we would investigate the relationships between the elements of the two dimensions of Belardo's Matrix and OP (i.e. the relationship between individual KM practices and OP and the individual CSFs and OP could be investigated.) More than that, comparisons at the level of cells (for both, KM<sub>Ir</sub> and KM<sub>Ie</sub>) in the Matrix should be investigated to assess relationships between KM practices and CSFs. We hope that results from such extended investigations would be beneficial to managers and academicians alike.

#### ENDNOTES

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See also footnote 3

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