Measuring the impacts of knowledge management

Jong-Ae Kim
Ph.D, Manager
Dongbu Information Technology Co., Ltd.
RTE Consulting Center
Seoul, South Korea
Work Phone: 82-2-3449-2373
Fax: 82-2-3449-2392
Email : jongae_kim@yahoo.com
jongae_kim@dongbu.com

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Abstract

With the growing popularity of knowledge management, the need for frameworks for evaluating the impacts of knowledge management on organizational performance has been recognized by practitioners. Despite the wide implementations of knowledge management, there is yet no standardized framework for measuring the performance within organizations. This paper provides an overview of the approaches to evaluate the contributions of knowledge management implementations to organizational performance. It presents methods such as return on investment, balanced scorecard approach, qualitative case studies, and success case method to aid practitioners to identify and develop the evaluation frameworks. Thus, it seeks to serve as a foundation for further research and development.

Introduction

Confronting today's knowledge-based business environment, companies have implemented knowledge management as a new management technique that can increase competitive advantage. Knowledge management (KM) refers to "a broad collection of organizational practices and approaches related to generating, capturing, disseminating know-how and other content relevant to the organization's business" (American Productivity and Quality Association, 2002). Sveiby (1997) defines knowledge management as "leveraging the intellectual assets of the company to meet defined business objectives." With increasing investments in KM implementations in many organizations, measuring organizational benefits of KM initiatives has become an important agenda among KM practitioners. To maintain continued support of decision makers, practitioners need to ensure that KM strategies have

contributed to the organization's performance improvement. Given that gaining continuous support from decision makers is a critical factor for a successful KM initiative, the measurement of KM performance is considered important.

Despite that the methods of evaluating KM performance have been widely studied, no consensus has been reached yet. Although it is difficult to demonstrate direct linkages between KM and an organization's performance, the efforts to examine the interrelationships between the two have been made using both quantitative and qualitative approaches. This paper provides an overview of the approaches to evaluate the impacts of KM implementations on organizational performance as an effort to aid practitioners to identify frameworks for KM performance evaluation.

Frameworks for evaluating knowledge management performance

KM practitioners are often requested to provide empirical evidence that KM initiatives contribute to corporate objectives. Measuring how much a KM implementation contributes to business benefits can be a challenge because it deals with something intangible. It is not simple to evaluate the impacts of KM strategies on an organization's performance because KM may not be the only factor influencing the organization's performance. It may be affected by other factors such as competitive environment and industry conditions. However, KM initiatives should be able to demonstrate their value and benefits in order to gain continuous support from a variety of stakeholders. Thus, to demonstrate that KM initiatives have created value and benefits, the contributions of the initiatives must be measurable.

Teruya (2004) categorizes KM performance measurements into three general types: internal measurement, external measurement, and inferred value measurement. *Internal measurement* evaluates how well KM strategies are implemented. Performance evaluation of KM strategies can be done using various methods such as surveys, interviews, and satisfaction ratings. The internal measurements often employ subjective measures that quantify one's perceptions by assigning values and weights. *External measurement* involves numerical or financial analyses such as return on investment and benefits to the organization incurred by implementing KM. *Inferred value measurement* is based on speculation and often captures anecdotal benefits.

Academics and practitioners have made efforts to develop the frameworks for evaluating the performance of KM practices. Bose (2004) emphasized the importance of standardized KM metrics to quantify knowledge and convince stakeholders of the value of KM initiatives. With the need for standardized KM metrics, he also asserts that unique standards for measuring intellectual capital and KM initiatives need to be created by each company. Del-Rey-Chamorro et al. (2003) present a framework to evaluate the contributions of KM implementations to corporate objectives using a set of key performance indicators. Gooijer (2000) proposes an approach to measure the performance of KM practices in public sector agencies. He developed the knowledge management performance scorecard, which is a KM performance framework based on the BSC approach. The framework aims to measure the impacts of KM on an organization's operations. In recognition that KM performance should be considered in a comprehensive business performance context, the knowledge management performance scorecard adopts the BSC as an overall business performance framework and embeds the KM performance elements across the framework. Given that public sector

agencies have different objectives and strategies from commercial enterprises, Gooijer recommends modifying the elements of the four perspectives on the BSC to reflect unique characteristics of public agencies. For example, the concept of the customer on the BSC needs to be redefined in the context of public sector agencies. Darroch (2003) developed the knowledge management scales to examine the associations between KM practices and firm performance. The knowledge management scales enable managers to identify gaps and implement effective strategies to improve KM practices in organizations. The knowledge management scales help evaluate which areas in KM practices in an organization are well developed and which areas are less developed.

Return on investment in knowledge management

In the projects of developing knowledge management systems, it is often required to calculate return on investment (ROI) of the projects based on objective data and measurable results. Calculating the return on investment helps justify the resources invested in KM initiatives and assess financial performance of the initiatives. In terms of cost and benefit, the ROI calculation may be done simply by dividing the value of benefits by the cost spent on the project (Haugh, 2002). Both the costs involved in the development of a knowledge management system and additional costs such as employee time spent in the operations of the system should be considered. The method proposed by McDermott (2002) to calculate ROI of the communities of practice (CoP) can be adopted to estimate ROI in general KM activities. McDermott suggests that a KM practitioner can ask people in the organization to estimate savings in time and cost and financial benefits incurred by KM activities to come up with the value and benefits that the KM activities have created. Additionally, s/he can ask them to estimate what percentage of the benefits or savings can be directly attributed to the KM activities and how certain they are about that number. By multiplying the numbers, the return on investment in the KM activities can be estimated.

Reported savings = Estimated savings and benefits * Percent attributed to KM activities * the degree of certainty

Although the estimation relies on the individual judgment, not the objective data, it can provide decision makers with the information they need to determine whether the investments in KM practices has created value.

There have been debates among academics and IT specialists as to whether measuring the ROI in IT projects is desirable. Numerical values derived from the assessment of the costs and benefits may be preferred by decision makers. That may be the reason that evaluating the ROI from the fiscal standpoint has been often demanded by top managers. Some IT projects are well suited for the assessment of ROI. Examples may include call center systems and billing applications. However, certain aspects of the return may not be measured in pure fiscal methods. KM projects are not as straightforward as call center systems or billing applications in terms of calculating the ROI. It is difficult to discern the return on investment in a KM initiative from business financial data because the impacts of a KM initiative cross many business processes, and financial data are affected by various other factors. Due to the limitations of calculating ROI in IT projects based solely on financial performance, new ways of evaluating the value of IT investments have been called for. Recent trends in research in IT investments tend to emphasize nonfinancial returns such as improving customer satisfaction and improving the quality.

Balanced scorecard approach

The balanced scorecard (BSC) was developed by Kaplan and Norton (1992) to complement traditional financial performance measures and provide a balanced view of both financial and operational measures. The BSC presents four perspectives of performance measures: financial perspective, customer perspective, internal business perspective, and innovation and learning perspective (Figure 1). Customer perspective on the BSC concerns how well a company meets customers' expectations. Customer-based measures may include customer satisfaction, on-time delivery defined by the customer, and price performance. Internal business perspective focuses on business processes that a company should do to meet its customers' expectations. The internal process measures may include cycle time, quality, cost, and productivity. Innovation and learning perspective focuses on a company's ability to innovate and learn, which enables the company to continue to make improvement and create value. The customer-based and internal process measures identify the most important drivers for the company's competitive success. However, they are not able to show that the company has the ability to make continual innovation so that the company can achieve continuous improvement in customer satisfaction and internal business processes. The innovation and learning measures may include new product introduction, sales from new products, and process time to maturity. Operational measures such as customer satisfaction, internal processes, and innovation and improvement activities are the indicators that can drive the organization's future financial performance. Financial perspective concerns whether a company performs well in terms of profitability, growth, and shareholder value. Financial performance measures include cash flow, sales growth, and ROE. Financial indicators tend to show the consequences of actions already taken and do not represent the company's current performance in creating value. Some suggest that if a company takes care of its operating performance, financial success will follow (Kaplan & Norton, 1993). However, improvement of operational performance does not necessarily lead to financial success. So, the BSC seeks to provide a comprehensive view of the business by incorporating both financial and operational measures in one report, thereby compensating for the limitations of presenting just one perspective. This way, the BSC enables senior managers to ensure that improvement in one aspect of organizational performance is not the result of sacrificing another (Kaplan & Norton, 1992).
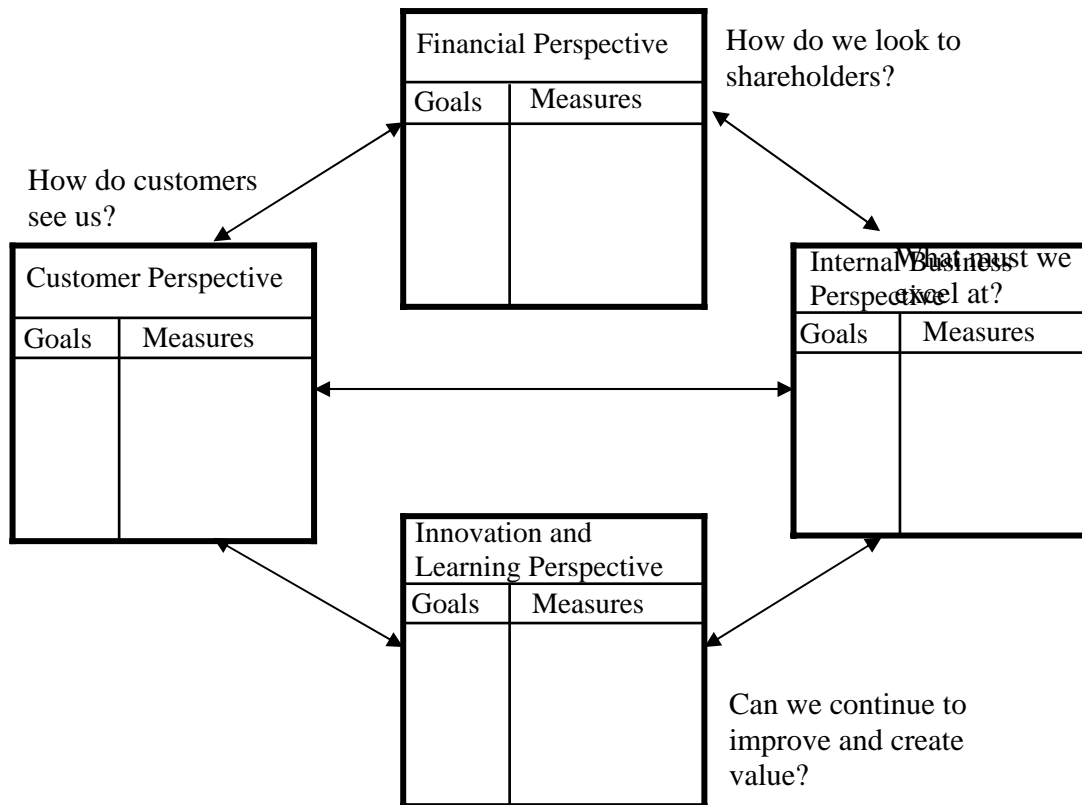
Figure 1. Balanced scorecard

When a company develops a BSC, it should establish general goals and specific goals for each perspective on the BSC and identify appropriate measures based on the goals. Limiting the number of measures within each of the four perspectives on the BSC helps the company focus on the most critical strategic objectives and competitive agendas. An important task of companies implementing the BSC is to make appropriate linkage between operations and finance based on the companies' business objectives and strategies. The chains of cause and effect link the measures of the four perspectives on the BSC. Causal relationships among the measures are based on hypothetical assumptions of causes and effects. It should be noted that measures of customer satisfaction, internal process, and innovation and learning reflect the company's particular view of the business environment, but it is not guaranteed that the view is correct.

Epstein and Rejc (2005) developed an IT balanced scorecard that includes a list of measures for evaluating IT performance based on the BSC approach proposed by Kaplan and Norton (1992). The IT balanced scorecard is a framework that aids an organization to identify and assess the cost and benefits of IT projects. It can be used to justify an IT initiative at a planning stage and to evaluate it after the initiative has been implemented. Epstein and Rejc recommend that an IT balanced scorecard should not include too many drivers and complex causal relationships between the drivers to help managers focus on key issues. They suggest that a complete IT performance measurement system include no more than 20 measures. Also, it is important to modify the IT balanced scorecard as circumstances change to reflect changed priorities.

Arora (2002) suggests that organizations can effectively implement KM by developing and applying a KM index based on the BSC. The KM index reflects the progress of KM across the four perspectives on the BSC. Although measures of a KM index should be developed by each organization to reflect the organization's unique objectives and KM strategies, Arora identifies some generic measures of KM performance. The generic measures include the amount of codification of tacit knowledge, popularity and importance of the codified repository, usage of the repository items, currency and relevancy of the repository, level of collaborations, new products/practices introduced or problems solved by communities, and intellectual capital. The number of measures in a KM index should be limited to minimize a managers' information overload. To achieve this, the measures identified should be reviewed and prioritized by considering the importance and relevance of each measure. When prioritizing the measures, weight may be assigned to the identified measures. It is desirable for senior managers who have a comprehensive picture of the organization's vision and priorities to be involved in developing a KM index. Kaplan and Norton (1993) point out that a BSC cannot be applied to any business in general or even organizations in the same industry. The same can be said with KM. It is not recommended to apply the same KM index to two different organizations in the same industry (Arora, 2002). Also, it is important to modify the KM index as the company's strategies change and the maturity of the KM implementation progresses.

Qualitative case studies

Given that some types of benefits are not quantifiable, the qualitative case study approach can be valuable in evaluating the performance of KM. The qualitative case study approach seeks to uncover meaning by analyzing rich, non-numerical information in a context of a particular case or multiple cases. Teruya (2004) points out that well-researched and supported qualitative findings are better than quantitative examples whose basis and methods are suspect. The qualitative case study approach can be implemented using a variety of methods including interviews, focus groups, observations, and analyses of existing paper or electronic documents. The interview method refers to a flexible technique that investigates interviewees' expectations and perceptions on a specific issue with a question framework that will yield reliable responses. The focus group method refers to a group depth interview that seeks to gain detailed comments and feedback on a specific issue from a group of people. The focus group method can be conducted both in-person and through Web-based chat sessions. The observation method is an unobtrusive method that does not intrude upon people participating in a case study by observing them in a field setting. In qualitative case studies, the use of a data collection matrix is recommended as a tool to guide the entire data collection process (Creswell, 1998). The data collection matrix includes information such as where the needed data is and what tools and procedures can be used to collect the data, thus helping ensure that all the data is collected from the right source(s) (O'Connor, 2002).

The analysis of existing paper or electronic documents is also a useful qualitative approach in evaluating KM performance. In KM practices, this method can be applied to analyze communications among CoP members, messages posted on a bulletin board, and questions and answers posted on a Q&A page to identify how KM activities influence the members' job performance. In addition, the qualitative case study approach can be used to explore the impacts of CoP activities on organizational performance.

Success Case Method

Success case method (SCM) also provides an effective framework to measure the impacts of KM implementations on organizational performance. The SCM was originally developed in the human resource development field to evaluate the return on training investments. It was developed by Brinkerhoff (2003) to address the less effectiveness of traditional evaluation approach in reporting success cases in the program evaluation field. Motivated by the need to evaluate training's effect in a broader context of performance management than traditional evaluation models did, the success case method seeks to identify the success in the training-to-performance process as well as the weakness in the process. It is also intended to help understand "what worked, what did not, what worthwhile results have been achieved, and most important, what can be done to get better results from future efforts" (Brinkerhoff, 2005, p.90). The SCM is based on the notion that we can learn how to improve the performance of a program best from those who have been the most and least successful. By applying qualitative methods, the SCM can pinpoint the extremes that quantitative methods such as central tendency measures cannot.

The SCM aims to illustrate intentionally the best practices that training has produced, but it is important to prove that the implementation of the organizational change program has caused the positive performance. By analyzing the cases in which the organizational change program did not lead to the positive performance, one can elicit the factors that impede the positive performance of the program. Also, by comparing these factors with the factors that lead to success, adequate strategies to produce better performance can be developed.

The SCM consists of two parts: locating likely success cases and identifying and documenting the success cases. The survey method is often used to locate potential success cases by investigating people's perceptions and behaviors. However, various other methods such as analysis of usage records or performance data can be used to locate success cases. Once the success cases are located, the interview method is employed to probe, understand, and document the actual nature of success. Through interviews, a researcher can screen the cases to find whether they are verifiable and documentable and gather the evidence of the success cases.

One of the strengths of the SCM is that it is capable of identifying lack of success. The SCM helps locate the instances of nonsuccess, examine the reasons for nonsuccess, compare the perceptions and behaviors of both the success and nonsuccess groups, and identify the factors leading to the success of the program and the factors impeding the positive results. In this way, the SCM helps improve the performance of the program.

Conclusion

With the growing popularity of KM, the need for frameworks for evaluating the contributions of KM to an organization's performance has been recognized by executives and KM practitioners. Despite the wide implementations of KM, there is yet no standardized framework for measuring KM performance within organizations. Thus, identifying and implementing the evaluation frameworks for KM strategies has become a challenge for practitioners who seek to justify their efforts. In order to aid practitioners to accurately understand and evaluate the contributions of KM implementations, this paper has provided an overview of various evaluation approaches.

Until establishing a standard evaluation framework for KM performance across various organizational contexts and techniques to aid the development of a unique evaluation framework in a particular organizational context, academics and practitioners should continue the efforts to develop meaningful evaluation frameworks. It is hoped that this overview will serve as a foundation for further research and development.

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