Abstract

Knowledge management (KM) has long gained acceptance as an important pillar in the organizational realm. However, the acceptance of standardized measurement systems to assess KM value has lagged behind. This is mainly due to the intangible nature of knowledge assets and the fact that no consensus has been reached on the positive effects that KM generates, which could then, in turn, be measured. A standardized measurement system would assist practitioners arguing for the introduction of KM initiatives. It would also enable managers in assessing the performance of those KM endeavors already in place. The main goal of this paper is thus to provide an overview of existing KM value measurement approaches, to evaluate these on the basis of a predefined catalogue of criteria, and to derive a new, combined model from this assessment.

1. Introduction

1.1. Motivation and objective

KM initiatives continue to receive ample attention, both in terms of commitment and resources, from top management, even if it is sometimes unclear how and to what extent KM improves an organization’s overall performance [12]. However, particularly in times of financial distress, executives will want to see hard figures regarding how KM can add value to their company and its bottom line [5]. Merely propagating the possibility of long-term cost savings or an increase in innovative capabilities – without being able to present hard evidence and agreed-upon performance indicators – will no longer be enough. It is therefore of great importance that KM managers are able to refer to a universally accepted and credible measurement model when emphasizing the necessity of KM-related spending to sustain the support of decision-makers.

This paper continues the discussion on KM value and its measurement, which was stimulated by a symposium at the 43rd Hawaiian International Conference on System Sciences (HICSS) in January 2010, entitled “Determining the Value of Knowledge Based Initiatives”. This contribution is thus embedded in the current discourse on KM value measurement and aims to contribute to this field of research in the form of a newly derived KM value measurement model and a comprehensive research agenda for the issue’s future exploration.

It should be kept in mind that there still seems to be no general consensus on what constitutes a successful KM initiative, which a study by Jennex, Smolnik, and Croasdell revealed [14]. While they provided a significant starting point for the discussion on KM success, the apparent general disparity in the literature increases the difficulty of measuring KM value. It is still not obvious exactly which performance indicators and success factors should be measured when attempting to assess KM value.

The objectives of this paper are threefold: First, it will introduce the current notion of KM value and its measurement as identified in an extensive literature review. Second, an overview of existing value measurement models will be provided. These approaches will be evaluated by means of a set of criteria developed from the literature. Based on this evaluation, the authors derived a new, combined model that will be presented. Third, on the basis of the analysis results, a research agenda will be developed for specific issues on which future KM value studies could focus.

1.2. Research approach and paper outline

This paper employs a structured literature review as the research method with which to identify and detail existing KM value measurement approaches [26]. The approaches are assessed and evaluated in the form of a comparative analysis, based on a catalogue of evaluation criteria developed from the literature. Based on this evaluation, the authors derived a new, combined model that will be presented. Third, on the basis of the analysis results, a research agenda will be developed for specific issues on which future KM value studies could focus.
The derived value measurement model is conceptualized that draws upon the presented models’ identified strengths, while alleviating their weaknesses in the best possible way. In conclusion, the paper presents a research agenda that identifies important, yet unstudied aspects of KM value measurement for future research and proposes ways in which the newly derived model could be empirically validated.

2. Foundations of KM value and measurement

The following sections aim at setting the discussion on KM value measurement against the background of current academic literature on this topic. Important terms and concepts used in the paper will be defined and disambiguated.

2.1. The integrated KMS architecture as a basis for analysis

The authors use the integrated Knowledge Management Systems (KMS) architecture by Riempp [23] as a reference framework (for other frameworks cf., e.g., [18, 29]) to illustrate where measurement efforts are conceptually located in the overall KM landscape. In addition, the integrated KMS architecture will be used as a basis to develop a catalogue of criteria to evaluate the presented KM measurement approaches. Not only does the architecture encompass strategic, technical, cultural, and process-related issues, but it also incorporates all relevant dimensions of KM and KMS. The architecture is composed of three layers (strategy, process, and system layer), intersected by four pillars, namely content, collaboration, competence, and orientation. These dimensions are all encompassed in and influenced by the organizational culture. An overview of the complete architecture can be found in figure 1.

The strategy layer subsumes and comprises the KM strategy, KM goals, as well as the measurement system, which is the most important component for the purpose of this paper. It includes key performance indicators (KPIs) to measure the degree of integration, i.e. how successfully KMS have been integrated. The process layer is composed of business, support, and, specifically, KM processes. The system layer subsumes the technical aspects of the respective KMS, i.e. how they are accessed and integrated with other applications (e.g., via a global search functionality), and how they are implemented from a technical perspective in terms of data storage and technical infrastructure. Across all the layers, there are four vertical pillars that refer to different functional KMS areas, namely content, collaboration, competency and learning, and orientation. These pillars reflect the dimensions along which KMS should be integrated.

The integrated character of the framework lends itself as an ideal basis for the analysis of KM and KMS from the different viewpoints from which KM can be assessed. The framework is not only integrated from a vertical and horizontal perspective, but also links strategic business processes with KM processes. The framework offers a linkage between strategy, process, and IT, as well as the most important areas and fields of KM and KMS application. It is constructed in such a way that each downward step is equivalent to a move from the abstract to the more concrete technical implementation. It is also structured to lead from strategic aspects to more technical, IT-related aspects [23].

Figure 1. Riempp’s integrated KMS architecture [23]

How the set of criteria for evaluating existing KM value measurement models has been derived from the strategy, process, and systems layer of the integrated KMS architecture is explained in section 3.

2.2. The notion of KM value

Value is a concept that is not universally understood. It is not an objective term and is thus not clearly defined in academic literature. Qureshi states that “value is attributed to things that people consider useful, important, or desirable” [22], which hints at the fact that it is a relative rather than an absolute concept.
This implies that organizations need to decide for themselves what the term means in their context. A number of terms are closely linked to KM value, such as “intellectual capital, knowledge capital, knowledge organizations, learning organizations, organizational learning” [1] and “information assets, intangible assets, intangible management, hidden value, and human capital” [1]. These all allude to the value of knowledge and its management. The popularity and large number of terms relating to KM value are primary indicators that organizations perceive KM as valuable.

KM can add value to an organization in a multitude of ways. It can help retain knowledge assets by codifying existing knowledge and making it available to others, can increase employees’ organizational commitment and satisfaction, and can advance customer service and teamwork [11]. Nonaka even argues that the fundamental formula for performance depends on an organization’s ability to distinguish itself in “managing the creation of new knowledge” [20]. KM may spur “increased efficiency, lower costs, improved return on investment” [20], but can also add value through more qualitative benefits such as a faster response to customers’ needs, economies of scope, an increase in innovation capabilities, and capitalizing on emerging technologies [20].

KM value is often used in conjunction with terms such as KM success, effectiveness, and performance, which should be disambiguated here. Jennex defines KM success as “improving the organization’s effectiveness” by “selectively applying knowledge from previous experiences of decision making to current and future decision making activities” [15]. In the literature, the terms effectiveness and success are typically used interchangeably [8], as “effectiveness is a manifestation of success” [14]. Success and value are definitely related concepts, but value takes a broader stance that incorporates benefits such as an increase in innovativeness that the term effectiveness may not necessarily capture.

KM performance is a concept that has two different facets, it can be split into internal and external performance: Here, internal performance refers to how well a KM initiative is implemented, which may or may not increase KM’s overall value to the organization [28]. On the other hand, external performance is similar in nature to KM value, as it typically assesses the before-and-after look of the organization’s KM with regard to how the KM initiative was able to increase overall financial performance [17] over a period of time. Among other benefits, KM can therefore provide value to an organization via time and cost savings, quality, decision-making, and customer service improvements, as well as through potential increases in innovation capabilities.

2.3. Measuring the value of KM

The preceding section has shown that KM can potentially add value to an organization in various areas. In order to realize such potentials, KM executives have to secure funding from budget holders, attain the buy-in of employees and other stakeholders, and know when to adjust their efforts aimed at a certain KM initiative. These facets of KM can be achieved by effective measurement, by qualitatively and quantitatively demonstrating KM value to different stakeholders. It is thus strategically important to measure KM value as this will sustain decision-makers’ long-term support in terms of attention, commitment, and resources. Furthermore, measurement also motivates KM staff by enabling them to visualize the results of their efforts and to identify areas for further improvement.

Scholars agree that the task of measuring KM value is anything but easy. The “elusive nature of knowledge” [2] and its inherent intangibility complicate efforts to do so. Nevertheless, researchers have proposed an array of concepts which will be presented here. A number of frameworks, such as the ROI approach or the balanced scorecard method, have been adapted from disciplines unrelated to KM, whereas others have been developed specifically for the KM realm. The frameworks and models this paper will depict and evaluate are: the ROI approach, the individual productivity model, the external view productivity measure, the balanced scorecard approach, qualitative case studies, the success case method, and KM benchmarking initiatives. Table 1 depicts an overview of these existing approaches and lists the key papers pertaining to each approach, its general measurement approach or method, and a categorization into external, internal, or inferred value measurements. These three possible types of measurement have been derived from Teruya’s analysis of KM value [25]. In this context, internal measurements refer to subjective, qualitative valuations of the KM team’s effort to implement the KM strategy as well as the quality of the department’s operation in general. Such a measurement could be executives’ codified reactions to a presentation on KM. The internal value category of measurements is thus, by nature, susceptible to intentional or unintentional skewing of results in any direction. External measurements, on the other hand, are usually quantitative in nature, and aimed at comparing the before-and-after state of an organization introducing a specific KM initiative.
Measurements in this category could, for example, include the ROI of a KM initiative. The third and last possible category of value measurements, inferred measurements, is “based on speculation, hypothesis, and conjecture” [2] and can rarely be expressed in hard figures but rather in anecdotes and stories. A measure in this category could be an increase in the pervasiveness of knowledge in an organization [25].

This paper will not cover or further pursue inferred measurements, as they are, by definition, subjective and based on speculation. This renders them unsuitable for the planned standardized and valid measurement model. External and internal measurements offer a higher degree of reliability. It should be noted, however, that it would be pretentious to claim that all changes in a firm’s operating profit come from effective KM. In addition, there are a number of extraneous variables that can substantially affect external measurement metrics, such as the current economic climate or changes in the regulatory environment, which an organization cannot control. It thus is too short-sighted to simply use the change in profits from one year to the next as a metric for KM’s value-adding benefits. Most measurement models have found ways to mitigate this difficulty, which will be further described in the analysis of the individual models.

### 3. Comparative analysis of existing approaches

The authors identified seven approaches to measure KM value that have been proposed in academic literature. The approaches were selected on the basis of their current level of sophistication, recognition in academic literature, and specificity to KM value. Approaches that mainly focus on valuating existing knowledge assets, rather than including their management, such as the Skandia navigator [7, 9], Sveiby’s intangible assets monitor [24], and intellectual capital indices, were excluded from the analysis.

In order to allow for a fair and comprehensible evaluation of the selected models, a catalogue of assessment criteria has been derived from the strategy, process, and system layers of Riempp’s integrated KMS architecture. In addition, criteria to assess general model quality factors will be applied to each model. These general assessment criteria include the cost of applying the model, its internal consistency, and whether it follows the parsimony concept. A model’s inner workings should be as simple as possible and only use measures that are absolutely necessary to

<table>
<thead>
<tr>
<th>Model</th>
<th>Approach</th>
<th>Category</th>
<th>Key papers / authors</th>
</tr>
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<tbody>
<tr>
<td>Success case method</td>
<td></td>
<td>Internal measurement</td>
<td>Breukerhoff 2003</td>
</tr>
<tr>
<td>Qualitative case studies</td>
<td></td>
<td>Internal measurement</td>
<td>O’Connor 2002 [21]</td>
</tr>
<tr>
<td>Balanced scorecard approach</td>
<td></td>
<td>External &amp; internal</td>
<td>Kaplan 1992 [16]</td>
</tr>
<tr>
<td>External view productivity measure</td>
<td>Using organizational productivity based on KM as an indicator for KM value</td>
<td>External measurement approach</td>
<td>Jennex 2008 [13]</td>
</tr>
<tr>
<td>Individual productivity model</td>
<td>Deriving a figure for employee productivity as a measure of value</td>
<td>External &amp; internal elements</td>
<td>Jennex 2008 [13]</td>
</tr>
<tr>
<td>Return on investment</td>
<td>Dividing the value of benefits by costs incurred</td>
<td>External measurement approach</td>
<td>Cohen 2006 [6]</td>
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Table 1. Model overview

![Table 1. Model overview](image)
<table>
<thead>
<tr>
<th>Model</th>
<th>Return on investment</th>
<th>Individual productivity model</th>
<th>External view productivity measure</th>
<th>Balanced scorecard approach</th>
<th>Qualitative case studies</th>
<th>Success case method</th>
<th>Benchmarking</th>
</tr>
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<tbody>
<tr>
<td>General strengths/advantages</td>
<td>Well-known, widely accepted approach in a number of disciplines</td>
<td>Incorporates the measured and perceived value of KM from different stakeholders and perspectives</td>
<td>Easy to apply, as metrics should have already been gathered in the course of normal operations</td>
<td>Accepted tool for measuring as well as managing strategy and implementation</td>
<td>Offers deep and extensive insights from which not only KM value but also courses of action can be derived</td>
<td>Is able to choose the most meaningful, extreme cases rather than arriving at an average figure</td>
<td>Directly compares KM results to competitors' efforts, no “translation” or conversion needed</td>
</tr>
<tr>
<td>General weaknesses/drawbacks</td>
<td>Difficult to establish meaningful metrics, not comparable across organizations</td>
<td>May be costly to apply, as the proposed collection of metrics requires time and effort</td>
<td>Specifically tailored to organizations where productivity is a direct result of KM use</td>
<td>Requires an extensive amount of experience to develop a helpful balanced scorecard</td>
<td>Inherently subjective approach, may be expensive to perform recurrently</td>
<td>Expressive power depends on how well extreme cases are chosen</td>
<td>Results may be less meaningful if benchmarking group is homogenous</td>
</tr>
<tr>
<td>Measuring direct and indirect effects</td>
<td>Depends on the chosen metrics, but typically focuses on direct effects</td>
<td>Incorporates both, as productivity is the result of direct and indirect effects</td>
<td>Incorporates both, as productivity is the result of direct and indirect effects</td>
<td>Depends on the individually chosen metrics</td>
<td>Typically able to capture both types of effects through qualitative analysis</td>
<td>May miss certain effects through the focus on specific cases</td>
<td>Can incorporate both types of effects, depending on the measures chosen</td>
</tr>
<tr>
<td>Measuring short and long-term results</td>
<td>Depends on the chosen time-horizon, (can be applied retrospectively or future-orientated)</td>
<td>Focus is on achieved past productivity, which incorporates short and long-term effects</td>
<td>Focus is on achieved past productivity, which incorporates short and long-term effects</td>
<td>Can be easily configured to incorporate short and long-term results</td>
<td>Possible, depends on how the cases are set up and structured</td>
<td>Depends on the time-period of the chosen cases</td>
<td>Usually is an on-going effort and can thus capture short and long-term effects</td>
</tr>
<tr>
<td>Capturing tacit as well as explicit knowledge</td>
<td>Depends on the benefit measures selected, but typically, only explicit knowledge is monetized</td>
<td>Indirectly, as individual productivity reflects tacit as well as explicit knowledge use in the organization</td>
<td>Depends on how well productivity reflects knowledge use in the organization where the model is applied</td>
<td>Depends on the metrics chosen for the balanced scorecard in question</td>
<td>Focus typically on tacit knowledge, but analysis of explicit knowledge can be integrated</td>
<td>Depends in part on the features of the extreme cases chosen for analysis</td>
<td>The benchmarked metrics can be chosen to capture both tacit and explicit knowledge assets</td>
</tr>
<tr>
<td>Cost of application</td>
<td>Depends on the sophistication of benefits measurement, but generally high</td>
<td>Moderate, as a large number of stakeholders might have to complete surveys</td>
<td>Low, as no new metrics have to be measured</td>
<td>Time-intensive to create, but can forgo the use of costly surveys</td>
<td>Typically expensive, involves a number of resources and a stakeholder</td>
<td>Can largely be based on existing secondary documentation</td>
<td>Depends on the measures chosen and what it takes to gather them</td>
</tr>
<tr>
<td>Internal consistency</td>
<td>Fully</td>
<td>Fully</td>
<td>Fully</td>
<td>Depends on how well-structured the process of assigning importance to parameters is</td>
<td>Is subject to how the organization goes about the process of applying the approach</td>
<td>Fully</td>
<td>Is subject to the used process of applying the approach</td>
</tr>
<tr>
<td>Parsimony</td>
<td>Effort to gain input measures can vary</td>
<td>Depends on the extent of measurements efforts</td>
<td>Follows the concept of parsimony</td>
<td>Fully; inherent focus on most important aspects</td>
<td>Costly, but offers valuable insights to balanced</td>
<td>Can be performed with limited time and capital resources</td>
<td>Follows the concept of parsimony</td>
</tr>
<tr>
<td>Reliability and validity of measures</td>
<td>Chosen by the applying organization</td>
<td>Valid, but chosen individually &amp; thus not necessarily reliable</td>
<td>Fully</td>
<td>Chosen by the applying organization</td>
<td>Chosen by the applying organization</td>
<td>Chosen by the applying organization</td>
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Table 2. Model evaluation
while there are a number of concepts for measuring within the sample that each study uses. Of benchmarking, therefore they are only comparable chosen anew by the researchers applying the concept organizations. These metrics are, however, always applying the same set of metrics to a number of the benchmarking approach achieves this feat by measures that may be neither reliable nor valid. Only conclusions and actions taken as a result of using worse yet, the outcomes could be wrong, as could the analysis revealed that none of the models is necessarily easy to apply, most of them only capture explicit knowledge assets. This criterion belongs to the process category of Riempp’s framework, as it depends on the process through which an organization transforms tacit knowledge assets into explicit ones, or makes tacit assets discoverable and available.

In the strategy category, two criteria were identified: A comprehensive KM value measurement model should measure KM’s direct as well as indirect effects and benefits. In addition, it should capture short and long-term KM results, rather than focusing on one point in time. A KM value measurement system should take into account tacit as well as explicit knowledge assets. This criterion belongs to the process category of Riempp’s framework, as it depends on the process through which an organization transforms tacit knowledge assets into explicit ones, or makes tacit assets discoverable and available.

The results of the comparative analysis are found in table 2. In addition to the pre-defined criteria, it lists each model’s general advantages and strengths, as well as its weaknesses and drawbacks. In summary, the analysis revealed that none of the models is necessarily easy to apply, most of them only capture explicit knowledge, and their application cost is generally high, as extensive surveys have to be carried out in order to arrive at the measures they require.

One of the major shortcomings of the models analyzed here is that the organization wanting to apply the model has to choose the metrics. This makes it impossible to compare the results across organizations and could result in the misinterpretation of results. Worse yet, the outcomes could be wrong, as could the conclusions and actions taken as a result of using measures that may be neither reliable nor valid. Only the benchmarking approach achieves this feat by applying the same set of metrics to a number of organizations. These metrics are, however, always chosen anew by the researchers applying the concept of benchmarking, therefore they are only comparable within the sample that each study uses.

The comparative analysis has, above all, shown that while there are a number of concepts for measuring KM value, none of the presented approaches is yet standardized or widely accepted by practitioners and scholars alike. Most models are quite generic, with no pre-defined measures and metrics. This makes it difficult to compare their results across organizations. Consequently, this paper proposes a new, derived model that incorporates a set of pre-defined metrics that any organization can gather, regardless of the nature of the KM initiatives in place or the industry. This model is based on an accepted, widely known framework.

4. Towards a combined model of KM value measurement

The following sections describe the proposed model and its base framework in detail and suggest ways in which the resulting measurement approach could be empirically validated.

4.1. Development of a combined model

The model that the authors derived from the results of the analysis of existing KM value measurement models is based on the ROI approach, combined with the individual and external view productivity approaches. The ROI approach is an accepted and credible tool in a variety of disciplines and general project-based work. Using an established base allows the proposed model to be easily understood by KM experts and senior business executives alike. In addition, the newly derived model tries to mitigate some of the identified weaknesses of the presented existing models by providing a clear set of measurement metrics that only need to be adapted in special cases. It therefore allows a greater comparability of the results when the model is applied across organizations. While every KM initiative and organization is unique, the authors believe this step is helpful in advancing the measurement of KM value, as it makes it easier for KM executives to apply the model, and allows broad benchmarking of the results across organizational, industry, and country borders.

Figure 2 depicts the new model. The ROI approach works by dividing the net value of the KM initiative by this initiative’s total costs. The result is expressed in percent and can thus be calculated as follows:

\[
\text{ROI} \, (\%) = \frac{\text{(Gain from Investment - Cost of Investment)}}{\text{Cost of Investment}} \times 100
\]

When the original ROI approach is applied to KM initiatives, the main difficulty is that there is no clear, standardized process that allows organizations to determine the gains from their KM investment. While
the cost figure is usually obvious, the benefits are intangible and often indirect. To simplify this approach, the new model includes the following metrics for arriving at a figure for the benefits of KM: The time saved per employee through the use of KM, applying information obtained via KM use to business needs (such as sales and customer service), general product or service quality enhancements through the use of KM, and the increase in inter- and intra-corporate networking among stakeholders resulting from the application of KM. These metrics can be obtained through employee survey questions such as “I was able to save X percent of time through KM use” in the case of the time-saved-metric, “The information I obtained through the use of KM enabled me to effect a sale or contract” when trying to assess the effectiveness of KM in obtaining relevant information for business needs, or “The information I obtained for my daily work through the use of KM enhanced my work quality” when attempting to establish a value for quality enhancements through KM. The metric values should be expressed as a percentage figure. In addition to such self-ratings through surveys delivered directly to employees, third-party ratings by, for example, supervisors or managers could be used to gauge the listed KM benefits. Moreover, objective data such as performance records may be incorporated into the process of quantifying the listed metrics in order to add credence to the model results.

The presented metrics were chosen so that they cover the benefits of a broad range of KM initiatives but are, at the same time, non-initiative-specific. They reflect the various knowledge application areas of Riempp’s integrated KMS architecture. The metrics were chosen so that a minimal response time for employee questionnaires was ensured, while maximizing the benefit of gathering each metric. This warrants that the model’s application is cost-effective. Four metrics were selected in total to establish a balance between the need for an accurate measurement result and the practicability of the model in terms of the time and resources needed for its application. Responses could be gathered through an online survey system, which further ensures that costs will be contained and the proposed approach’s parsimony, as no metric is of such a nature that it would require an extensive qualitative feedback gathered by a human interviewer. Moreover, the model could be re-applied at specific points in time to allow consistent measurement of potential value improvements. By incorporating a networking metric, the model integrates long-term as well as indirect KM effects, since the results of an increase in inter- and intra-corporate networking will particularly in the long run positively affect other KM outcomes, such as quality and innovativeness. The proposed measures are reliable and valid, they measure what they are supposed to measure and should return similar results on a number of measurement instances.

When estimating the cost figure for the KM initiative under scrutiny, all possible cost items, direct or indirect, should be taken into account. These include the proposed KM solution’s initial architectural design, its actual development or purchase costs, a proportional fraction of the KM teams’ annual salary, the KM solution’s ongoing infrastructure costs, and, if applicable, a cost per user figure, if the costs increase with each new user.

\[
ROI_{KM} = \frac{(\text{Gain from Investment} - \text{Cost of Investment})}{\text{Cost of Investment}} \times 100
\]

Figure 2. Proposed KM value measurement model
The process of applying the model can be divided into three steps: First, the metrics are obtained through the use of an employee survey. Sample questions were provided at the beginning of this section. The survey should be administered to a randomized sample group, as choosing a specific department or employee entity that is either a heavy or infrequent user of KM may skew the results. Second, the measured metrics are assigned a monetary value. In the case of time saved per employee, this can be done, for example, through the use of the employees’ salary plus benefits to evaluate their time. While it is debated whether employees always use freed time productively [6], this is assumed here, as this issue has to be dealt with in each organization. In addition, the total costs of the KM initiative are summarized in this step. Third, the obtained values are fed into the presented ROI formula, which results in a single percentage figure as the value of a specific KM initiative. This suggested process can be used by any organization applying the model and thus makes the model easy to use, as KM executives simply have to follow the proposed steps to arrive at a meaningful result.

The model thus accomplishes to arrive at a single figure that represents the value of KM, while taking into account the difficulty of assigning numeric values to propagated KM benefits, such as the amount of time saved by employing KM. In addition, the model’s results are comparable across organizations, as it provides pre-defined metrics that leave little room for subjective interpretation and intentional or unintentional skewing. The metrics are flexible enough to accommodate a broad range of KM endeavors, but are simultaneously explicitly tailored to KM and its specificities. A clear process outline has been presented that shows how the model could be applied.

4.2. Proposed model validation

The newly developed model has been derived from a literature review of existing models and has thus not yet been applied to a real-life organizational setting. The authors propose to validate the model in the near future, which could potentially be undertaken by using a variety of approaches. There are three suitable ways in which the model could be validated: First, an explorative, qualitative study could be conducted, using expert interviews [10, 27]. This would allow the authors to refine the model based on KM practitioners’ feedback. Second, multiple case studies could be prepared from a variety of industry sectors and employee groups. This would allow the authors to achieve an in-depth performance evaluation of the model and to derive additional, meaningful input through the use of case analysis techniques. Third, the model could be applied in a larger, quantitative study, in which the results of the model can be benchmarked against the results of other approaches and against the participating firms’ subjective assessments of KM value by an independent party. Here, surveys would be chosen as a means of gathering information about the metrics included in the model.

Potential interview or case study research partners could, for example, be KM decision-makers. The organizations in which any of the approaches outlined above are to be applied should represent a broad range of industries, as the model should not only be applicable to knowledge-intensive organizations and industry sectors, but universally across organizations with different characteristics. For an explorative, qualitative evaluation of the model and its inner workings, the interview partners should be selected with regard to their experience in measuring KM to ensure they have a sufficient knowledge base to evaluate the proposed model in comparison to the existing approaches the organization currently uses. Such a qualitative validation should be a first step in validating the model, after which the insights provided by the study can be fed back to the model, thus further refining it. A second step could be the proposed quantitative validation in order to see if the refined model holds for a larger group of firms, industries, and organizational settings.

5. Research agenda

The analysis of theoretical literature as well as the assessment of existing KM value measurement models has shown that this is still a new research field. Most existing models are in conceptual stages or of a generic nature. The derived value measurement model that the authors proposed has yet to be empirically validated. Consequently, the authors aim at developing a structured agenda for future research in this section; issues and research questions are suggested that require further exploration.

The literature review that has been carried out to present the foundations of KM value showed that to date there is no clear definition of KM value. The symposium on KM value in the context of the 43rd HICSS instigated a discussion on possible definitions and aimed at reaching consensus. The results of this discussion have been collated and will be published in a special issue of the International Journal of Knowledge Management. It goes without saying that trying to measure something that is not well understood in the first place is a difficult task. The paper at hand thus used a working definition of KM value that stresses the relative nature of the term value.
Another issue that future research could examine is the consequences of the failure to measure KM value. It has been stated in the theoretical foundations of this paper that measuring KM value serves a variety of purposes and may prove to be an essential component of managing knowledge. It would be interesting to see how KM develops in organizations that do not measure its value, for example, if top-level executives acknowledge the necessity of employing KM without needing explicit proof in the form of value measurements.

In order to gain further acceptance among researchers and practitioners alike and to refine the existing measurement approaches, additional quantitative as well as qualitative studies should be carried out to test the underlying assumptions, approaches, and measures of each model. This includes the developed measurement model, which should also be validated as described in section 4.2. A standardized, verified model will help KM executives rationalize their choice of a specific measurement model, and will lend the approach credibility. In turn, budget holders can then be sure that the approach a KM executive is using to present a business case for a proposed KM initiative produces valid and reliable results across organizations and can hardly be skewed to fit the KM executive’s needs.

The analysis of existing models showed that most models are rather generic and do not have a set of pre-defined criteria or metrics that are easy to apply. While this is understandable in the context of the breadth of possible applications of KM and the differences in KM from industry to industry, it limits the comparability of these approaches’ results. If possible, models that have been developed in a specific industry context, should, thus, be generalized to accommodate more heterogeneous fields of application. If a model is developed from observations and interviews in practice, for example, even the choice of the observed group can result in differences in the developed model: A group of technology-savvy engineers who rely on knowledge in their daily work is more likely to embrace KM tools than, for example, professional designers.

Until a standard value assessment framework has been developed, researchers should continue to devise new value measurement models or refine existing ones up to the point that a standard is established for value measurement. In addition, existing approaches should be validated empirically to gain the necessary acceptance for a standard to evolve.

6. Conclusion and limitations

This paper provided an overview of existing value measurement approaches and an extensive assessment of these in the form of a comparative analysis. As they have all been found to be lacking in one or more areas, an initial conceptualization of a new, derived model for measuring the value of knowledge management was presented. It uses clearly defined metrics and a universally accepted base framework that is known and understood by managers in- and outside the KM discipline. A number of ways in which this new measurement model could be empirically verified were proposed. This is an important step in the development of the model, as it should be reviewed and assessed by experienced practitioners in order to gain acceptance. This empirical validation is still lacking, which is currently an inherent limitation. However, the authors plan to carry out the proposed validation methods in the immediate future. While the purpose of the paper was to present an easy-to-follow measurement approach for the value of KM, it acknowledges that the proposed model cannot measure every single KM benefit. In addition, the metrics of applying information gained through KM to business needs and of quality enhancements through KM use may be difficult to separate in practice: results collected for these metrics might be overlapping, especially if there is no standardized questionnaire at hand to assess the metrics. In some cases, it may be meaningful or even necessary to supplement the model with the use of anecdotes or stories. The latter can convey the softer benefits of KM, such as an increase in innovative capabilities, which is hard to grasp through numeric values. Future research should also cover how such stories can be added to purely numeric models in order to increase their level of precision. The suggested research agenda has distinguished important issues in the future consideration of KM value, and has shown which questions still need to be answered.

7. References


