IMPROVING ORGANIZATIONAL PERFORMANCE BY A KNOWLEDGE RELATED MEASUREMENT- AND MONITORING-SYSTEM

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Abstract

Measuring knowledge related performance in organizations usually is conceptualized on the basis of a strategic resp. top down-approach of KM measurement. Unfortunately, such a strategic approach has some important disadvantages: (1) It is difficult to get commitment from senior managers regarding the investment into strategic KM projects; (2) Due to the complexity of the organizational system it is difficult to show the impact of KM on organizational performance; (3) Operational KM projects often are out of focus for top managers since decentralized activities seem not to have the potential to convince senior managers of the impact of KM on organizational performance. In this paper it is shown how the actual weaknesses of measuring knowledge related performance can be overcome by a knowledge related measurement- and monitoring-system. This will be made clear on a conceptual level as well as on the basis of a case study.

Keywords: Knowledge Performance, Intellectual Capital, Knowledge Process Measurement.

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Keywords: Knowledge Performance, Intellectual Capital, Knowledge Process Measurement

Suggested track: Practitioner's Track

1 AIM OF THE PAPER

Actual research shows that showing evidence of the impact of knowledge management (KM) initiatives on organizational performance is still one of the key challenges in the KM community (for an overview see Holsapple 2002; cf. figure 1).

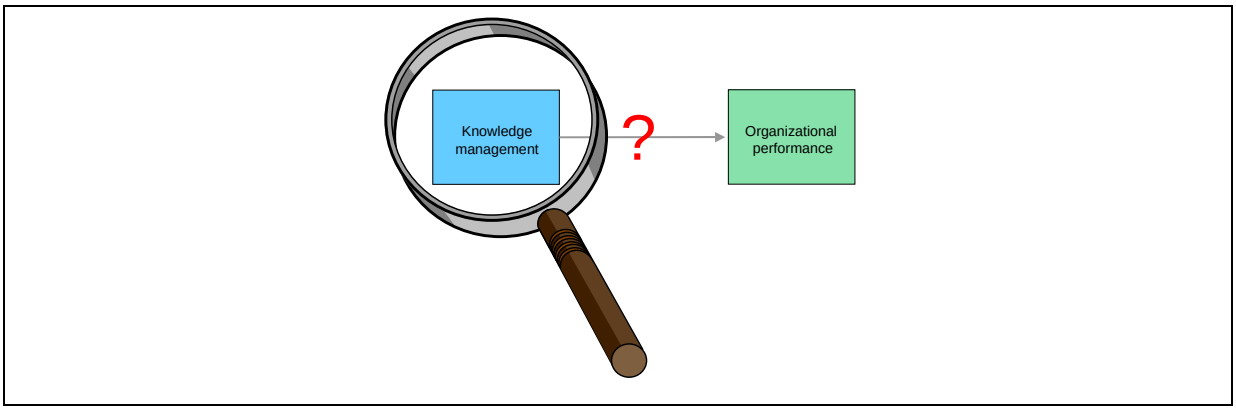

Figure 1: Key challenge of knowledge management

Most of the actual literature argues on the basis of a strategic resp. top down-approach of KM measurement (e.g. Sveiby 1997; Edvinsson/Malone 1997). Unfortunately, such a strategic approach has some important disadvantages:

- It is difficult to get commitment from senior managers regarding the investment into strategic KM projects.
- Due to the complexity of the system and the difficulty of measuring knowledge it is difficult to show the impact of KM on organizational performance.
- Operational KM projects often are out of focus for top managers since decentralized activities seem not to have the potential to convince senior managers of the impact of KM on organizational performance.

Hence, the goal of this paper is to show how the actual weaknesses of measuring knowledge related performance can be overcome by a knowledge related measurement- and monitoring-system (KMMS). This will be made clear on a conceptual level as well as on the basis of a case study.

2 CONECEPTUAL BACKGROUND

2.1 A framework of knowledge related performance

Having a closer look to the relation between KM and performance it becomes clear that this relation is very complex. Figure 2 provides an overview of the variables that influence this relationship. Additionally, figure 2 makes also clear that a profound measurement system of knowledge related performance is not as simple as lots of KM protagonists argue for. Finally, figure 2 shows the important distinction between knowledge results or knowledge related performance and organizational performance.

From a managerial perspective the implication of this differentiation is to focus first on the improvement of knowledge performance, e.g. process improvement, innovations, new/better products and services, learning and individual growth, and subsequently look for the impact of knowledge related activities on organizational performance, e.g. market value, image, customer value, profit.

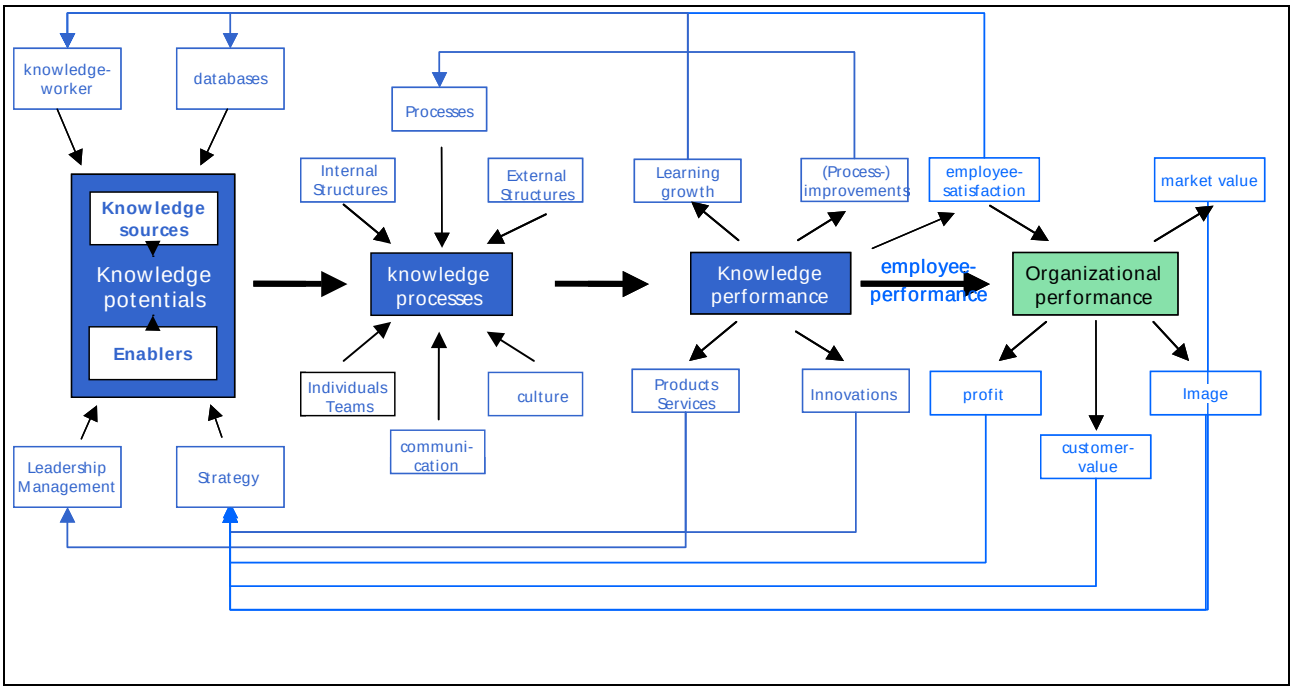

Figure 2: Framework of measuring of knowledge and its links to organizational performance

In the recent literature two types of measuring knowledge related initiatives are discussed: intellectual capital accounts and process measures related to KM phases (cf. Reinhardt et al. 2001; Reinhardt 2002). In the subsequent chapters both methods are outlined briefly.

2.2 Intellectual capital accounts

2.2.1 Conceptual basics

Since the midst's of the 1990's a major approach has been developed to deal with the management and the measurement of knowledge as resource – that is intellectual capital management. The intellectual capital (IC) of a company can be defined as "the sum of the knowledge of its members and the practical translation of this knowledge" (Roos/Roos/Edvinsson/Dragonetti 1997, p. 27) into organisational action.

Current IC concepts and their most important categories cover Human Capital, Organisational Capital and Relational Capital (cf. Reinhardt et al. 2001). It is assumed that the interaction between them produces financial capital that over time can turn into equity which is recognized by the capital market and therefore influences the market value of the company. However, there might be a considerable lag between knowledge development and its impact on the financial bottom line (organizational performance).

The vision reflected in current IC measurement models clearly points towards better management of the resources considered – human capital, organisational capital and relational capital – to be essential in the knowledge economy. Additionally, the IC measurement movement is nourished by the shareholder-value approach that requires more transparency and information directed towards external constituencies. The first perspective leads to the development of internal IC reports for strategic management and decision making support, whilst the latter implies the need for external IC reporting to support corporate communication priorities.

Despite the specific intention of IC reporting, an IC measurement system briefly can be described as follows (cf. figure 3): From a general management perspective there is a linkage and bi-directional dependence between corporate objectives, knowledge objectives and their implications for IC stock measures (cf. North 1998; Reinhardt 2001). Additionally a relation between financial and IC related measures with regard to two distinct statements is proposed. This means that IC measurement deals with the assumption that increasing knowledge stocks – as a consequence of investing in IC – should lead to effects that can be made visible on the traditional financial annual report (e.g. Stewart 1997) or with regard to an increasing market value (e.g. Strassmann 2000).

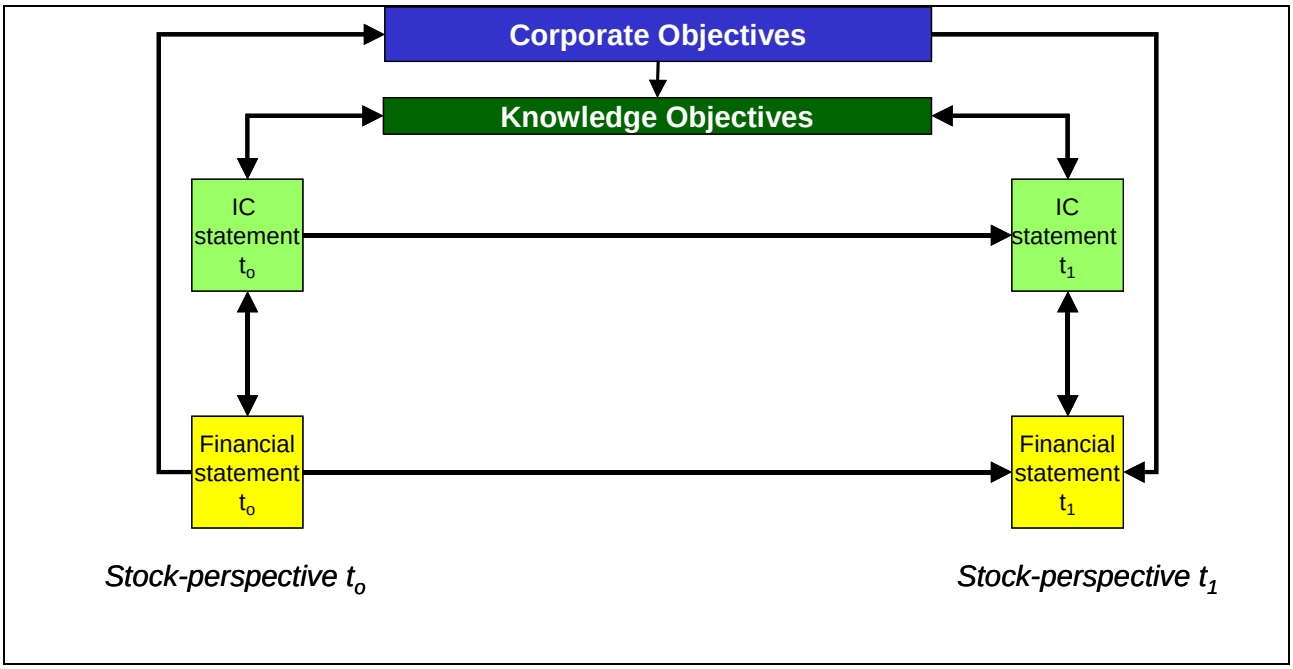

Figure 3: Framework of an intellectual capital system

Thus, a complementary statement for intangible assets covering intellectual capital, knowledge stocks and flows documents the development of the investments into knowledge as well as transformations processes of knowledge into "new" knowledge. A constant interaction and exchange with the more tangible elements of the annual financial report takes place and – proper value management assumed – leads to an improved / more valuable organization a period later. So investments into the intangible part of an organization no longer imply a "loss", as conventional accounting suggests, but remains visible in the IC statement. After a time period while the process might be reversed and knowledge turns into profits (now visible in the cash flow statement, later in equity) or via new processes and new products in the assets column of the Intellectual Capital statement.

A long term oriented and value driven management strategy no longer proves negative to the performance of a management team exclusively evaluated by financial terms, which on the short term are inclined to be misinterpreted.

2.2.2 Framework For The Implementation Of IC

Common implementation approaches of IC management follow a structure that has been described by Roos et al. (1997). Furthermore, they can be related to other managerial methodologies such as the balanced score card (Kaplan/Norton, 1994). Figure 4 shows four distinctive steps of this implementation process:

(1) Its starting point is top management's prescription of corporate strategy and

(2) The deduction of related critical success factors (CSF).

(3) With the help of a wide range of financial indicators as well as non-financial indicators, a link of operative actions (business processes) with long term goals (strategy) is established in this model.

(4) These indicators are linked to a specific IC model (for example the model of the Skandia Navigator, e.g. Edvinsson/Malone 1997, the Austrian Research Centres Model 1999 or the New Danish Guideline model 2003).

Summarizing these four steps of a traditional strategy implementation approach, the following scheme emerges:

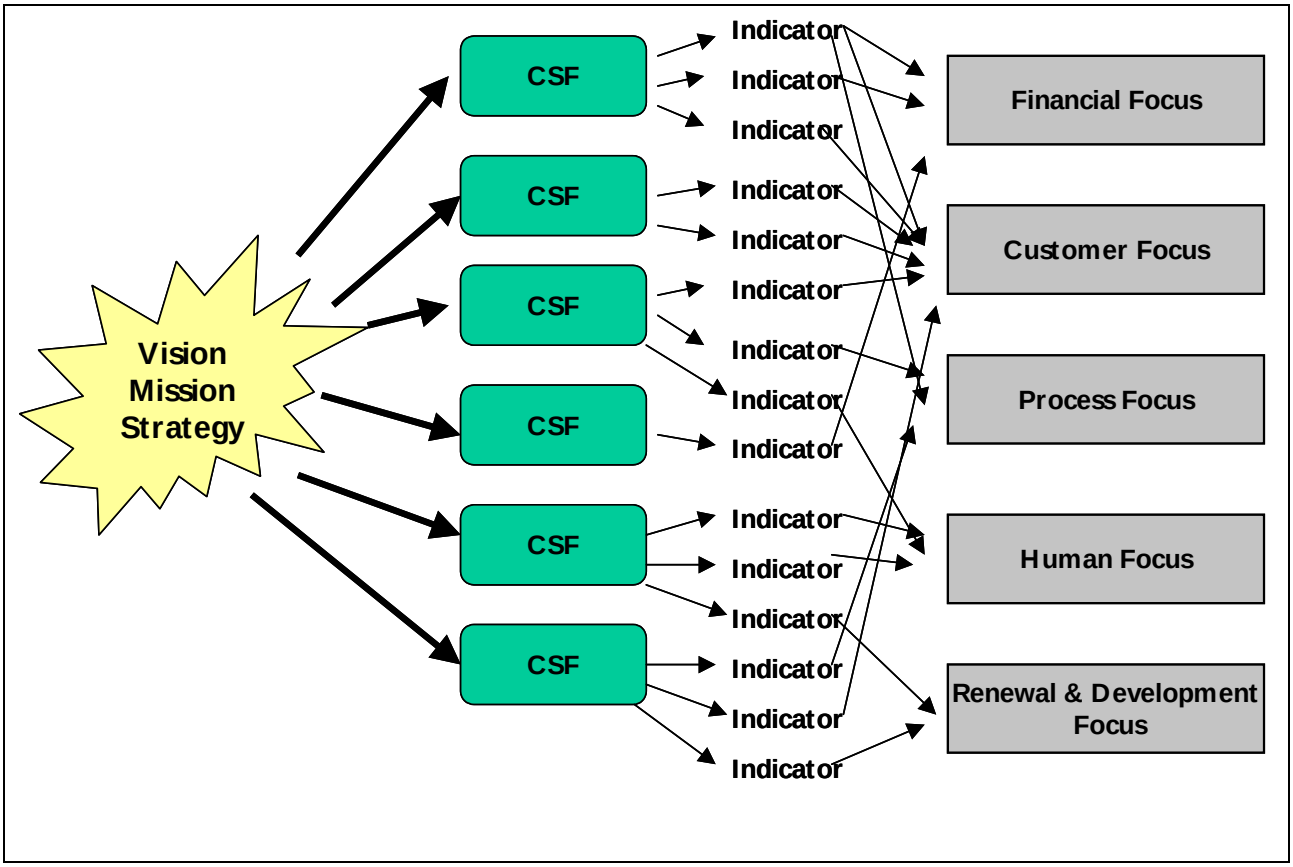

Figure 4: Implementing a current IC system

2.2.3 Implications of IC measurements systems

Looking at actual managerial practices and theoretical frameworks it becomes clear that the concept of Intellectual Capital provides relevant metrics regarding knowledge related benefits. Measurement of Intellectual Capital deals predominantly with the measurement of knowledge stocks. Hence, the impact of IC investments at the beginning of a period can be identified in an increased knowledge stock at the end of the period.

Unfortunately, IC measurement approaches alone do not provide managers with explicit recommendations on how to deal with the resource knowledge within a period. The lack of permanent

monitoring implies severe troubles in timely adaptation of actions. The discrete analysis once within a time period (e.g. annually) shall be complemented by a continuous monitoring of knowledge flows.

Additionally, the implementation of intellectual capital accounts often follows a „top-down“ philosophy. This perspective highlights the strategic dimension of such a knowledge-related measuring and monitoring system. Unfortunately, this “top-down” approach also shows some inherent deficits that can be explained by a less than optimal implementation process.

In this context, the following main problems – analogously to the well-known problems regarding the implementation of a balanced scorecard system – can be identified:

- lack of alignment between measurement system and operational needs
- lack of involvement and thus commitment of middle management levels
- lack of communication of the benefits of the system
- lack of experience or expectations regarding “quick wins” of the system

2.3 Knowledge Flow Measurement

2.3.1 A Conceptual Model Of Knowledge Flows

The model of integrative knowledge management (Reinhardt 2001) integrates corporate goals, process oriented actions and via evaluation some kind of results to specific knowledge related processes (see also Bontis 1999). These processes can be differentiated into knowledge identification, knowledge creation, knowledge diffusion, storage and retrieval as well as knowledge integration and modification. They are interwoven in an interdependent system oriented for value creation, depending on the priorities of corporate strategy. These elements fit into the classic scheme of planning (corporate strategy and knowledge goals), acting (all the processes above) and evaluating. Figure 5 visualizes this conceptual framework for measuring knowledge flows.

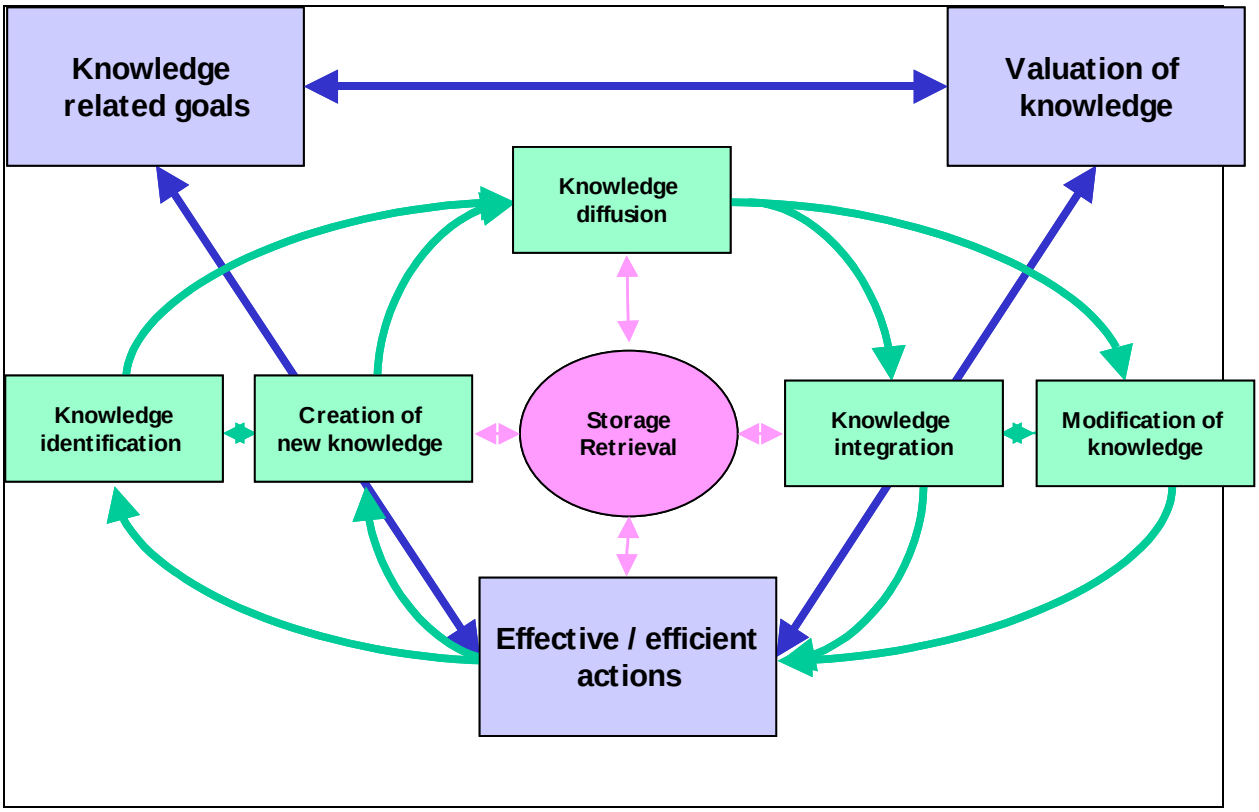

Figure 5: Knowledge Management: A Process model of knowledge flows (Source: Reinhardt 2001, p. 193)

In table 1 the content of each of the dimensions in the knowledge management model is explored by key questions and therefore can be understood as a basis for a definition of the distinct phases of the model illustrated in figure 5.

KM dimension	**Key questions**
Knowledge related goals	• To which extents are knowledge-related goals derived from a strategic or an operational perspective?
Identification/ creation	• Where and how is knowledge collected, which is important to the organization? • How can internal knowledge systems be integrated in order to create new knowledge?
Diffusion	• What exchange processes exist between the organization and its environment and within the organization? • What kind of communication barriers can be identified - how can they be removed?

Integration/ Modification	• Which knowledge systems determine strategic decisions? • How differentiated / integrated are the mental models of the dominant coalition?
Action	• Do opportunities for testing new behaviors, without getting punished, exist? • What kind of structure, processes, and systems shape the transformation of knowledge into action?
Storage/ retrieval	• What IT-tools exist in order to store and/or to retrieve knowledge? • How do culture and processes support knowledge processing? • What kind of managerial infrastructure fosters/hinders implementation of KM activities?
Valuation of knowledge	• To which extent are measures used to monitor the knowledge-related activities and to identify the level of the goal's achievement?

Table 1: Definition of knowledge flow phases (Source: Reinhardt 2001, p. 194)

2.3.2 Measuring Knowledge Flows: Method

The method of measuring knowledge flows can briefly be described on the basis of the following steps: (1) Identification of knowledge areas to be improved; (2) analyzing the knowledge areas on the basis of knowledge flow phases (gap analysis on the basis of a survey); (3) feedback of results & definition of action areas; (4) Implementation of action areas; and (5) Evaluation.

The measurement aspect of this method can be described as follows: Based on the knowledge management model outlined above, a questionnaire was developed. Each of the individual dimensions of the model have been transformed into a set of distinct statements. Participants are to be asked to assess the time spent regarding activities linked to each phase (actual performance) as well as to assess the priority of the distinct activities regarding their daily work (desired performance). Table 2 illustrates this measurement practice on the basis of the scale "creation of new knowledge".

Frequency							Priority						
very often	often	medium	seldom	never	don't know	How **frequent** are you creating new knowledge with regard to your daily work?	How **important** is the creation of new knowledge for your daily work?	very important	important	medium	less important	unimportant	don't know
						Creation of new knowledge is supported by...							
1	2	3	4	5	?	• conversations with actually applied experts		1	2	3	4	5	?
1	2	3	4	5	?	• time for reflection		1	2	3	4	5	?
1	2	3	4	5	?	• cooperation with R & D		1	2	3	4	5	?
1	2	3	4	5	?	• creativity techniques		1	2	3	4	5	?
1	2	3	4	5	?	• analysis of projects		1	2	3	4	5	?
1	2	3	4	5	?	• conversations with actually applied managers		1	2	3	4	5	?
1	2	3	4	5	?	• structured modes of sharing experiences, e.g. workshops etc.		1	2	3	4	5	?
1	2	3	4	5	?	• observation of third parties activities and transfer on own tasks		1	2	3	4	5	?
1	2	3	4	5	?	• external specialists/experts		1	2	3	4	5	?
1	2	3	4	5	?	• specific methods/instruments, e.g. learning laboratories, scenario technique		1	2	3	4	5	?
1	2	3	4	5	?	• incidental contacts at cafeteria, in breaks etc.		1	2	3	4	5	?
1	2	3	4	5	?	• planned contacts at cafeteria, in breaks etc.		1	2	3	4	5	?

Table 2: Measuring the creation dimension of knowledge management (Source: Reinhardt 2002, p. 236)

2.3.3 Implementation of knowledge process measurement

Contrary to IC measurement methods, knowledge flow measurement have not applied very often. Hence, there are only little experiences that can be reported regarding this issue. Usually the implementation of knowledge flow measurement approach follows a decentralized and operational logic (e.g. Bontis 1999; Reinhardt 2001, 2003).

Especially, this class of measures are not interpreted as performance measures in a narrower sense, but as attitudinal measures of participants regarding the quality of knowledge flows. Hence, these measures are treated as a starting point for meetings or workshops, in which the joint interpretation of a knowledge process analysis leads to the identification of operational action areas, e.g. the implementation of a Yellow pages system, of methods with regard to the explication of tacit knowledge, or of methods to improve intra- or interdepartmental meetings etc.

2.4 Implications for the development of a sound KMMS

Summarizing the arguments outlined above, it becomes clear, that either the IC measurement or the knowledge process measurement methods both show different weaknesses. Especially, the practical linkage between both measurement methods seem not to be very clear for managers or for consultants:

- Where should an organization start with the measurement of knowledge performance and with regard to organizational performance?
- Are there any indications, if a top down- or a bottom up approach should be considered?
- What can we learn from previous experiences with knowledge related measurement?

From the author's perspective, the following learnings seem to be key for a successful knowledge related measurement project:

- Provide participants with knowledge process related measures that are as well self-explaining as show high relevance for the participant's benefits (measures I)
- Let participants interpret their own knowledge process related data regarding strengths and weaknesses. Enable them to identify projects and help them to develop very specific actions plans especially with regard to knowledge performance or project results (measures II)
- The definition of an IC account should consider as well a strategic framework defined from top management as accepted type II-measures (measures III).

In the subsequent sections it is shown, how this conceptual framework is translated into organizational action. It will be made clear, that the KMMS can be understood as a system that provides managers orientation within the complex knowledge related measurement issue.

3 CASE STUDY: IMPLEMENTING THE KMMS

3.1 Background

One of the Knowledge Manager 2002 award winners, the leasing company LHI from Munich, has decided to invest the prize money in the improvement of their own knowledge management capabilities.

The main focus of the new project has been to develop a scientifically sound method that enables the company to measure and monitor the benefits of their own knowledge management activities.

Hence, the following three objectives have been defined:

1. Development and implementation of a knowledge-related measurement system on the basis of pilot studies.
2. Roll out of an improved version of this method on the complete company

3. Further development of this bottom-up approach into an intellectual capital management system.

3.2 The Measurement Approach

Figure 6 gives an overview of the specific project phases and steps. The three core phases can be described briefly as follows:

- **Phase 1 – Piloting of measuring knowledge processes:** Preparation, conceptualization, and implementation of a method to measure knowledge processes (measures I); design and conducting of feedback workshops in order to identify improvement opportunities. Such projects are defined, planned and additionally controlled by project- related success indicators (measures II).
- **Phase 2 – generalization of measuring knowledge processes:** Critical analysis of experiences during the pilot phase, possibly improvement of the measurement method and the workshop design. Roll out of the measurement system into the entire company with the aim of identifying improvement opportunities as in phase 1. Hence, here again two different sets of measures are applied: knowledge-process-related measures (measures I) and project-related measures (measures II).
- **Phase 3 – conceptualization and implementation of the intellectual capital audit:** Based on the project experiences during phase 2 and the accepted measures II of this phase, on the one hand, an aggregation of these measures takes place. On the other hand, critical measures form a top-down perspective will be identified or developed. Finally, the intellectual capital measurement system is built into the integration of these top-down measures and the bottom-up measures (measures III).

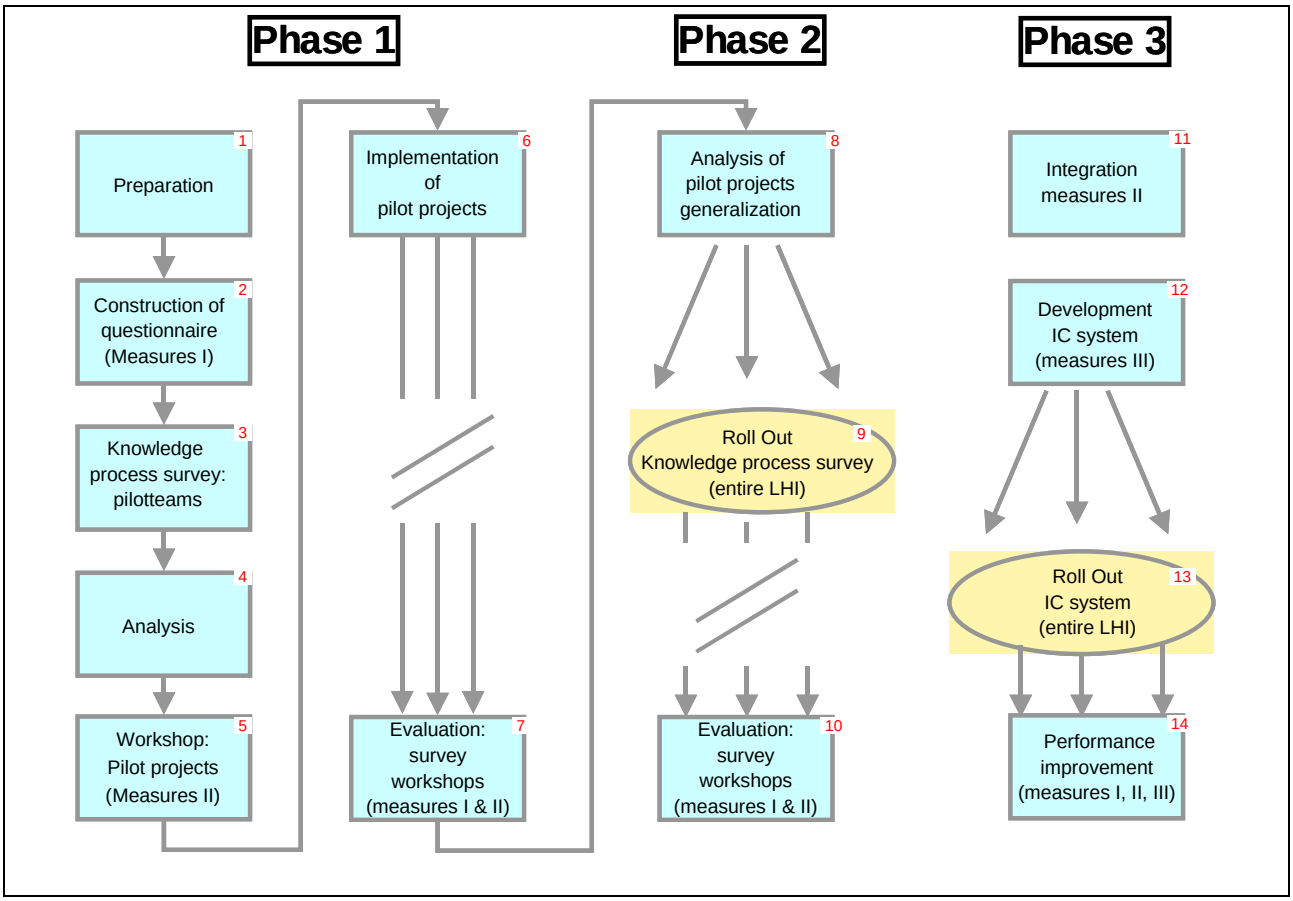

Figure 6: Implementation of a KMMS: Project phases and steps

3.2.1 Phase 1 – Piloting of measuring knowledge processes

The are two major aims of the pilot phase:

1. A “part” of the company, e.g. a deperartment or a division, learns how to deal with the proposed measurement system as well as to provide hints for improvement regarding the entire company.
2. Additionally, the pilot project shows the advantages and the efficiency of the approach, helps to show the value-added for the entire company and increases the acceptance for the approach in phase 2.

In the subsequent table an overview of the relevant steps of phase 1 is provided.

Step	Brief description
1. Preparation	A KM project team was established as well as top management commitment was realized The design of the overall project was developed.
2. Construction of questionnaire (measures I)	A questionnaire was developed in order to measure the quality of knowledge processes; the questionnaire included the following dimensions • Knowledge related problems • Quality of the knowledge management process (measures I) • Drivers of knowledge management (knowledge potentials) • Knowledge management related experiences
3. Piloting of knowledge survey	There were two rules that have been applied in order to identify relevant pilot teams: • High level of motivation regarding KM issues • Strong relation to core processes of the company
4. Data analysis	The data were analyzed regarding the core dimensions of the questionnaire • Knowledge related problems • Quality of the knowledge management process (measures I) • Drivers of knowledge management • Knowledge management related experiences
5. Pilot workshops (Measures II)	One day workshops with each of the two departments have been conducted; the design had the following structure: 1. Introduction 2. Conceptual basics of knowledge management 3. Analysis of results: Overview 4. Detailed results and implications for action areas 5. Action planning: Pilot projects in order to improve knowledge related performance (measures II) 6. Follow Up: The next steps of the project
6. Implementation	Both departments started with the implementation of the pilot projects, e.g.

of pilot projects	• Improving meeting management • Improving interdepartmental knowledge transfer • Identifying and storing knowledge of leaving employees Additionally, the following ideas for projects have been reported to top management: • Implementation of an training concept for the entire company • Implementation of a e-mail-standardization and –classification system • Implementation of a yellow pages system
7. Evaluation of pilot projects	After having accomplished the pilot project, both pilot teams run through an evaluation phase, including • 2nd measurement of the quality of the knowledge management process (measures I) • comparison between actual and targeted goals regarding measures II (project performance)

Table 3: Overview of the relevant steps of phase 1

3.2.2 Phase 2 – generalization of measuring knowledge processes

The are two major aims of the second phase:

1. Learning from pilot projects and improvement of complete approach
2. Roll Out of measurement approach throughout the entire company

In the subsequent table an overview of the relevant steps of phase 2 is provided.

Step	Brief description
8. Analysis of pilot projects and improvement of design	After having implemented the pilot projects it is important to learn from the previous experiences in order to improve the complete approach. Hence, the KM project team and the two pilot teams will identify strengths and weaknesses of the complete pilot phase within a half-day workshop.
9. Roll Out of measurement system	After having developed an improved version of the total measurement approach, this version will be rolled out throughout the entire company. Hence, this means, that steps 3 to 7 will be realized in the entire company.
10. Evaluation of entire measurement system	Finally, the complete approach will be continuously evaluated with regard to two perspectives (cf. step 7): • 2nd measurement of the quality of the knowledge management process (measures I) • comparison between actual and targeted goals regarding measures II (project performance)

Table 4: Overview of the relevant steps of phase 2

3.2.3 Phase 3 – conceptualization and implementation of the intellectual capital audit

The are four major aims of the third phase:

1. Aggregation of type II measures in order to develop a measurement for operational measures of the IC system
2. Developing a strategic measurement framework for the IC system
3. Design and implementation of the complete IC system
4. Improving performance by the continuous application of the IC system on a strategic and an operational level

In the subsequent table an overview of the relevant steps of phase 3 is provided.

Step	Brief description
11. Aggregation of project related measures (measures II)	On the basis of the implemented projects the company has learned to deal with performance measures II. This means that the company developed an accepted set resp. an universe of type II performance measures – measures, that are strongly linked with the improvement of knowledge related processes. Hence, the KM project team will aggregate these type II measures in order to develop a sound, accepted and approved set of measures for the operational aspects of the intellectual capital account subsequently to be developed.
12. Development of the intellectual capital account system	The top management team will first develop the strategic framework of the intellectual capital account. Additionally, the aggregated set of type II measures will be evaluated to their level of fit regarding the strategic context.
13. Roll Out of the intellectual capital account system	The IC system will be rolled out within the entire company.
14. Continuous improvement of performance	The IC system is the backbone to improve strategic and operational performance.

Table 4: Overview of the relevant steps of phase 3

4 DISCUSSION

4.1 Summary

In figure 7 a summary of the implications of the case study outlined above is given. This figure indicates that

- knowledge related measurement has started in a decentralized way, e.g. on a departmental level. Here it has been important to link the measurement of the quality of knowledge processes with the measurement of knowledge performance.
- the organization learned from each of the departmental projects regarding measures I &II: Having rolled out this „measurement philosophy“ throughout the entire organization, the ex-

periences with type II-measures can be used to complete the strategic framework – including strategy related measures.

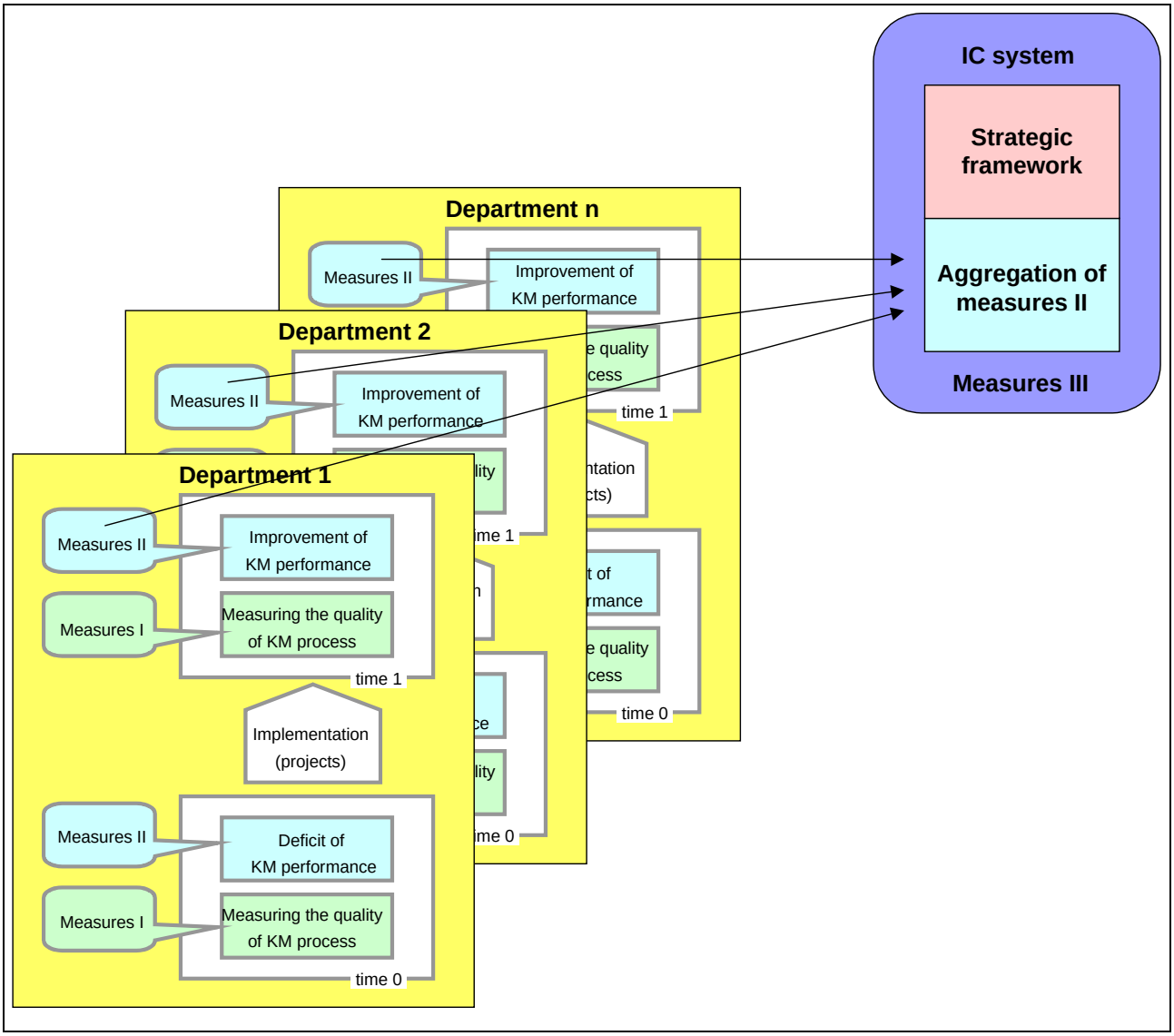

Figure 7: Measures I, II; III as building blocks of a KMMS

4.2 Implication of the KMMS

Summarizing the approach outlined above, it becomes clear that the proposed KMMS approach helps to overcome the relevant weaknesses (cf. table 5):

Common weaknesses	**Solutions**
Lack of alignment between measurement system and operational needs	The consideration of operational measures – i.e. project measures (measures II) – within the intellectual capital management system (measures III) guarantees a high-level alignment between the measurement system and operational needs.
Lack of involvement and thus commitment of middle management levels	The involvement of middle management and staff during the roll out phase ensures a high level of commitment of the complete measurement system.
Lack of communication of the benefits of the system	The extensive project communication in phase 2 is an important prerequisite for insight into the benefits of the system as well as the individual experience of specific project-related improvements.
Lack of experience or expectations regarding “quick wins” of the system	The positive experiences during phase 2 foster the understanding of the benefits of the complete system in phase 3

Table 5: Advantages of the proposed concept

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