Multi-Functional Stakeholder Information System for Strategic Knowledge Management: Theoretical Concept and Case Studies

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ABSTRACT

The use of the term stakeholder in the context of strategic knowledge management processes in combination of the information systems research fields is recent. However, if companies want their knowledge workers to use information more effectively for decision-making, they have to pay attention to the different interest groups (stakeholders) using the information system. Companies need to communicate more effectively with their stakeholders. As a direct consequence, the management must focus on a stakeholder analysis for implementing strategic knowledge management. From a theoretical point of view, this article combines the theories of stakeholder analysis with strategic knowledge management. The result is the development of a process model for the implementation of a multi-stakeholder information system for knowledge management. Case studies conducted, illustrate how the use of a multi-stakeholder information system can improve the company's knowledge strategy and the relationship between knowledge workers.

1 RESEARCH FRAMEWORK AND OBJECTIVES

The management of knowledge has become a major research field in different disciplines in the last ten years [see for example Davenport/ Prusak, 98; Malhortra, 00; White, 02]. However, in recent years, not only knowledge management, but also primarily the measurement of knowledge [see for example Fink, 04; Skyrme, 98] is developing into a new research field. Skyrme [Skyrme, 98] sees the measurement and management of knowledge-based assets as one of the most important issues for knowledge organizations. In the knowledge-economy, the value of the company's knowledge is the key driver for success. In the knowledge-based economy, the management and the measurement of intangible assets has become one of the most important issues. Both, the use of knowledge management methods and the active involvement of knowledge workers during knowledge processes are key issues that information systems developed for the planning and controlling on the top-management level should be expanded. The use of the term stakeholder in the information system research field is recent [Pouloudi, 99]. Furthermore, the combination of the impact to stakeholder relationship management to knowledge management processes and the derivation of a multi-functional stakeholder relationship management system are new. Several case studies gave rise to the question how large knowledge management data can be edited in a way that each participant taking part in knowledge management can be satisfied. Top management had to give thought about the optimization of information logistics during strategic knowledge processes. This means, every person involved in knowledge management has a different demand on the information system. Top management had to deal with the problem to get the right information, at the right time to the right persons involved in knowledge management. The following list – derived from conducted case studies by the authors – shows the most important triggers for research in stakeholder management for strategic knowledge management:

- Expanding and improving the company's communication process especially for knowledge management processes in order to avoid a wrong information management strategy.
- Involving every participant (stakeholder) from the beginning of the knowledge project to the implementation of a knowledge management system (information logistics).
- Designing an information system that integrates knowledge processes and the concept of stakeholder relationship management.

The motivation for research in this area was given by top management in many software companies who introduced strategic knowledge management, but did not think about the communication and integration of knowledge processes into the overall company's strategy. Knowledge management processes and business process modelling were parallel processes and needed integration into one information system. The solution was the design and implementation of a multi-functional stakeholder relationship management system to improve the company's communication strategy for knowledge management processes. The research framework is the combination of three research fields:

- *Information System Research*: How can information technology support the process of knowledge management and the communication policy of the company?
- *Stakeholder-Relationship-Management Research*: What employees (knowledge workers) are affected by knowledge processes?
- *Knowledge Management Research*: What kind of knowledge management systems should be used in order to gain competitive advantages?

During much knowledge management projects the importance for identifying stakeholder viewpoints [Donaldson/Preston, 95; Freemann, 84] and considering their cultural values that may be central to an organization became apparent. An organization is an ecological system and an information system has to deal with the whole environment effected by knowledge management. Until an executive understands what is going on, his judgement and decisions will be incomplete and uncertain. This paper makes a contribution by extending the knowledge management process to stakeholder analysis [Andriof et al, 02; Carroll/ Buchholtz, 02], with a special view on information system thinking [Laudon/Laudon, 06]. The objective of this paper is to show the rising impact of stakeholder relationship management to knowledge management processes and by doing so the need of an information system that supports the key knowledge processes. Therefore, the key research question is: How can a multi-functional stakeholder information system

improve strategic knowledge management processes? Nine case studies at IT-companies conducted by the authors made it possible to formulate two key hypotheses:

1.   The success of strategic knowledge management can be improved by the application of a stakeholder analysis.
2.   The success of strategic knowledge management is depending on the implementation of a multi-functional stakeholder information system.

Chapter Two discusses the planning process of the implementation of a multi-functional stakeholder information system and stakeholder analysis. Chapter Three outlines the key research findings and the future research projects.

2 BUSINESS PROCESS MODEL FOR THE IMPLEMENTATION OF A MULTI-FUNCTIONAL STAKEHOLDER INFORMATION SYSTEM

2.1 Knowledge Stakeholder Analysis
In the context of knowledge management, stakeholder analysis [Carroll/ Buchholtz, 02; Friedman/Miles, 02] is the identification of a knowledge project's key stakeholders, an assessment of their interests and the way in which those interests affect the project viability. The stakeholder analysis is the first step in building the relationships needed for the success of a participatory knowledge management project. It provides a starting point, by establishing an environment with which knowledge workers are working in the project. This means, a stakeholder analysis helps the project initiators to access the social environment in which they will operate.

Stakeholder analysis is best accomplished before the knowledge project is initiated or at some beginning point. The broad view of stakeholder identification focuses on a stockholder's ability to influence the firm's behaviour, direction, process or outcome, and focuses on the urgency, power and legitimacy of the stakeholder in question [Andriof et al, 02; Mitchell et al., 97]. The classic broad definition is Freeman's: "those who affect or are affected by a firm' [Freeman, 84]. The narrow view of stakeholder identification in an organisation focuses on a stockholder's legal, moral or presumed claim [Mitchell et al., 97] on the firm. Clarke links stakeholder theory to the knowledge based company and defines: "If knowledge is the pre-eminent productive resource and most knowledge is created by and stored within individuals, then employees are the primary stakeholders (…)" [Clarke, 98, p. 188]. Stakeholders in the context of knowledge management are persons or a group of individuals who are interested in participating in knowledge management processes. *Key knowledge stakeholders* are those who can significantly influence,
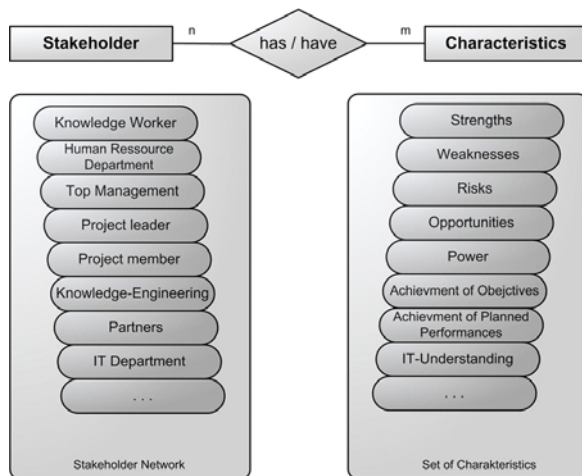
or are important to the success of the knowledge management project. *Secondary knowledge stakeholders* are those who are indirectly influenced by the results of the knowledge management projects. Figure 1 lists possible knowledge stakeholders with their characteristics.

A supporting tool for stakeholder identification is the development of *stakeholder identification matrix*. Stakeholders can be listed and categorized in various ways. One starting point is to divide a list into key and secondary stakeholders.

Knowledge stakeholder analysis must be integrative part of the company strategy. Top management has to make a commitment for knowledge management and develop a communication strategy concerning the impact and the use of knowledge management to the success of the company. The result of the first analysis process is a *stakeholder relationship map* visualizing key and secondary knowledge stakeholders.

2.2 Knowledge Influence and Importance Matrix Process
The objective of the second process is the identification of the influence and importance of the stakeholders to the knowledge processes [Post et al, 02]. The term influence refers to how powerful a stakeholder is in the knowledge management project. Influence is in fact the extent to which the stakeholder is able to persuade or coercer others into decision making processes concerning the impact of the knowledge project. The term importance implies the interest of the stakeholder in the participation of knowledge management. Same of the key variables measuring influence are: (1) the power of leadership in a knowledge project, (2) the stakeholder position (e.g. leader) in the project, (3) the relevance of the expert knowledge to the project. The variable importance was determined by asking question such as (1) Which needs or expectations of the stakeholder are affected by the knowledge project? or (2) Are the stakeholder needs linked to the knowledge project objectives?

Having defined influence and importance, the gained position of each stakeholder is positioned in a two by two matrix of high and low importance and influence. Figure 2 illustrates the four areas concerning the decisions on conducting knowledge management projects in a company:

*   *Area I:* If the importance is high and the influence of the stakeholders is low, then the management should think of starting knowledge management projects and implementing a multi-functional stakeholder information system.
*   *Area II:* If the importance and the influence of the stakeholders to the knowledge project is low, investments in setting up this project does not improve the competitiveness of the company.
*   *Area III:* If the importance is low and the influence is high, then management should design a multi-functional stakeholder information system for knowledge management.
*   *Area IV:* If the importance and the influence of the stakeholder are high, then a multi-functional stakeholder information system must be integrated in the company strategy.

Figure 1. Knowledge stakeholder relationship characteristics

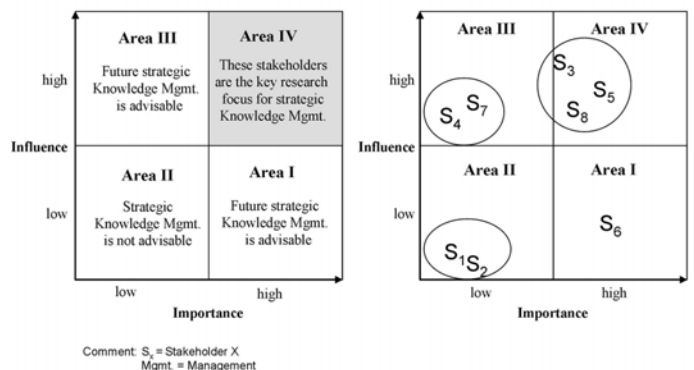*Figure 2. Knowledge stakeholder importance-influence matrix and classification*

Table 1. Knowledge stakeholder impact table

Stakeholder	Key/Secondary	Importance	Influence	Impact	Explanation/Improvement
S₃	Key	High	High	High	...
S₁	Secondary	Low	Low	Middle	...
...	...	...	...	...	...

After the determination of the stakeholder position in the matrix, it is possible to form clusters of stakeholder groups. The result is *knowledge stakeholder impact table* (Table 1), visualizing the role of the stakeholder, the importance and influence to the management process, the interest of the stakeholders and finally their impact on the knowledge process and establishing strategies for improvement.

2.3 Implementation of a Multi-Functional Stakeholder Information System

Developing information systems to support decision making cannot take place in isolation of the broader social context within which people generate and utilize information. Ongoing dialogues provide those who participate in the knowledge process with immediate access to new ideas and perspectives, which may help them, re-evaluate their current policy strategies. There is still a need to capture, store, and provide this information for the benefit of those who did not have the opportunity to be directly involved in the knowledge processes. Information systems such as those described in this paper are intended to improve efforts to share information by building trust and confidence between information providers and users. The key issue is the integration of knowledge management results into an information system by taken the aspect of information logistics into consideration. It is important to understand the stakeholder's expectations, and provide them with the right information report. A successful realization of stakeholder relationship management can only be achieved by an information system support [Pouloudi/Whitley, 97; Pouloudi, 99].

Key issues for a multi-functional stakeholder information system are:

- In the future, strategic knowledge management will become not a single event once a year, but rather a continuous management process.
- To optimize the process of knowledge management, an information system support is necessary.
- The knowledge management analysis needs an internal and external communication strategy.
- The electronic mapping of the knowledge management process helps to optimize business processes and to identify key knowledge processes.

Figure 3 illustrates the basic concept of a multi-functional stakeholder information system. This system is influenced by two data flows. The first one is concerning the knowledge processes and the second flow deals with stakeholder processes.

A multi-functional stakeholder information system [Mertens, 04] provides managers with information related to all knowledge management functions, such as knowledge policies, job descriptions, and knowledge worker evaluation. The cores of the stakeholder information system are the databases: (1) the knowledge repository storing information concerning knowledge management processes and (2) the Enterprise Ressource Planning Repository storing all information of the company. So the stakeholder information system for strategic knowledge management is tightly integrated with the financial, accounting, human resource and management subsystems. The focus of the information system is the *electronic control center* that offers the right information to the right stakeholders during and after the knowledge process. The multi-functional stakeholder information systems must satisfy the needs of all different groups, such as the top management, the middle management, the knowledge worker, the department man-

Figure 3. Architecture of a multi-functional stakeholder information system
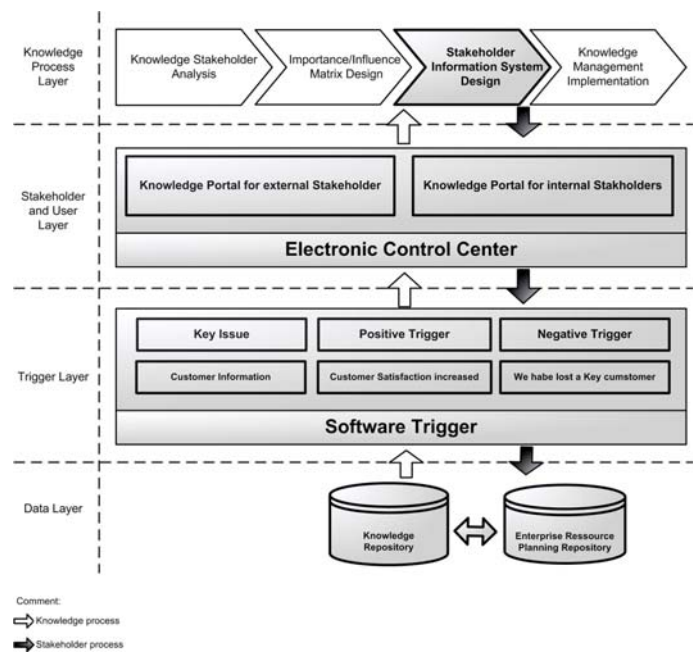
ager and so on. Relevant data are the cornerstone of all good decision planning processes. A knowledge portal for top management summarizes the key results of the knowledge processes. This information is a key issue in order to communicate the company's intellectual capital value to other external partners such as banks, stock exchange, analysts. This information supports the top management in strategic decision making. Furthermore, the enterprise information portal delivers information for the internal stakeholders. The electronic control center is supported by a *software trigger*. The major objective of the integration of the trigger concept can be seen as an early warning system. The trigger concept reacts to negative and positive trigger. The electronic control center addresses senior management to select, retrieve and manage information that can be used to support the achievement of an organization's business objectives. For a knowledge organization is becomes central to communicate to external stakeholders the intellectual value of the company and therefore increase the company's strategic market position. Furthermore, the stakeholder information system must consider the need and expectation of the internal stakeholders. In this case, the control center can be defined as a decision support system that provides the stakeholders with the information needed to support their knowledge processes. Since different stakeholders may hold different perceptions, satisfaction of all parties becomes problematic unless a common frame of reference can be determined.

Figure 4 visualizes the stakeholder information system from the software design perspective. The stakeholder controlling center links the different stakeholder portals with the data sources. In the first step (1) the templates for a special topic are designed by the administrator. In the second step (2) these templates become personalized for all different groups of stakeholder. After the use of the stakeholder view (3) usability and information content gets evaluated. If there might occur problems with the stakeholder view there is the possibility to deal with them by going back one step (6) and make corrections in the stakeholder views. In the final step all required information and data sources are collected (5) and therefore they can improve the quality of the stakeholder information system for strategic knowledge management.

3 Empirical Studies and Key Research Findings

To investigate the knowledge management process and the impact of a multi-functional stakeholder information system, the *case study*

Figure 4. Workflow of a multi-functional stakeholder system
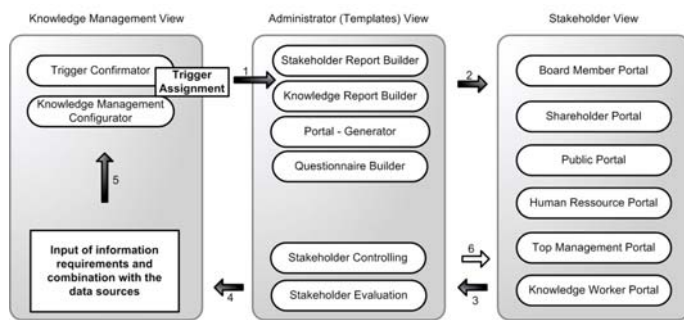
method was used by the authors. Once agreement was reached about the questionnaire design and the information system design for knowledge management a pre-test was administrated with two major objectives: to test the questionnaire and to test the prototype of the stakeholder information system. The pre-test was the proving ground for the administration of interviews [Fink, 05] and for the use of the usability as well as the performance of a multi-functional stakeholder information system. Afterwards, nine case studies have been conducted by the authors and can be structured as follows:

- Two case studies were conducted at European Companies working in the field of document management systems and market research in the year 2000.
- Three case studies were conducted at American software companies in the New Orleans area in the years 2000 – 2004.
- Four case studies are representing a large European software company offering Enterprise Resource Planning (ERP) software products since the year 2004 until now.

These nine case studies [Fink, 05] represent the data sample for the derivation of the design of knowledge management processes in combination of the implementation of a multi-functional stakeholder information system. Key research findings from the case studies verify the two hypotheses in chapter 1 and can be summarized as follows:

- *Improvement of Internal Communication Processes*: The central control center aims at improving the situation of information logistics for knowledge processes. The control center supported and clearly improved the communication process to all stakeholders associated with strategic knowledge management. In advance to the actual knowledge management process, all identified stakeholders were provided with the right information and the objective of strategic knowledge management. This helped to achieve a transparent company communication policy.
- *System Integration of a Knowledge Management Processes*, *the stakeholder view and administrative view:* The business model for a multi-functional stakeholder information system has to integrate a specific knowledge management process. The case studies showed that stakeholder participation is critical to the success of the stakeholder information system. User participation can result in an improvement in the users´ understanding of the information system. Active stake holder integration enhanced system acceptance, ensured a more accurate software design specification, and enhanced the quality of the system being developed. Top Management and knowledge stakeholders should help to establish clear goals and objectives for the knowledge projects to meet the users´ needs and to support organizational changes.

Future research projects aim to integrate methods from artificial intelligence to reduce decision uncertainty and to support stakeholder groups during and after knowledge management processes. The main objective of this paper was to outline the business process model for the integration of a stakeholder thinking into the knowledge management processes. The case studies showed that the results of knowledge management initiatives could be used more efficiently by the support of a multi-functional stakeholder information system.

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