

Data Mining Management for Implementation of Knowledge Management Using SECI Model and Data Testing

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Abstract—A company can no longer only rely on resources to be able to compete with other companies, but also must use knowledge assets that have more strategic characteristics. Models of knowledge management can be used to explore tacit knowledge and explicit knowledge, including the SECI model. But before making the model, a tool that can be used to search for patterns of data owned by companies is needed, in the form of data mining. The results of the implementation of knowledge management models and the use of data mining are examined using static tools for testing the data obtained. Novelty is done by repeating research in other contexts. The research will be conducted on several organizations in the same field, using empirical foundations with different methods and knowledge management models such as the SECI model. Data mining functionality is also used in addition to clustering and hypotheses that will be different to be examined from the knowledge gained.

Keywords—knowledge management, data mining, SECI model

I. USE OF KNOWLEDGE MANAGEMENT FOR THE COMPANY

Building the advantages of a business organization in a situation of high competition requires business people to find strategies that are more in line with the changing demands of the competitive environment. Resources such as financial resources, buildings, land, technology, market positions, and other tangible assets, are no longer able to lead the organization to be superior. Now companies must rely on knowledge assets because only knowledge has non rivalrous, increasing return and non-additive criteria[1].

In the knowledge management discourse, knowledge divided in two types, namely tacit knowledge, and explicit knowledge. Tacit knowledge is the knowledge that is owned by someone and is very difficult to formulate, difficult to communicate or share with others. The understanding inherent in the individual can still be categorized as intuition and conjecture, in both action and experience. Tacit knowledge has two dimensions, namely the technical dimension which includes a variety of skills or expertise that are difficult to formalize or experience dimensions. The second dimension is the cognitive dimension consisting of beliefs, perceptions, idealism, values, emotions and mental models. While explicit knowledge is very different from tacit knowledge because explicit knowledge can be expressed in the form of words, it can be summed up and can be divided into data forms, scientific formulas, product specifications,

manuals, universal principles. Explicit knowledge can also be transferred to others formally and systematically [1].

Various types of companies have implemented the principles of knowledge management to help the company find its next strategy. If explicit knowledge can be shared, then the company finds it difficult to be able to share tacit knowledge.

There are so many cases that occur, if someone stops working, the work productivity will be slower if the work is continued by his successor. This can happen because the policy of the company which stipulates that an employee can quit his job if notifying the information one month in advance, while the time required by the human resources department to find a replacement in a period of around a few months. This reason the old personnel do not have enough time to give their knowledge to the new personnel. Then there can also be a discontinuity of knowledge for new personnel to keep on the work of the old personnel and he must repeat the studying operation that will cause the cost of studying and the effort in a long time to continue the knowledge and experience of the previous personnel [2].

In the process of continuing the relocation of knowledge from the old personnel to the new personnel, the company can request the old personnel to make notes containing job responsibilities and then collect the required documents and then submit them to the new replacement personnel to be learned. Knowledge is transmitted explicitly in the format of the document. However, explicit knowledge can only represent 15% to 20% based on knowledge by old personnel. The remaining 80% to 85% knowledge is still in unexplored knowledge which can be namely idea, mind, experiences and personnel relations [3].

The Knowledge Continuity Management (KCM) process begins by defining several indicators that have important objectives which can replace the next KCM objectives, namely for the strategic and operational corporate layers. In the KCM project, critical areas of knowledge are recognized and transferred to company knowledge. Important output from KCM implementation: Development of a detailed framework of the knowledge management cycle that is used as a systematic procedure for knowledge management in nonprofit organizations. Second, identify the knowledge area with the complete attribute categories needed to obtain hidden and explicit knowledge possessed by personnel. Third, identify last position in the company so that

knowledge needs can be realized, which must be continued to the other personnel [2].

The purpose of the Knowledge Management System (KMS) is to improve the quality of human resources for the organization by increasing communication between each part of the organization and increasing knowledge acquisition by knowledge transfer. The application of KMS with a web-based system is expected to later be a solution of the knowledge transfer requirements that are not hampered by time and place limitations, while the mobile application is expected to be able to facilitate accessing KMS by students and lecturers with high mobility. Research can use the Amrit Tiwana model framework, mapping knowledge and organization using the Zack cycle [4].

The KMS application is produced from a prototype KMS model that can be implemented in areas of need such as Islamic Banking at STEI SEBI. This can also be used as an opportunity for faculty and students to improve their ability to master the knowledge and also share knowledge. The quality level of the prototype of the Knowledge Management System in Sharia Banking Practices in the SEBI Sharia Banking department resulted from four characteristics of black-box testing and ISO 9126 models, namely: functionality, reliability, usability, and efficiency criteria can be very good [4].

II. REVIEW STEPS

This research review has the following steps:

- Collecting data. The data collected is relevant research from one another.
- Analyze research data. The analysis was carried out as a comparison of methods, theories, and data.
- Summing up the results of the study. Conclusions are drawn based on the results of the research obtained.

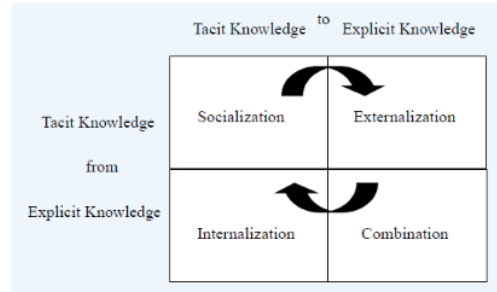
III. SECI MODEL

A. Knowledge Conversion

There are many models to describe knowledge management, including the SECI model.

According to Nonaka and Takeuchi, there are four modes of knowledge conversion as illustrated in Figure 1 [3]:

- From tacit knowledge to tacit knowledge: the process of socialization.
- From tacit knowledge to explicit knowledge: the process of externalization.
- From explicit knowledge to explicit knowledge: the process of combination.
- From explicit knowledge to tacit knowledge: the process of internalization.

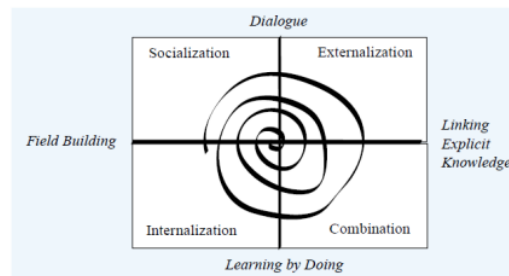


Source: Nonaka and Takeuchi, 1995, p. 62.

Fig. 1. The Nonaka and Takeuchi Model of Knowledge Conversion

B. Knowledge Spiral

Knowledge creation is not a sequential process. Rather, it depends on the continuous and dynamic interaction between tacit and explicit knowledge throughout the four quadrants. The knowledge spiral at figure 2 shows how organizations articulate, organize and systematic individual tacit knowledge [3].



Source: Nonaka and Takeuchi, 1995, p. 71.

Fig. 2. The Nonaka and Takeuchi Model of Knowledge Spiral

Nonaka and Takeuchi argue that an organization has to promote a facilitating context in which the organizational knowledge-creation process and the individual one can easily take place, acting as a spiral. They describe the following "Enabling Conditions for Organizational Knowledge Creation" [3]:

- Intention: an organization's aspiration to its goals (strategy formulation in a business setting).
- Autonomy: condition whereby individuals act autonomously, according to the "minimum critical specification" principle, and are involved in cross-functional self-organized teams.
- Fluctuation and Creative Chaos: condition that stimulates the interaction between the organization and the external environment and/or creates fluctuations and breakdowns by means of creative chaos or strategic equivocality.
- Redundancy: existence of information that goes beyond the immediate operational requirements of

organizational members; competing multiple teams on the same issue; and strategic rotation of personnel.

- Requisite Variety: internal diversity to match the variety and complexity of the environment, and to provide everyone in the organization with the fastest access to the broadest variety of necessary information; flat and flexible organizational structure interlinked with effective information networks.

IV. USE OF SECI MODEL

SECI model is widely used by companies to describe the spread of tacit knowledge of companies from various fields and various elaboration of the contents of SECI model.

Medical Record Documents are documentation files that have patient's medical record information. In Indonesia, there are many problem records for managing and storing medical record data that must be a concern, while existing medical record documents still exist, depending separately on medical institutions. Indonesian people usually continue to change doctors and make Patient medical records are found everywhere among medical institutions. There are research studies in the medical field for disease data management become impossible due to the lack of knowledge that can be completed by Knowledge Management. The biggest problem with the research being done is the incomplete medical history of the patient's life and there are no medical records for the health research institute. So a knowledge management system is needed to manage the knowledge of medical records in all medical institutions in Indonesia and neatly record all community medical record data to form complete lifetime medical history data for health institutions [5].

The SECI model for the medical record KMS can be seen as its implementation from:

- Dissemination (Information from Patients to doctors about health problems by Doctors) to Externalization (Documenting medical records).
- Combinations (Collecting data entered as part of complete medical records) to Internalization (Doctors examine medical history possessed to help analyze diseases in patients).

This review is based on future needs in Indonesia and in accordance with government needs in the business of developing information systems in the health sector [5].

In the field of education, knowledge transfer, and the distribution of links, teachers need to do a lot of research using the Internet, to improve their ability to increase self-knowledge, build knowledge professionally and increase their value and competitiveness. Based on four modes of knowledge transformation from the SECI model and four teacher knowledge management processes, teacher knowledge management tools and strategies are proposed simultaneously [6].

From every model that has been created, the results are obtained: Teachers should change the method of personal knowledge management, The teacher must update and add to their knowledge to promote professional development, the teacher must gradually build a knowledge management system as a teacher [6].

V. DATA MINING APPROACH AS DETERMINING THE RESULTS OF DATA OUTPUT

Data Mining functionality consisting of classification, association and grouping can be used as a support for data processing in knowledge management. The algorithm used can vary according to data from the company being analyzed.

In the banking sector which has a lot of data, all banking concepts have shifted to a centralized database, transactions have gone online and ATMs are spread all over the world. Transaction data growth is accelerating, but most banks can only utilize very little data from very large databases, with Data Mining technology, various knowledge that is very useful for business interests can be found [7].

The benefits that can be obtained by banks by integrating KMS with Data Mining to optimize marketing strategies are:

- Banks can get knowledge from the historical transaction database.
- Banks can store, organize and share documents, information, and knowledge systematically for all bank employees.
- Increase bank competitive advantage by differentiating how to market the products offered.
- Provides easy and practical collaboration facilities between employees.

In addition to banking, in other fields, KMS can show there is a clustering approach as a data mining method for the extraction of knowledge which also perfects the KMS output process. Data using 110 documents on the knowledge of writing Indonesian publications were obtained from direct input through KMS derived from interviews, DIKTI writing guidelines, books, journals and other sources of articles on the Internet related to writing publications [8].

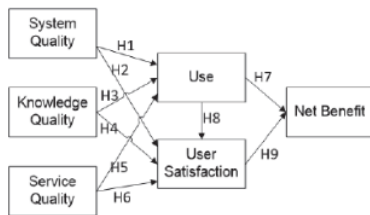
The clustering approach can be used for knowledge extraction in KMS development. Clustering can also be used to support one of the main features of KMS, which is a knowledge cluster and can improve the output of KMS [8].

VI. TESTING THE OUTPUT DATA RESULTS

After the knowledge management model is obtained, further data testing is needed after the implementation is carried out. This test can be done in various forms. The context of this test is needed to reinforce the results obtained from the knowledge management model that has been formed. The test can include an analysis of the success factors of implementation for example in the form of a survey of users who use the model.

This test for example to determine the Factors That Influence System Implementation. Based on research at the South Sumatra Province Development Planning Agency. The research model is taken from six latent variables of the information system success model by DeLone & McLean. These latent variables are system quality, information quality and service quality, user satisfaction, system usage and net benefits. There is a positive influence of the quality of the system and the quality of service on the use of KMS. There

is also a positive influence of the quality of knowledge, services and use of KMS on user satisfaction. There is also a positive influence of KMS usage and user satisfaction. The access model was created as an important part of the knowledge management system that was analyzed to ensure the knowledge management system can be well applied and can be used by users [9].



Source: Syahrizal A., Sensuse D. I., Ashshidhiqi G. B. H., Baroto K. W. A., Rizki M. F. D., and Primadi R. E., 2018

Fig. 3. Research Model

Knowledge Management Behavior Research among Academics found that, if policymakers want to ensure academics demonstrate Knowledge Management behavior, they must take steps to develop a culture of trust among academics and develop decentralized decisions to create an organizational structure. Also, it must be instilled among academics that involvement in Knowledge Management behavior will improve their performance in their profession and will require very little effort and will be easy to adapt to the Knowledge Management culture [10].

VII. DISCUSSION RESULT

From the review obtained research flow that starts from data collection, where the data can be from companies with various fields. The company conducts knowledge management analysis to obtain knowledge that will later be utilized as a strategy going forward. Knowledge management uses a model that is by the data held.

The tools used in processing data are data mining tools with functionalities that are by the objectives of each company. After the data mining results are obtained, testing

needs to be done, both in terms of supporting factors, as well as other tests.

VIII. CONCLUSION

From the many sources above, it can be concluded that the knowledge management model has been widely used by various companies to help companies find strategic ways to maintain the company's existing knowledge. Data mining techniques and tools and statistics are also widely used to explore and process data or information from these companies.

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