



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

Knowledge Management in Manufacturing Industry

Thesis submitted in accordance with the partial requirements of the
Universiti Teknikal Malaysia Melaka
for the Bachelor of Manufacturing Engineering (Manufacturing Process)

By

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APPROVAL

This thesis submitted to the senate of KUTKM and has been accepted as partial fulfillment of the requirements for the degree of Bachelor of Manufacturing Engineering (Manufacturing Process). The members of the supervisory committee are as follow:

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DECLARATION

“I hereby declare that this report and its entire contents is my own work unless specific reference and figure are made in the text. This work is submitted in partially fulfillment of the Bachelor in Manufacturing Process and has not been submitted for any other qualification in any other institute.

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ABSTRACT

Knowledge Management is not only a technology, nor a system, although it uses technology. Knowledge Management is an environment, a culture and a business ethic that enabled with an application of technology, people and business processes. The based definition of Knowledge Management is from Davenport and Prusak (1998). They define Knowledge Management as a knowledge fluid combined framed experience, values, contextual information, and expert insight in which provide a framework of evaluation and incorporation of new experiences and information. This project is intended to implement and practiced the knowledge management in manufacturing industry. This project studies the relationship and interaction between two departments by using the knowledge management. The both department are Engineering Department and Process Department. The Integrated DEFinition (IDEF) of methods is used to supports a paradigm in which it is capable to address the functional and information modeling needs in this project.

ABSTRAK

Pengurusan Pengetahuan bukan satu teknologi mahupun sebuah sistem walaupun ia menggunakan teknologi. Sebaliknya adalah satu persekitaran, sebuah budaya, dan satu etika perniagaan yang boleh digunakan dengan menggunakan teknologi, manusia dan process pengurusan. Definisi Davenport dan Prusak mengenai Pengurusan Pengetahuan adalah yang terbaik dan digunakan sebagai model untuk projek ini. Mereka mendefinisikan Pengurusan Pengetahuan adalah gabungan pengetahuan melalui pengalaman, nilai-nilai konteks maklumat dan wawasan ahli dalam menyediakan satu rangka kerja penilaian dengan menggabungkan pengalaman dan maklumat baru. Projek ini adalah perancang pelaksanaan dan pengamalkan pengetahuan pengurusan dalam Industri Pembuatan. Projek ini dilakukan untuk mengkaji hubungan di antara dua jabatan dengan menggunakan Pengurusan Pengetahuan iaitu Jabatan Kejuruteraan dan Jabatan Proses. "The Integrated DEFinition (IDEF)" adalah kaedah yang digunakan di dalam projek ini untuk menunjukkan hubungan fungsi dan maklumat di antara dua jabatan tersebut.

DEDICATION

For my beloved parents and my younger sister and brother.

For my supervisor and my friend for always been there for me, encouragement and support me.

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It would be impossible to more than scratch the surface in the form of knowledgements to the many individual who have helped me through the semester. However, some have contributed so much that their names literally jump off pages of my life and demand recognition.

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LIST OF ABBREVIATIONS, SYMBOLS, SPECIALIZED NOMENCLATURE

APQC	-	American Productivity and Quality Council
ASIS	-	American Society for Information Science
BPE	-	Business Process Engineering
BPR	-	Business Process Reengineering
DCS	-	Distributed Control System
IDEF	-	Integrated DEFinition
IKMN	-	The International Knowledge Management Network
IT	-	Information Technology
KM	-	Knowledge Management
OSTD	-	Object Static Transition Description
PFD	-	Process Flow Description
RBM	-	Reliability Based Maintenance
5TKMH	-	Five-Tier Knowledge Management Hierarchy

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CHAPTER 1

INTRODUCTION

1.1 Background of project

This project is intended about the implementation and practices of knowledge management in industry. Knowledge Management is getting the right information to the right people at the right time, and helping people create knowledge and share and act upon information. This project starts from the system level to the functional level and their arrangement organization.

Knowledge can lead to innovation, improvement of business processes and overall business performance. But knowledge is often not explicit and in many cases captured in the minds of experts, making it very hard to distribute it throughout the organization. The last decade knowledge has become more and more important for businesses. Acknowledging the importance of knowledge however is not enough; it is much more important to be capable of managing this knowledge.

Being able to create, store, and transfer knowledge can result in sustainable competitive advantages. Knowledge itself however does not necessarily lead to competitive advantage, there has to be the right link between knowledge and action. As Malhotra mentioned that Knowledge is the ultimate competitive advantage only if understood from an action-orientated perspective (Malhotra, 2003). It also is a concept that has

received much interest since the 1990's and has led to large investments by many knowledge intensive firms

Some processes have very critical product specifications, especially as regards the permissibility of contaminants, and an understanding of how to manage the production process accordingly is essential to success in designing and building such as plant. A plant which is designed to produce pigment as a food requires different considerations from a plant which produces pigment as an industrial chemical

The final fundamental concept that needs to be addressed is that process. A process is a set of usually sequential value added tasks that use organizational resource to produce a product or service. A process can be unique to a single department or can cross many departments within an organization. A process is usually repetitive in nature and is needed to make product or achieve a result. The initial perception of processes may be that they are not complicated; that they can managed with relative ease and that arbitrary changes can be made to the process or make improvements

1.2 Objectives of Project

The purpose of this project is to study the implementation and practices of knowledge management in industry. The objective of this project is:

- To study the implementation and practices of knowledge management in manufacturing industry.
- To develop knowledge management model for the organization

1.3 Scopes of Project

To ensure the objective is achieved, some of the important elements must be consideration. There is:

- This study was done at Hunstman Tioxide(M) Sdn.Bhd, Kemaman, Terengganu.
- The point of view of this study starts from the system level to the fuctional level (Product Flow)
- Framework for Knowledge Management implementation
- To study the interaction and inter-relation between Engineering Department and Process Department from Knowledge Management point of view

1.4 Problem Statement

The knowledge management (KM) is very important in the 2000's because it helps organizations to gain competitive advantage and effective working through sharing and re-using knowledge. In the market place of e-business, KM initiatives are used to systematically leverage information and expertise to improve organizational responsiveness, innovation, competency and efficiency (RICE) (Lotus, 2001). There are many reasons why knowledge should be managed properly especially using the collaborative technology. Among these are information overload, technology advancement, increased professional specialization, competition, workforce mobility and turnover, and capitalization of organizational knowledge.

Based on this, Nonaka and Takeuchi (1995) proposed four KM interactions is also called SECI model. This model consists of Socialization (Tacit to tacit using teleconferencing technology), Externalization (Tacit to explicit using e-mail and broadcasting technology), Internalization (Explicit to tacit using visualization technology) and Combination (Explicit to explicit using groupware technology).

CHAPTER 2

LITERATURE REVIEW

2.1 History of knowledge management

Knowledge management (KM) has become an important strategy for improving organizational competitiveness and performance due to the fact that appropriate management and leveraging of knowledge can propel an organization to become more adaptive, innovative, intelligent and sustainable. An overarching theory of knowledge management has yet to emerge, perhaps because the practices associated with managing knowledge have their roots in a variety of disciplines and domains.

A number of management theorists have contributed to the evolution of knowledge management, among them such notables as Peter Drucker, Paul Strassmann, and Peter Senge in the United States. Drucker and Strassmann (2003) have stressed the growing importance of information and explicit knowledge as organizational resources, and Senge has focused on the "learning organization," a cultural dimension of managing knowledge.

The phrase "knowledge management" is a serious matter even in dictionary. To provide a technological base for managing knowledge, a consortium of U.S. companies started the Initiative for Managing Knowledge Assets in 1989. Knowledge management-related articles began appearing in journals like Sloan Management Review, Organizational Science, Harvard Business Review, and

others, and the first books on organizational learning and knowledge management were published (for example, Senge's *The Fifth Discipline* and Sakaiya's *The Knowledge Value Revolution*).

By 1990, a number of management consulting firms had begun in-house knowledge management programs, and several well known U.S., European, and Japanese firms had instituted focused knowledge management programs. Knowledge management was introduced in the popular press in 1991, when Tom Stewart published "Brainpower" in *Fortune* magazine. Perhaps the most widely read work to date is Ikujiro Nonaka's and Hirotaka Takeuchi's *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation* (1995).

By the mid-1990s, knowledge management initiatives were flourishing, thanks in part to the Internet. The International Knowledge Management Network (IKMN), begun in Europe in 1989, went online in 1994 and was soon joined by the U.S.-based Knowledge Management Forum and other KM-related groups and publications. The number of knowledge management conferences and seminars is growing as organizations focus on managing and leveraging explicit and tacit knowledge resources to achieve competitive advantage. In 1994 the IKMN published the results of a knowledge management survey conducted among European firms, and the European Community began offering funding for KM-related projects through the ESPRIT program in 1995.

2.2.1 Types of knowledge

By reading different definitions of knowledge it will soon become clear that knowledge is not very easy to define. It also comes in multiple forms. The main distinction between types of knowledge which is widely accepted is tacit, explicit and implicit (Nonaka and Takeuchi, 1995). The comparison of the three of knowledge can refer in the Table 2.2 and for knowledge culture interaction for three of this knowledge can be refer Figure 2.2

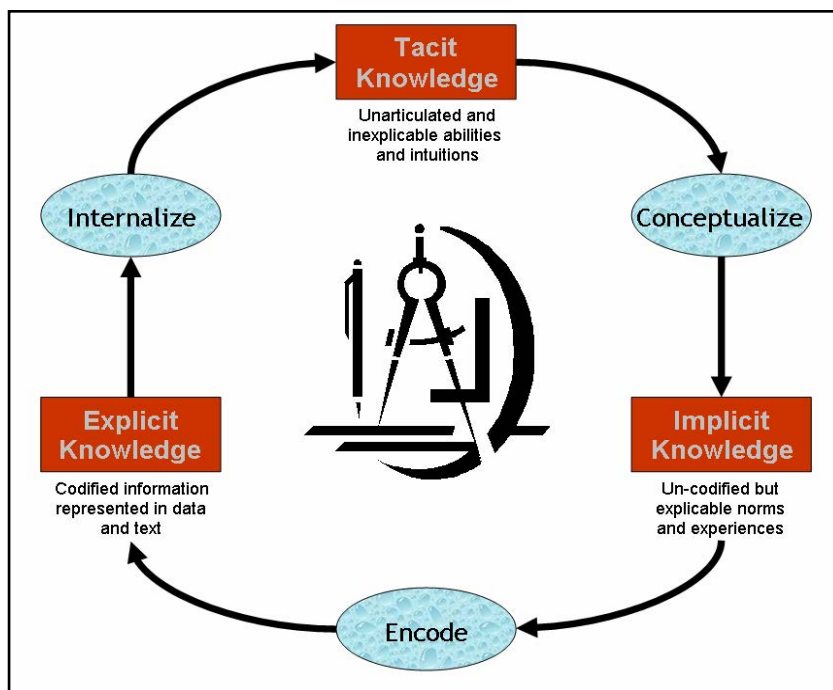


Figure 2.1: Knowledge culture between tacit, explicit and implicit knowledge. (Nonaka and Takeuchi, 1995).

Table 2.1: Comparison between Tacit, Explicit and Implicit Knowledge

Tacit knowledge	Explicit knowledge	Implicit knowledge
Obtained by internal individual processes and stored in human beings such as experience, reflection, internalization or individual talent.	Stored in a mechanical or technological device, such as documents or databases.	Fundamental to all human knowing and for knowledge management in particular.
It is personally held and may not even be recognized as knowledge by its holder and therefore hard to formalize and communicate.	Easily transmitted between individuals and groups, formal, systematic and therefore easy to communicate and share	It has been argued that a large portion of the knowledge required for executing organizational activities and processes.
It is often viewed as the real key to getting things done and creating new value. Also the informal knowledge.	Rather explicit and discrete type. Sometimes referred to as formal knowledge.	Understanding based on ontological, epistemological and methodological assumptions that are highly problematic.

Nonaka and Takeuchi, 1995 also discussed four different ways in knowledge conversion model (Refer Figure 2.2). The elaborate of different ways of knowledge conversion model are:

- i. Tacit knowledge to tacit knowledge (socialization). It is process of sharing experiences which creates tacit knowledge such as shared mental models and technical skills.

- ii. Tacit knowledge to explicit knowledge (externalization). It is a knowledge creation process in that tacit knowledge becomes explicit, taking the shapes of metaphors, analogies, concepts, hypotheses or models.
- iii. Explicit knowledge to explicit knowledge (combination). It involves combining different bodies of explicit knowledge.
- iv. Explicit knowledge to tacit knowledge (internalization). It is a process of embodying explicit knowledge into tacit knowledge and is closely related to ‘learning by doing’.

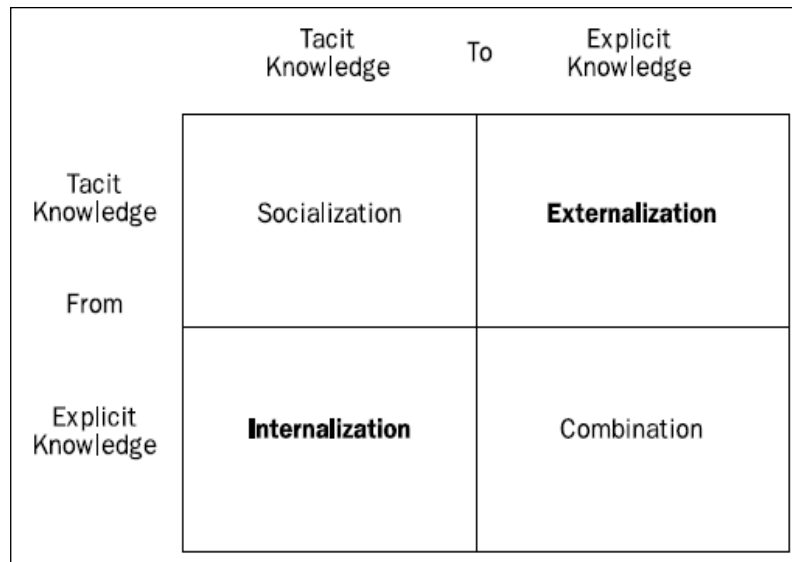


Figure 2.2: Four Different Ways of Knowledge Conversion Model (Nonaka and Takeuchi, 1995)

Using the framework Davenport and Prusak have come to a working definition of knowledge:

“Knowledge is a fluid mix of framed experiences, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers. In