

**DEVELOPMENT OF A KNOWLEDGE MANAGEMENT TOOL FOR THE  
ECOTOURISM COMMUNITY**

**By**

**MUSTAFA AFANDDI BIN MAT NOR**

**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in  
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**Chairman: Professor Ir. Mohamed bin Daud, Ph.D**

**Faculty : Engineering**

Malaysian government is focusing more than ever on its ecotourism industry, which could soon become the nation's number-one source of foreign exchange. This industry is made up of hotels, restaurants, retail operations, transportation, travel agents, marketing organizations, tour operators and a host of other businesses, organizations and components. Therefore, Internet technology is widely used to support the operation of this industry.

The number of documents on ecotourism published on the Internet is growing very fast. This growth has caused difficulty in accessing and managing the information by the ecotourism community in Malaysia. This has lead to a study to be conduced with designing, developing and testing a knowledge management tool called etrNet in order to manage information related to ecotourism. Knowledge management tool provides infrastructure for process of knowledge creation, validation, presentation, distribution, and application to the community. The design process used software development life cycle (SDLC), systematic design with UML and common database design method. The artifacts produced from the method are conceptual model, navigational model, presentational model and database diagram for the system. The application is developed

using Microsoft Active Server Page technologies. The application is then validated by utilize user acceptance test (UAT), web stress test and load test method.

This application can integrate various modules, database and other related data. The system built is Internet-enabled thus it can be accessed by anyone, regardless of time and place. It is hoped that the application can assist the ecotourism community in managing their knowledge resources. Companies can utilize it to create new types of services and enhance their existing products. EtrNet is a knowledge management tool for the ecotourism community that can be easily accessed by anyone at anytime and anyplace.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

## **PEMBANGUNAN ALAT PENGURUSAN PENGETAHUAN UNTUK KOMUNITI ECOTOURISM**

**Oleh**

**MUSTAFA AFANDDI BIN MAT NOR**

**September 2004**

**Pengerusi : Profesor Ir. Mohamed bin Daud, Ph.D**

**Fakulti : Kejuruteraan**

Kerajaan Malaysia telah memfokuskan perhatian dalam sektor industri *ecotourism*, yang mana ianya akan menjadi pendapatan utama pertukaran asing negara. Industri ini melibatkan hotel, restoran, peruncitan, pengangkutan, agensi pelancongan, organisasi pemasaran, operator pelancongan dan lain-lain perniagaan, organisasi dan komponen. Maka, teknologi Internet telah digunakan dengan meluas untuk membantu dalam pengoperasian industri ini.

Bilangan dokumen berkaitan *ecotourism* yang diterbitkan di Internet bertambah dengan pesat. Pertumbuhan ini menyebabkan maklumat tersebut sukar untuk dicapai dan diuruskan oleh komuniti *ecotourism* di Malaysia. Tujuan kajian ini adalah untuk merekabentuk, membangun dan menguji alat pengurusan pengetahuan yang dikenali sebagai *etrNet* untuk menguruskan maklumat berkaitan *ecotourism*. Alat pengurusan pengetahuan ini menyediakan infrastruktur untuk proses pembinaan pengetahuan, pengesahan, persembahan, penyebaran dan penggunaan kepada komuniti terbabit. Proses merekabentuk aplikasi ini adalah menggunakan kaedah SDLC, rekabentuk sistematik dengan UML dan kaedah merekabentuk pangkalan data. Proses tersebut menghasilkan model konsep, model navigasi, model persembahan dan rajah pangkalan data untuk system ini. Aplikasi ini dibangunkan menggunakan teknologi *Microsoft Active Server*

*Page.* Kemudian, aplikasi ini diuji menggunakan kaedah *user acceptance test*, *web stress test* dan *load test*.

Perisian ini mampu mengintegrasikan pelbagai modul, pangkalan data dan pelbagai maklumat lain. Perisian ini adalah berasaskan teknologi internet supaya ianya boleh digunakan oleh sesiapa sahaja pada pelbagai tempat dan masa tanpa mengira sempadan. Perisian ini diharap dapat membantu komuniti ecotorism untuk menguruskan sumber pengetahuan mereka. Syarikat boleh menggunakannya untuk menawarkan perkhidmatan baru dan mempelbagaikan produk yang sedia ada. EtrNet adalah alat pengurusan pengetahuan untuk komuniti ecotourism yang mana ianya boleh digunakan pada bila-bila masa, sesiapa sahaja dan di mana jua.

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Last but not least, I would like to convey my sincerest gratitude and appreciation to my mother, brothers, sisters, colleagues and friends (especially saffiya) who had lend their hands in helping and guiding me throughout the research.

I certify that an Examination Committee met on 29<sup>th</sup> September 2004 to conduct the final examination of Mustafa Afanddi bin Mat Nor on his Master of Science thesis entitled “Development of a Knowledge Management tool for the ecotourism community” in accordance with Universiti Pertanian Malaysia (Higher Degree) Act 1980 and Universiti Pertanian Malaysia (Higher Degree) Regulation 1981. The committee recommends that the candidate be awarded the relevant degree. Members of the Examination Committee are as follows:

**Ir. Lee Teang Shui, Ph.D.**

Associate Professor  
Faculty of Engineering  
Universiti Putra Malaysia  
(Chairman)

**Abdul Rashid Mohamed Shariff, Ph.D.**

Associate Professor  
Faculty of Engineering  
Universiti Putra Malaysia  
(Member)

**Ir. Mohd Amin bin Mohd Soom, Ph.D.**

Professor  
Faculty of Engineering  
Universiti Putra Malaysia  
(Member)

**Safaai bin Deris, Ph.D.**

Professor  
Faculty of Computer Science and Information Technology,  
Universiti Teknologi Malaysia  
(Independent Examiner)

---

**GULAM RUSUL RAHMAT ALI, Ph.D.**

Professor/ Deputy Dean,  
School of Graduate Studies  
University Putra Malaysia

Date:

This thesis submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Master of Science. The members of the Supervisory Committee are as Follows:

**Ir. Mohamed Daud, Ph.D.**

Professor  
Faculty of Engineering  
Universiti Putra Malaysia  
(Chairman)

**Dato' Ir. Mohd Zohadie Bardaie, Ph.D.**

Professor  
Faculty of Engineering  
Universiti Putra Malaysia  
(Member)

**Abdul Rahman Ramli, Ph.D.**

Associate Professor  
Faculty of Engineering  
Universiti Putra Malaysia  
(Member)

---

**AINI IDERIS, Ph.D.**

Professor/Dean  
School of Graduate Studies  
Universiti Putra Malaysia

Date:



## **DECLARATION**

I hereby declare that the thesis is based on my original work except for quotations and citations that have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at UPM or other institution.

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**MUSTAFA AFANDDI BIN MAT NOR**

Date:

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## **LIST OF ABBREVIATIONS**

ASP	Active Server Page
CA	Certified Authority
COM	Component Object Model
DM	Data Mining
DSS	Decision Support System
EIS	Executive Information System
HTML	Hypertext Markup Language
ICT	Information and Communication Technologies
ISS	Internet Information Service
KM	Knowledge Management
LCD	Liquid-crystal display
MIS	Managing Information System
PC	Personal Computer
SDLC	Software Development Life Cycle
SHE	Security, Health & Environment
SME	Small or Medium Enterprises
SSL	Secure Socket Layer
SQL	Structured Query Language
UAT	User Acceptance Test
UML	Unified Modeling Language
WAPT	Web Application Testing
WISE	Web-enable Information Services for Engineering



## CHAPTER 1

### INTRODUCTION

In the modern society, knowledge is a very important factor for preserving valuable heritage, learning new things, solving problems, creating core competencies, and initiating new solutions for both individual and organizations. How to manage this knowledge has become an important issue in the past few decades, and the knowledge management (KM) community has developed a wide range of technologies and applications for both academic research and practical applications (Liau, 2002).

Information and communication technologies have become an essential component of contemporary society, not least through the growth of the Internet. However, many issues concerned with the human aspects of the use of computer-based systems remain problematic despite technological advances. An enhanced ability to collect and process data, or to communicate electronically across time and space, does not necessarily lead to improved human communication and action (Walsham, 2001a).

The tourism industry is made up of hotels, restaurants, attractions, retail operations, transportation, travel agents, marketing organizations, tour operators and a host of other businesses, organizations and components. Tourism has not been credited with attending to the well-being of natural and cultural environments; negative impacts to these environments have been the norm. Ecotourism is a sustainable form of natural resource-based tourism that focuses primarily on experiencing and learning about nature, and which is ethically managed to be low impact, non-consumptive, and locally oriented (control, benefits, and scale). It typically occurs in natural areas, and should contribute to the conservation or preservation of such areas (Fennell, 1999).

The Internet seems more than an organizing tool, an organizing model that promotes and enables decentralized cooperative decision-making. It facilitates the process of information sharing and forging links between organizations and groups around the world (Klein, 2001).

Organizations need an infrastructure for exchanging data, coordinating activities, sharing information, emerging private and public sectors and supporting globalization commerce. There are many parties involved in ecotourism industry, for example an ecotourism operator, ecotourists, government, Tourism Development Corporation (TDC), universities and local communities. An effective system that can manage information that is related to travel and tourism needs to be developed. With the creation of this system it is hoped that etrNet can assist the tourism industry community by getting the right information at the right time.

### **Problem Statement**

The World Wide Web (WWW) has extensively changed the distribution of information. Many new documents are published in the WWW everyday and the number is growing rapidly and continuously. This success and exponential growth makes it increasingly difficult to access, present and manage the information required by users from ecotourism community in Malaysia.

The competitiveness of many organizations in tourism industry depends heavily on how they exploit their knowledge resource. Most information in modern electronic media are mixed media and rather weakly structured. As volumes of information continue to increase rapidly each day, the task of turning them into useful knowledge in ecotourism community has become a major challenge.

Efficient system for manages information in ecotourism community need to be developed. This system will enable interaction between relevant parties in the ecotourism community to ensure a sustainable development in the tourism industry.

### **Objective of the Study**

The objective of this project is to design, develop and test etrNet, a knowledge management tool. EtrNet can be accessed anytime, by anyone at anyplace using the Internet platform. EtrNet is a portal that enables a user to create, refine, and access knowledge that is related to their need and field of study.

The specific objectives of this project are:

1. To design a database that will enable the ecotourism community to exchange data, coordinate activities and share information.
2. To develop a tool that enable users to add, update and retrieve ecotourism data using Internet network.

### **Significance of the Study**

Knowledge is the power to act and to make value-producing decisions (Kanter, 1999, Polanyi, 1962). Knowledge management tool is a system that enables people to learn new things, solve problems, create core competencies and initiate new situations for both individuals and organizations for the present and future. The ecotourism community consists of individuals that come from different backgrounds and locations in Malaysia. They need an easy and efficient tool to share their knowledge thus creating a community of unlimited knowledge boundary.

### **Outcome**

At the end of the project, a knowledge management tool called etrNet is developed. Etrnet consists of a logical and physical design of database that contains different types of information. Etrnet is a portal system that enables user to add, update, refine, and search as well as rate the record in the database.

## **Scope and Limitation**

Knowledge grows when resources are shared. In order for this multiplying process to work optimally for the ecotourism community, the process of communication and collaboration between interested parties must be supported and promoted.

This study relies on existing ecosite data in Malaysia. This set of data is used in the database for testing purposes. Actual ecosite data is bigger compared to the existing data. Actual data is also very dynamic and always changes from time to time.

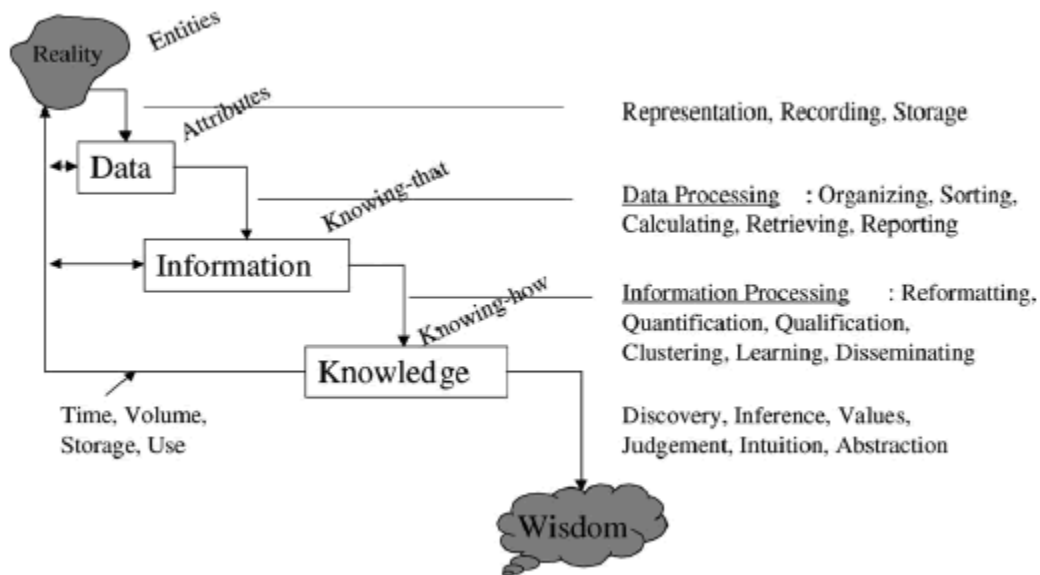
## CHAPTER 2

### LITERATURE REVIEW

This chapter will discuss in detail the related studies on knowledge management, technologies, ecotourism industry and virtual community.

#### Knowledge Management (KM)

Before trying to understand knowledge management, the terms data, information, and knowledge must be clarified. Spiegler suggests a recursive and spiral model of linking the three, where “yesterday’s data are today’s information and tomorrow’s knowledge, which in turn recycles back through the value chain into information and then into data”(Spiegler, 2000). This model, depicted by Spiegler (2000) in Figure 2.1, defines a cycle, almost a life cycle, of knowledge generation. An interesting and diametrically opposed view is proposed by Tuomi (2000) who argues that knowledge is needed before data are collected and indeed it determines what data to store.



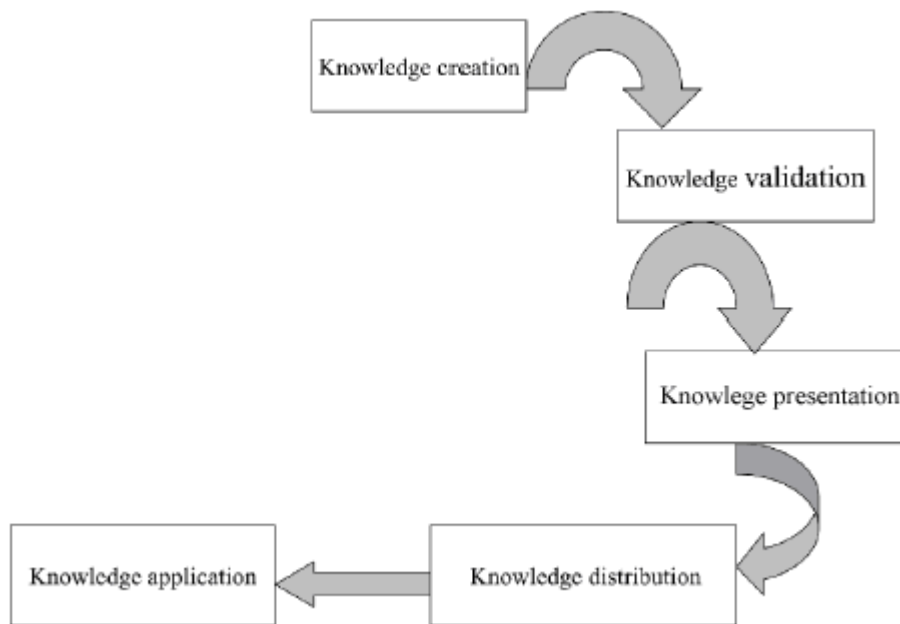
**Figure 2.1:** Data, information and knowledge (Spiegler, 2000)

Knowledge, information, and data are often used interchangeably. In the earliest days of computing, the terms data and information were used with data processing turning the former into the latter. Then, data management and information management were introduced, and now we have knowledge management (KM) and the coming of knowledge based business (Davis, 1994). Serious attempts are being made to distinguish these concepts but definitions of KM are still notably similar to those given in the past for MIS, DSS, EIS and related systems (Speigler, 2000).

Many approaches are used to generate knowledge. Among them is abstract thought, data mining (DM), and the commercial practice of managing and utilizing the organization's data resources. The objective of DM is to detect, interpret, and predict qualitative and quantitative patterns in data, leading to information and knowledge (Speigler, 2000). A wide variety of models and algorithms are employed, from statistics, artificial intelligence, neural nets and databases, to machine learning (Bose, 2002). The core mining techniques applied by researchers are clustering, classification, association, and time series (Fayyad, 2002). These approaches provide mechanism for knowledge management process to the user.

### **Knowledge Management Process**

Knowledge management is defined as a process of knowledge creation, validation, presentation, distribution, and application. These five phases in knowledge management allow an organization to learn, reflect, and unlearn and relearn, usually considered essential for building, maintaining, and replenishing of core-competencies (see Figure 2.2).



**Figure 2.2:** Knowledge management process (Ganesh, 2001)

Knowledge creation refers to the ability of an organization to develop novel and useful ideas and solutions (Marakas, 1999). By reconfiguring and recombining foreground and background knowledge through different sets of interactions, an organization can create new realities and meanings. Knowledge creation is an emergent process in which motivation, inspiration, experimentation, and pure chance play an important role (Lynn *et al.*, 1996). The extent to which knowledge is considered to be novel depends if it solves existing problems more proficiently and effectively or may lead to innovations in the marketplace.

Some firms may choose to organize and interpret existing information in a new light. For example, an accounting firm may choose to use existing accounting standards through different methods, using different procedures of discount, depreciation, and overhead costs. On the other hand, some firms may choose the process of “probe and learn”, through a series of experiments (Lynn *et al.*, 1996). For example, Corning’s optical fiber program, GE’s CT scanner experience, Motorola’s cellular phone development, and

Monsanto's NutraSweet inventions were perfected through a series of probing and learning processes (Lynn *et al.*, 1996).

Knowledge validation refers to the extent to which a firm can reflect on knowledge and evaluate its effectiveness for the existing organizational environment. Because with age, a part of knowledge may be obsolete that needs to be reconfigured and refined to the existing realities. Often, multiple and continual interactions between technologies, techniques, and people may be necessary to test the validity of the knowledge (Bhatt, 2000b). For example, when an organization employs new sets of tools and technologies, and processes and procedures, it may need to update or refine the skills of its employees so that they can swiftly adapt to the new competitive realities.

The question of knowledge obsolescence is a paramount concern to shape the core competencies of the organization. The core competencies cannot be easily imitated; they nevertheless become obsolete if not matched with the existing development in the fields (Nonaka and Takeuchi, 1995).

Knowledge presentation refers to the ways knowledge is displayed to the organizational members. In general, an organization may devise different procedures to format its knowledge base. However, organizational knowledge is distributed and scattered in different locations, embedded into different artifacts and procedures, and stored into different mediums such as print, disks, and optical media. Each of them requires different means of knowledge presentation. Because of these different presentation styles, organizational members often find it difficult to reconfigure, recombine, and integrate knowledge from these distinct and disparate sources. For example, there could be many departments or divisions, which may be processing data through their own devised conventions, often creating redundancy and incompatibility in data standards, formats, and programs. Though organizational members may find the relevant pieces of information by organizing data into separate databases, they will still find it difficult to integrate and interpret information different perspectives (Ganesh, 2001).