Knowledge-based Agricultural Hub

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Abstract

The paper proposes an approach to transform an information based portal into a knowledge-based hub. The study is made on the Agribazaar, which is an information-based portal provided by the Department of Agriculture, Ministry of Agriculture and Agri-based Industry, Malaysia. Basically, the portal has been developed to offer an internet-based commerce infrastructure for buyers and sellers of agriculture products. Agribazaar has been found to be successful in bridging the rural connectivity between users locally and globally. The applications has been accepted and utilized by a substantial number of users in Malaysia and other countries as well. However, the percentage of usage of the portal could be increased if it is made more competitive. One way to obtain a greater percentage of market shares is to reconstruct the portal into a new paradigm which is known as a "knowledge-based" hub. The transformation approach proposed involves five stages namely data repository, metadata, knowledge-based services, application, and security. The approach proposed aims to illustrate the use of existing information to reconstruct and transform the information-based portal into a knowledge-based hub. It is also intended to serve as a model for transforming a information based portal to a knowledge-based hub.

1. Introduction

The technology of ICT has opened up more opportunities for businesses in agriculture, also known as "agribusiness" to expand locally and internationally. Today, agribusiness is operated via the Web through the use of the Internet technology and facilities. Thus, with the new technology, it is possible for stakeholders in the agricultural sector to communicate and exchange information between the locals and

internationals. The stakeholders are thus known as "agri-community."

In Malaysia, a virtual one stop center for specialized interest in agriculture has been developed by the government. Known as the Agribazaar, the virtual portal has been developed for the agri-community who is interested in purchasing or selling agricultural-based products. Besides that, the virtual portal enables the agri-community to obtain, disseminate, promote and discuss on matters related to agricultural and business. The Agribazaar has been in operation since 2004 and various comments from users have been obtained through the portal.

The Agribazaar is an information-based portal provided by the Department of Agriculture, Ministry of Agriculture and Agri-based Industry. It is designed to offer an internet-based commerce infrastructure for buyers and sellers of agriculture products. Agribazaar has been launched on June 2004 with 3 basics modules which are eMake, eSupport and ePayment. The aim of this portal is to improve market reach, efficiency, and productivity among individuals or businesses involve in buying or selling agriculture products.

The Agribazaar is considered as a marketing channel which allows individual or organizations to register with the application in order to promote their businesses. Marketing channels can be of different types, ranging from advertising channels, order processing channels, to customer support channels [1]. Promoting the agricultural products is a challenging tasks due to the nature of the products itself. This requires a good strategy of marketing. Agribazaar has

been designed to support the agribusiness entity via providing a platform to promote agriculture-based products and services. The opportunity given by the Department of Agriculture (DOA) will broaden of market size of agriculture products. This is due to the fact that a web-based applications are easy to access anytime at anywhere in the world. It is proven by the number of foreign registered users of Agribazaar. These registered users are from various countries in the world which includes Bahrain, Bangladesh, China, Indonesia, India, Maldives, Mexico, Morocco, Mongolia, Nigeria, Netherlands, New Zealand, Pakistan, Switzerland, Spain, Vietnam, Sri Lanka, South Africa, Syria, Taiwan, The United States of America, the United Kingdom and some more countries in the world.

This study is the continuation of the previous study made [2]. [2] highlighted how knowledge relating to agriculture is managed, and listed issues and challenges faced by the agri-community. Particularly, the study found that the portal has benefited the agricultural community. Agribazaar has been found to be successful in bridging the rural connectivity between users locally and globally. The applications has been accepted and utilized by a substantial number of users in Malaysia and other countries as well. 15.32% of the users agree that the Agribazaar portal provides useful information especially for the farmers. They found that the portal provides useful directory, and presents lots of information on agriculture. Several users have turned into successful entrepreneurs earning millions of Ringgit Malaysia annually after engaging their business through the portal.

However, the usage of the portal could be increased if it is made more competitive. In the twenty-first-century arena, competitive advantage can be achieved through globalization, technological development, and increasingly rapid diffusion of new technology, and use of knowledge [3]. In order to survive and prosper, systems or applications have to be designed differently. Specifically, they must look to new sources of competitive advantage and engage in new forms of competition. This, in turn, requires a new perspective in the development of a portal. One way is to transform the existing portal into a knowledge based hub.

The paper presents an approach to transform an information based portal into a knowledge-based hub.

2. The Agribazaar

Launched in the year 2004, the Agribazaar is a web portal provided by the Department of Agriculture, Ministry of Agriculture and Agri-based Industry. It has been developed for buyers and sellers of agriculture products [4]. Agribazaar has 3 basic modules eMake, eSupport and ePayment and its main aim is to provide a platform using ICT technology as the underlying tool to improve market reach, efficiency, and productivity among individuals or businesses involve in buying or selling agriculture products.

Generally, the Agribazaar can be seen as a marketing channel that allows individual or organizations promote their businesses. Promoting the agricultural products is a challenging tasks due to the nature of the products itself and thus, requires a good marketing strategy. Agribazaar has been designed to support the agribusiness entity via providing a platform to promote agriculture-based products and services. The opportunity given by the Department of Agriculture (DOA) is intended to broaden the market share in agriculture products.

Users of Agribazaar are global. Besides the local people, the registered users comes from various countries such as Bahrain, Bangladesh, China, Indonesia, India, Maldives, Maxico, Morocco, Mongolia, Nigeria, Netherlands, New Zealand, Pakistan, Switzerland, Spain, Vietnam, Sri Lanka, South Africa, Syria, Taiwan, The United States of America, United Kingdom and others [5].

Statistics on the percentage of local registered users (taken on 13 August 2007) is shown in Table. 1.

Table 1: Percentage of Agribazaar registered users according to states in Malaysia

Country / State	Users (%)
Johor	9.55
Kedah	5.99
Kelantan	4.99
Kuala Lumpur	11.49
Melaka	3.74
N.Sembilan	4.99
Pahang	7.15
Perak	7.15
Perlis	1.01
Putrajaya	1.08
Sabah	1.90
Sarawak	2.48
Selangor	29.10
Terengganu	7.37
W.P. Labuan	0.39
Others	1.74

Table 1: Percentage of Agribazaar registered users according to states in Malaysia
Source: N. Katuk et al., 2007.

The international users are the minority group covering less than 1% of the total Agribazaar users.

3. Information-Based Versus Knowledge-Based Applications

The notion of information-based and knowledge-based applications has been commonly used in information technology disciplines. Even though there are similar in nature, their objectives in actual fact differ. An information-based application system aims to provide static information through presentation of various kind of reports. Decisions are made based on these reports and most of the time management people could not foresee problems to arise. It has been used interchangeably with other terms such as information system, information, computer-based information system, and management information system. It is a system that uses computer technology to perform some or all of its intended tasks [6].

A knowledge-based application system, however, is an application system that incorporates knowledge discovery approach to facilitate its retrieval, analysis, and extraction from a large pool of data. Its major objective is to identify valid, novel, potentially useful, and ultimately understandable patterns in data.

The Agribazaar at present only provides static information for the agricultural community. At mentioned in section 2, the portal even though has been found to be useful has not been able to capture more percentage of users. One way to obtain a greater percentage of market share is to reconstruct the portal into a new paradigm which is known as a "knowledge-based" hub. The next section will discuss the transformation approach.

4. Transformation Approach

The approach incorporates the knowledge-based discovery and business intelligence methodology. Basically the approach consists of four stages: (i) Data repository, (ii) Metadata, (iii) knowledge extraction services, (iv) application, and (v) security. Figure 2 illustrates the respective stages.

(i) Data repository. This stage involves building the data repository. The information published on the portal can be stored in a variety of formats and may reside in a centralized data repository or distributed across multiple sites. It can be in a static form or dynamic. All the information will be gathered and then grouped in clusters.

(ii) Metadata. This stage concerns about controlling the quality of data gathered. All data gathered from different sources should be standardized in terms of format, units, and definitions. At this point data resided has to be completely free from noises, duplications etc.

(iii) Knowledge extraction services. The stage basically identifies various methods to extract knowledge. The extraction stage presents various options, tools, or techniques that can be used by users to uncover hidden pattern or known as "knowledge". Various techniques can be applied for extracting knowledge. Examples are ad-hoc query analysis, data mining, and visualization.

(iv) Application. Several applications identified in stage (iii) will be developed. The applications will be user-friendly such that users do not need to go through complexity process in obtaining knowledge. The applications may incorporate OLAP tools, data mining tasks such as clustering, association and classification, and visualization capabilities.

(v) Security. The final stage involves implementing security measures and threats to the knowledge-based portal. Systems can be damaged for many reasons. Some may be intentional, while others may be unintentional. Proper measures such enforcing access controls, data security controls, administrative controls, network controls, applications controls helps in preventing such occurrences.

The approach can be illustrated as in Fig. 1 below:
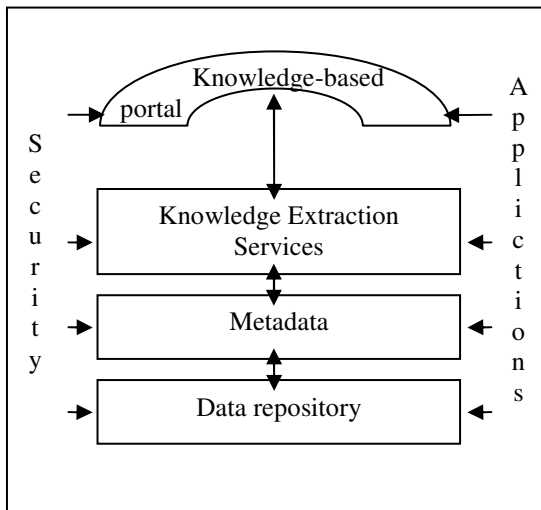
Fig. 1. Knowledge-based portal approach

5. Conclusion

The Agribazaar portal is a growing information source for agricultural users, suppliers, customers to support their businesses. The portal has been accepted and utilized by a substantial number of users in Malaysia. However, the usage of the portal could be increased if it is made more competitive. In order to survive and prosper, systems or applications have to be

designed differently.   Specifically, they must look to new sources of competitive advantage and engage in new forms of competition. This, in turn, requires a new perspective in the development of a portal. One way is to transform the existing portal into a knowledge based hub. The paper presents an approach to transform an information based portal into a knowledge-based hub. The transformation approach presented involves five stages namely data repository, metadata, knowledge-based services, application, and security. The approach proposed aims to illustrate the use of existing information to reconstruct and transform the information-based portal into a knowledge-based hub. It is also intended to serve as a model for transforming a information based portal to a knowledge-based hub.

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