



Critical factors influencing the adoption of data warehouse technology: a study of the banking industry in Taiwan

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Abstract

Previous literature suggests that various factors play crucial roles in the adoption of an information system; however, there is little empirical research about the factors affecting adoption of data warehouse technology, particularly in a single information technology intensive industry. In this study, we used a survey to investigate the factors influencing adoption of data warehouse technology in the banking industry in Taiwan. A total of 50 questionnaires were mailed to CIOs in domestic banks. The response rate was 60%. Discriminant analysis was employed to test hypotheses. The results revealed that factors such as support from the top management, size of the bank, effect of champion, internal needs, and competitive pressure would affect the adoption of data warehouse technology. The results and conclusions from this study may be a good reference for global banks in these aforementioned countries to establish and develop operational strategies, which in turn will facilitate the implementation in overseas branches.

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1. Introduction

With keener and stronger competition, enterprises are much more eager in getting immediate and accurate information to make better decisions. Furthermore, with the rapidly growing need for large amounts of information, enterprises' traditional database is incapable of effectively handling the demands of increasing

online information retrieval, access, update, and maintenance. This inability greatly impacts businesses in a way that the management level cannot utilize internal data efficiently and effectively to assist reliable decision-making in a timely manner. As a result, it is such a critical issue for every business to seek for ways and/or means to access, store, maintain, and utilize the massive data efficiently.

Businesses constantly require a database environment with high flexibility, better adaptability, and good support to make a decision. During the past years, academia and industry have continuously offered different solutions to create such an aforementioned environment. One of the possible alternatives is to adopt data warehouse technology. According to Inmon

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[20], data warehouse technology was described as, “Collecting data from several dispersed sources to build a central data warehouse. Then users can use appropriate data-analyzing tools to store and analyze needed data.” The main application of data warehouse is to process every dimension analysis in internal data by utilizing data survey technology, and it can be a reference of decision-making for enterprises. For example, online analytical processing (OLAP) capability can be a convenient and effective way to query data immediately and to provide various information using multidimensional querying to match with users’ demands.

The banking industry is categorized as one industry with high information demands. Information technology is taken as a key tool to improve the quality of service and to gain a competitive advantage. The Taiwanese banking industry has showed a great interest in adopting data warehouse technology and has started to undertake the challenges of implementing it in order to manage the existing internal and external heterogeneous database. According to the recent research of Wen et al. [40], the adoption of data warehouse technology, which requires huge capital spending and also consumes a good deal of development time, has a very high possibility of failure. Even most of the companies adopting data warehouse technology have successfully accomplished the expected goals established before adoption, and 20% of companies still fail [29]. As a result, it will be critical and essential to have a detailed understanding of critical success factors to ensure the successful adoption of data warehouse technology. Unfortunately, in the area of the adoption of data warehouse technology, most of the research available focused on the technological and operational aspects, and there is very little research to consider the factors in the managerial and strategic levels.

In addition, there is a little prior research to study the key factors affecting adoption of data warehouse technology, especially for the enterprises in Asia. Asia, including Singapore, Taiwan, and mainland China, is a fast-growing market. Many western banks have great interest in establishing Asian branches in cities such as Shanghai, Singapore, Hong Kong, and Taipei. To this end, this study, which reports valuable empirical data on the adoption of data warehouse for the banking industry in Taiwan, can be easily applied

to mainland China, Singapore, Hong Kong, and Taiwan, since these are all with the same culture and speak the same language. It is obvious that the results, findings, and conclusions drawn from this study can be a good reference for global banks to establish and develop operational strategies for their eastern branches.

With a systematic examination about the existing situation and future development of data warehouse technology in the banking industry of Taiwan, this study also investigates the factors affecting the adoption of data warehouse technology. The results presented in this manuscript can certainly help those banks, which might wish to adopt data warehouse technology by overcoming potential obstacles, and hence reducing the high risk of failure during implementation. For other industries intending to adopt data warehouse technology, the results and findings from this study can be used as a case study for the adoption of data warehouse technology in the near future. Furthermore, academia can use the findings of this study as a basis to initiate other related studies in the data warehouse area.

2. Literature review

2.1. Definitions and characteristics of data warehouse technology

The concept of data warehouse technology was initially introduced by Devlin and Murphy [6]. They suggested the construction of a read-only database that stores historical datum for operating and offers integration tools for users to query and search what they want for decision supporting and analyzing. Inmon [19] perceives that data warehouse technology mainly includes four essential characteristics, “subject-oriented,” “integrated,” “time-variant,” and “non-volatile.” “Subject-oriented” attribute actually means the datum is constructed and integrated in many ways according to different topics. In a traditional system, for example, the custom datum from a POS system might be different from other sale systems. By using data warehouse technology, the custom data are isolated as a single topic no matter what system is used. Furthermore, the data will not be in consistency because of its being integrated, extracted,

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