

Chapter X

Business Data Warehouse: The Case of Wal-Mart

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ABSTRACT

The retailing giant Wal-Mart owes its success to the efficient use of information technology in its operations. One of the noteworthy advances made by Wal-Mart is the development of the data warehouse which gives the company a strategic advantage over its competitors. In this chapter, the planning and implementation of the Wal-Mart data warehouse is described and its integration with the operational systems is discussed. The chapter also highlights some of the problems encountered in the developmental process of the data warehouse. The implications of the recent advances in technologies such as RFID, which is likely to play an important role in the Wal-Mart data warehouse in future, is also detailed in this chapter.

INTRODUCTION

Data warehousing has become an important technology to integrate data sources in recent decades which enables knowledge workers (executives, managers, and analysts) to make better and faster decisions (SCN Education, 2001). From a technological perspective, Wal-Mart, as a pioneer in adopting data warehousing technology, has always adopted new technology quickly and successfully. A study of the applications and issues of data warehousing in the retailing industry based on Wal-Mart is launched. By investigating the Wal-Mart data warehouse from various perspectives, we review some of the critical areas which are crucial to the implementation of a data warehouse. In this chapter, the development, implementation, and evaluation of the Wal-Mart data warehouse is described, together with an assessment of the factors responsible for deployment of a successful data warehouse.

Data Warehousing

Data warehouse is a subject-oriented, integrated, time-variant, non-updatable collection of data used in support of management decision-making (Agosta, 2000). According to Anahory and Murray (1997), “a data warehouse is the data (meta/fact/dimension/aggregation) and the process managers (load/warehouse/query) that make information available, enabling people to make informed decisions.” Before the use of data warehouse, companies used to store data in separate databases, each of which were meant for different functions. These databases extracted useful information, but no analyses were carried out with the data. Since company databases held large volumes of data, the output of queries often listed out a lot of data, making manual data analyses hard to carry out. To resolve this problem, the technique of data warehousing was invented. The concept of data warehousing is simple. Data from several existing systems is extracted

at periodic intervals, translated into the format required by the data warehouse, and loaded into the data warehouse. Data in the warehouse may be of three forms — detailed information (fact tables), summarized information, and metadata (i.e., description of the data). Data is constantly transformed from one form to another in the data warehouse. Dedicated decision support system is connected with the data warehouse, and it can retrieve required data for analysis. Summarized data are presented to managers, helping them to make strategic decisions. For example, graphs showing sales volumes of different products over a particular period can be generated by the decision support system. Based on those graphs, managers may ask several questions. To answer these questions, it may be necessary to query the data warehouse and obtain supporting detailed information. Based on the summarized and detailed information, the managers can take a decision on altering the production volume of different products to meet expected demands. The major processes that control the data flow and the types of data in the data warehouse are depicted in Figure 1. For a more detailed description of the architecture and functionalities of a data warehouse, the interested reader may refer to Inmon and Inmon (2002) and Kimball and Ross (2002).

BACKGROUND

Wal-Mart is one of the most effective users of technology (Kalakota & Robinson, 2003). Wal-Mart was always among the front-runners in employing information technology (IT) to manage its supply chain processes (Prashanth, 2004). Wal-Mart started using IT to facilitate cross docking in the 1970s. The company later installed bar codes for inventory tracking, and satellite communication system (SCS) for coordinating the activities of its supply chain. Wal-Mart also set-up electronic data interchange (EDI) and a computer terminal

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