Chapter 4.8

Data Warehouse and Business Intelligence Systems in the Context of E–HRM

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INTRODUCTION

The increased use of information technology leads to the generation of huge amounts of data which have to be stored and analyzed by appropriate systems. Data warehouse systems allow the storage of these data in a special multidimensional data base. Based on a data warehouse, business intelligence systems provide different analysis methods such as online analytical processing (OLAP) and data mining to analyze these data. Although these systems are already widely used and the usage is still growing, their application in the area of electronic human resource management (e-HRM) is rather scarce. Therefore, the objective of this chapter is to depict the components and functionality of these systems and to illustrate the application possibilities and benefits of these systems by selected application examples in the context of e-HRM.

BACKGROUND

In the past the importance of data warehouse and business intelligence systems has continuously increased and the rate of companies using a data warehouse and/or a business intelligence system is rather high (e.g., Watson, Annino, Wixom, Avery, & Rutherford, 2001). An increasing number of case study publications (e.g., Marks & Frolick, 2001; Watson, Wixom, Hoffer, Anderson-Lehman & Reynolds, 2006) and general literature for practitioners (e.g., Humphries, Hawkins, & Dy, 1999)

are further indicators showing the ever-growing importance of these systems. On the other hand, publications concerning these system categories in the context of e-HRM, except for short discussions to some isolated topics as online recruiting (Lin & Stasinskaya, 2002), enterprise resource planning (Ashbaugh & Miranda, 2002), or human resource information systems (Kovach, Hughes, Fagan, & Magitti, 2002) are rather scarce. Data warehouse and business intelligence systems are commonly used in sales or marketing departments. In contrast, their use in HR departments is relatively low (Watson et al., 2001). However, the adoption of these systems in the context of e-HRM offers new potentials to the management of human resources. In the following their technical and functional aspects are depicted.

A data warehouse is defined as a "subject-oriented, integrated, non-volatile and time-variant collection of data in support of management's decisions" (Inmon, 2005, p. 29). So the main task of the data warehouse is to integrate the data from a variety of different source systems existing inside and outside a company in a single data base and to store the data in a multidimensional structure which is optimized to support the management's analysis activities. In doing so the operative systems are no longer charged with the reporting requests of the management which resulted in poor system performance.

The data warehouse is the core component of the data warehouse system which further consists of several components (see Figure 1): the extraction, transformation, and loading system (ETL-system), the administration system, the archiving system, and the metadata repository.

To integrate the data in the data warehouse the ETL-system enables the extraction of data from different source systems. Furthermore the ETL-system transforms the data to eliminate syntactic and semantic defects and harmonizes the structure and value of the data. After the transformation the relevant data is loaded into the data warehouse.

The data warehouse stores the data in multidimensional data structures, so-called cubes, in order to provide optimized analysis possibilities (e.g., Inmon, 2005). The administration system supports the data modeling, the ETL-scheduling, the user administration, and the monitoring. As some data become obsolete and do not have to be accessible for the ongoing management analysis they can be stored in the archiving system. Furthermore the archiving system allows backup of the data. To manage the huge amount of data stored in a data warehouse, information about the data, so-called metadata, such as calculation rules, content description, or usage documentation, is necessary. The depicted components constitute the data warehouse system which is the basis for analysis activities performed by using a business intelligence system.

Business intelligence systems subsume different technologies and methods to access and analyze the data stored in a data warehouse (Turban, Aronson, & Liang, 2005). The core components of business intelligence systems are OLAP and data mining.

Figure 1. Reference architecture of data warehouse and business intelligence systems
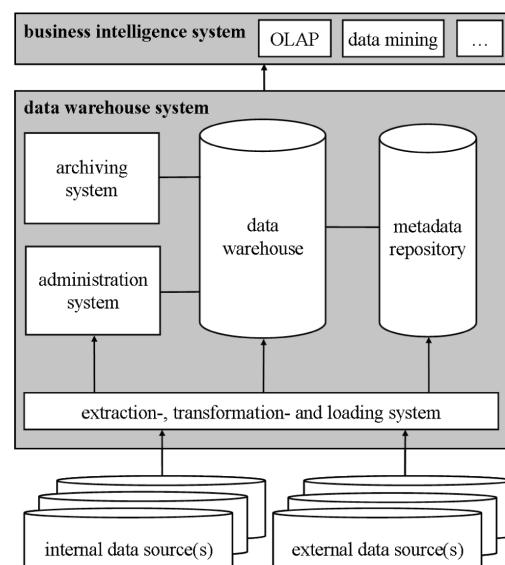
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