ABSTRACT

Information systems (IS) strategic planners debate what is the most appropriate data warehouse (DW) topology for an organization. The primary question is whether to start DW projects with enterprise-wide data warehouses (EDWs) or with smaller-scale data marts (DMs). This article examines the relationship between modes of IT governance and DW topology to determine whether or not the implementation differences in DW topology can be described by differences in IT governance arrangements. Three primary modes of IT governance—centralized, decentralized, and hybrid—were used to arrange key IT activities. A replicated case study approach coupled with a research survey was used to provide a comprehensive understanding of the relationship between modes of IT governance and DW topology. Utilizing information from six organizations, the empirical evidence presented indicates that the organizations with higher levels of centralized IT authority are likely to implement a more centralized data warehousing approach. Key implications for theory and practice are discussed.

Keywords: cross case study, data warehouse topology, data warehousing success, data warehousing technology, IT governance

INTRODUCTION

In the data warehouse literature, it is widely held that a data warehousing (DWG) technology is a cornerstone of the organization’s ability to provide effective information processing (Inmon, 1997; Kelly, 1997b). Many MIS researchers define DW topology as a set of rules or structures, which provide a framework by identifying and understanding how data will move throughout the system and be utilized within the organization (Bischoff & Alexander, 1997; Hammargren, 1996; Inmon, 1997; Kelly, 1997b). DW topology also distinguishes what is being built and how DW should be built in order to offer data consumers current and historical decision support information (Bontempo & Zagelow, 1998; Devlin, 1997; Hackney, 1997b;
Kachur, 2000; Kelly, 1997b; Poe, Klauer, and Brobst, 1998). If implemented correctly, DWG technology can enable and share the discovery and exploration of important business trends and dependencies that otherwise would have gone unnoticed.

Information systems (IS) strategic planners debate what is the most appropriate data warehouse (DW) topology for the organization. The primary question is whether to start DW projects with enterprise-wide data warehouses (EDWs) or with smaller-scale data marts (DMs). Enterprise-wide DW are built in the interests of overall business decision support and contain historical data summarized and consolidated from detailed individual records from a number of operational databases. At the same time, organizations are increasingly turning to smaller-scale DMs as an alternative means of delivering information due to their quicker delivery, lower risk, and lower costs. DMs seem to provide specific solutions to specific business challenges.

In principle, DW can meet information needs and provide strategic business opportunities to enhance or transform products, services, business relationships, markets, and work processes. The conceptual and practical understandings of the underlying evolutionary nature of organizational IT governance arrangements become critically important in establishing appropriate IT decision rights in managing effective use of IT. Many IS researchers suggest that three primary modes of IT governance, including centralized, decentralized, and hybrid, can be used to arrange key IT activities. These three modes vary to the extent in which centralized IS, divisional IS, and line management are vested with authority for the key IT activities. Key IT activities refer to IT infrastructure, IT use, and project management. Thus, this study seeks to explain whether or not the outcome of differences in DW topology could be explained by differences in IT governance arrangements.

The primary emphasis of this study is to gain a comprehensive understanding of the relationship between modes of IT governance and DW topology. This is achieved through a research methodology based on a replicated case study design coupled with a research survey. The research question generally investigated in this context is: Are three essential modes of IT governance likely to differ with respect to the degree of centralization in their DWG implementation approach? The results of data analyses indicate that levels of IT decision-making authority were found to significantly affect the differences in the outcome of DW topology. A highly centralized IT decision-making authority has reflected a dominating enterprise-wide DWG implementation approach.

In today’s highly competitive business environment, DWG technology can enable the discovery, exploration, and sharing of important business trends and dependencies that otherwise would go unnoticed. In this context, the question of whether DW architecture is to be implemented using an enterprise-wide DW or a divisional DM, is interesting but difficult to answer. This study seeks to explain whether or not the outcome differences in DW topology can be explained by differences in patterns of IT-related authority. A potential relationship between the patterns of authority for key IT activities and the choice of data warehouse topology is investigated by utilizing enriched information from each of the scenarios of multiple contingencies. Therefore, this study examines whether the IT governance arrangement lends itself to successful implementation of the data warehouse.
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