Chapter 15
Implementing Business Intelligence in Electricity Markets

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ABSTRACT

The authors elaborate on three basic ideas that should guide the implementation of business intelligence tools. First, the authors advocate for closing the gap between structured information and contextual information. Second, they emphasize the need for adopting the point of view of the organization to assess the relevance of any proposal. In the third place, they remark that any new tool is expected to become a relevant instrument to enhance the learning of the organization and to generate explicit knowledge. To illustrate their point, they discuss how to set up a forecasting support system to predict electricity consumption that converts raw time series data into market intelligence, to meet the needs of a major organization operating at the Spanish electricity markets.

INTRODUCTION

Business intelligence is one of the most promising approaches to achieve organizational success. A number of articles have set the basis for its development and implementation; see Jourdan, Rainer and Marshall (2008) for a review of the literature between 1997 and 2006. Leader companies have documented satisfactory experiences with real time business intelligence; see for instance the case of Continental Airlines in Watson, Wixom, Hoffer, Anderson-Lehman and Reynolds (2006), and Wixom, Watson, Reynolds and Hoffer (2008).

Business intelligence (from now on, BI) has succeeded in pointing out the need of introducing complex, top-level technologies of data analysis "to aid in controlling the vast stocks and flow of business information around and within the organization by first identifying and then processing the information into condensed and useful managerial knowledge and intelligence" (Lönnqvist & Pirttimäki, 2006, p. 32). But the emphasis on the efficient analysis of quantitative structured data has led to an undue dependence on specific tools, and this dependence

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has widened the gap between BI and knowledge management. Therefore, it is no surprise that some authors claim that "KM [knowledge management] competently deal with unstructured information and tacit knowledge which BI fails to address" (Wang & Wang, 2008, p. 623).

In this chapter we elaborate on three basic ideas that should guide the implementation of BI tools, and illustrate their application to convert raw time series data of electricity consumption into market intelligence.

First, we advocate for closing the gap between structured quantitative information and contextual information. In accordance, the performance of rival technologies should be assessed by their ability both to analyze narrow sets of quantitative information in an efficient way, and to capture more general information in order to transform tacit knowledge into explicit knowledge.

Second, we emphasize the need for adopting the point of view of the organization in assessing the relevance of any proposal. If "the effectiveness of BI should be measured based on the knowledge improvement for the organization" (Wang & Wang, 2008, p. 624), then the task must be addressed from the perspective of that particular agent.

Finally, in the third place we remark that any new tool of analysis will only be part of the BI system if it contributes to "the assimilation process, the stage in which knowledge becomes institutionally available, as opposed to being the property of selected individuals or groups" (Nevis, Di Bella & Gould, 1995, p. 74). A foremost requirement for such assimilation is that managers and final users are instructed to understand the rationale of the tool, so that they feel comfortable with it.

BACKGROUND

Business Intelligence: Foundations, Advantages and Limits

Business Intelligence refers to a wide set of procedures for analyzing data and reporting relevant information to managers, in order to improve the decision making process within the organization. BI combines information and knowledge, on one side, and the process to structure and organize them, on the other, to gain insight on the needs of the organization and the actions to be launched to satisfy such needs.

In their review of the literature, Jourdan et al. (2008) summarized the dual aspect of BI by claiming that it is both a process and a product. The product side of BI is the information it provides to managers, and has direct consequences on business performance. The process side consists of the methods used to gather relevant data, analyze it, and disseminate the conclusions to the various levels of the organization. As a consequence, BI is a chief determinant of the organizational performance.

BI is a vast concept. It aims to render a global, comprehensive view of the organization by processing large amounts of data, and extracting hidden patterns that are condensed into managerial intelligence. BI technologies are designed to analyze large databases of quantitative data, which provide systematic information gathered at regular intervals. Data mining techniques, expert systems, neural networks and genetic algorithms have become the prevailing tools for setting up a BI system.

Yet BI has its limits, most of them due to its input. There are many arguments for claiming that the type of databases BI relies on is uncommon in the typical organization. First, companies usually keep their records in different formats and under the control of different units, so they are not available either for quick access by all employees,