Preface

INTRODUCTION

Focus and Content of this Book

Business Intelligence in the Digital Economy: Opportunities, Limitations, and Risks
Wisdom grows in those who help others achieve greatness.
- Colle Davis

Who will build intelligence into your business processes? Organizations that need to gain more efficiency and manage or reduce costs are looking to Business Intelligence (BI) to address their requirements. This book can be used as a tool to explore the vast parameters of the applications, problems, and solutions related to BI. Contributing authors include management consultants, researchers, and BI specialists from around the world. The book has an extensive range of topics for practitioners and researchers who want to learn about the state of the art and science in business intelligence and extend the body of knowledge.

BI is important in helping companies stay ahead of the competition by providing the means for quicker, more accurate and more informed decision making. BI is a general term for applications, platforms, tools, and technologies that support the process of exploring business data, data relationships, and trends. BI applications provide companies with the means to gather and analyze data that facilitates reporting, querying, and decision making. The most agile BI products/services are not confined by industry classification and can

create an infinite number of possible applications for any business department or a combination of departments.

Business Intelligence (BI) provides an executive with timely and accurate information to better understand his or her business and to make more informed, real-time business decisions. Full utilization of BI solutions can optimize business processes and resources, improve proactive decision making, and maximize profits/minimize costs. These solutions can create an infinite number of possible applications for finance, competition monitoring, accounting, marketing, product comparison, or a combination of a number of business areas. The most agile BI solutions can be used in any industry and provide an infinite number of value-increasing possibilities for any organization.

The purpose of this executive's guide on Business Intelligence is to describe what BI is; how it is being conducted and managed; and its major opportunities, limitations, issues, and risks. It brings together some high-quality expository discussions from experts in this field to identify, define, and explore BI methodologies, systems, and approaches in order to understand their opportunities, limitations and risks.

The audience of this book is MBA students, business executives, consultants, seniors in an undergraduate business degree program, and students in vocational/technical training institutes.

The scholarly value of this proposed book and its contribution will be to the literature in information systems/e-business discipline. None of the current books on the market address this topic from a holistic perspective. Some are more geared toward knowledge management or artificial intelligence. Others take a more computer science and engineering perspective or a statistical analysis perspective.

CHAPTER OVERVIEW

Chapter I proposes that the initial perceptions of uncertainty and risk relating to the decisions faced are unlikely to be modified, irrespective of the quantity or quality of the information transmitted and processed by the decision maker. Initial risk perceptions and decisions are fairly robust even when confronted with contradictory information. Empirical evidence presented illustrates that the decision maker may also construct his or her decision-making behavior to constrain the opportunity for new information to alter the initial perceptions and choices made. Chapter I thus explores the premise that increased business intelligence reduces the risk inherent in decision making and provides suggestions on the appropriate management of individuals involved in information search activities.

Chapter II presents a high-level model for employing intelligent agents in business management processes in order to gain competitive advantage by timely, rapidly, and effectively using key, unfiltered, measurements to improve cycle-time decision making. It conceptualizes the transition of intelligent agents utilized in network performance management into the field of business and management. The benefits of intelligent agents realized in telecommunications networks, grid computing, and data visualization for exploratory analysis connected to simulations should likewise be achievable in business management processes.

Chapter III describes the different flavors of data mining, including association rules, classification and prediction, clustering and outlier analysis, customer profiling, and how each of these can be used in practice to improve a business' understanding of its customers. The chapter concludes with a concise technical overview of how each data-mining technology works. In addition, a concise discussion of the knowledge-discovery process — from domain analysis and data selection, to data preprocessing and transformation, to the data mining itself, and finally the interpretation and evaluation of the results as applied to the domain — is also provided along with the moral and legal issues of knowledge discovery.

Chapter IV provides a German industry perspective with a good balance of business and technology issues. Although system performance and product efficiency are continuously increasing, the information and knowledge capability of the enterprise often does not scale to the development of business requirements. This often happens due to complex company structures, fast growth or change of processes, and rising complexity of business information needs on one hand and a slow and difficult IT-improvement process on the other hand. The chapter illustrates which system architecture to use, which logical application structure to develop, how to set up and integrate the implementation project successfully, how to operate and improve these environments continuously, and how to configure, improve, and maintain the reporting, OLAP and HOLAP environments.

Chapter V presents an Intelligent Knowledge-Based Multi-Agent Architecture for Collaboration (IKMAC) to enable such collaborations in B2B e-Marketplaces. IKMAC is built upon existing bodies of knowledge in intelligent agents, knowledge management, e-business, and XML and web services standards. This chapter focuses on the translation of data, information, and knowledge into XML documents by software agents, thereby creating the foundation for knowledge representation and exchange by intelligent agents that support collaborative work between business partners. Some illustrative business examples of application in Collaborative Commerce, E-Supply Chains,

and electronic marketplaces and financial applications — credit analysis, bankruptcy analysis — are also presented. IKMAC incorporates a consolidated knowledge repository to store and retrieve knowledge, captured in XML documents, to be used and shared by software agents within the multi-agent architecture. The realization of the proposed architecture is explicated through an infomediary-based e-Marketplace prototype in which agents facilitate collaboration by exchanging their knowledge using XML and related sets of standards.

Chapter VI takes a closer look at text mining that is a collection of broad techniques for analyzing text, extracting key components, and restructuring them in manner suitable for analysis. As the demands for more effective Business Intelligence (BI) techniques increases, BI practitioners find they must expand the scope of their data to include unstructured text. To exploit those information resources, techniques such as text mining are essential. This chapter describes three fundamental techniques for text mining in business intelligence: term extraction, information extraction, and link analysis; an outline of the basic steps involved; characteristics of appropriate applications; and an overview of its limitations. The limits and risks of all three techniques center around the dependency on statistical techniques — the results of which vary by the quality of available data, and linguistic analysis that is complex but cannot yet analyze the full range of natural language encountered in business environments.

Chapter VII makes a step-by-step analysis of how one retail giant moved quickly to solve a very real problem facing industry executives today, i.e., getting and manipulating necessary data from a large variety of diverse legacy systems running on heterogeneous operating systems and platforms. The case study shows how the organization evaluated available software packages against internal development and nimbly adopted internal development to yield an integrated system that gathers and manipulates data from diverse systems using a common system architecture. The chapter also provides a valuable insight into the area of reclamation of advertising revenue that is valued at 3% of retail sales. The imperative this company faced was the loss of that revenue due to the expiration of the claim period unless its proposed solution came online as planned. The analysis shows, in detail, how a variety of systems' data were linked in a highly unique but effective manner to create the system that has value far greater than the sum of its parts.

Chapter VIII explores the opportunities to expand the forecasting and business understanding capabilities of Business Intelligence (BI) tools by using the system dynamics approach as a complement to simulate real-world behavior. System dynamics take advantage of the information provided by BI

applications to model real-world under a "systems thinking" approach, improving forecasts and contributing to a better understanding of the business dynamics of any organization. It discusses how BI tools can support system dynamics tools, supplying "analyzed and screened data" to models of real-world situations that are illustrated by application examples such as Customer Relationship Management (i.e., supporting the processes of acquiring, retaining, and enhancing customers with a better understanding of their behavior), Value-Based Management (i.e., understanding the dynamics of economic value creation in an organization), and Balanced Scorecard (i.e., modeling a balanced scorecard for a better insight of enterprise performance drivers).

Chapter IX explores data mining and its benefits and capabilities as a key tool for obtaining vital business intelligence information. It includes an overview of data mining, followed by its evolution, methods, technologies, applications, and future. It discusses the technologies and techniques of data mining, such as visual, spatial, human-centered, "vertical" (or application-specific), constraint-based, and ubiquitous data mining (UDM) for mobile/distributed environments. Examples of applications and practical uses of data mining as it transitions from research prototypes to data-mining products, languages, and standards are also presented in this chapter.

Chapter X focuses on the factors necessary for strategic BI success from a managerial perspective. BI results from the various information and human knowledge source systems, as well as the holistic view of the business processes within an organization, with its goal being to maximize the resources, and minimize the inefficiencies that are systematic within an organization. The interrelated and non-sequential factors for BI success are discussed. The chapter discusses the critical success factors that enable strategic BI success, i.e., business process of BI within an organization, managerial understanding of data systems, accountability for BI, and execution on BI.

Chapter XI discusses the role of text mining (TM) in BI and clarifies the interface between them. BI can benefit greatly from the bulk of knowledge that stays hidden in the large amount of textual information existing in the organizational environment. TM is a technology that provides the support to extract patterns from texts. After interpreting these patterns, a business analyst can reach useful insights to improve the organizational knowledge. Although texts represent the largest part of the available information in a company, just a small part of all Knowledge Discovery applications are in TM. By means of a case study, this chapter shows an alternative of how TM can contribute to BI. The case study presented, with the methodological approach described and an adequate tool, can be used to guide an analyst in developing similar applications. A discussion on future trends such as the approach that

uses concepts instead of words to represent documents supports the effectiveness of TM as source of relevant knowledge.

Chapter XII is an explanatory study of a CRM application in a financial services organization to understand decision-making in data warehousing and related decision support systems (DSS), the authors find the DSS provided by these systems limited and a difference in strategy selection between the two groups of user, analysts and advisors, related to incentives. They recommend an extended version of the DSS-decision performance model that includes the individual characteristics of the user as a construct to better describe the factors that influence individual decision-making performance and includes metadata, explanations and qualitative data as explicit dimensions of the DSS capability construct.

Chapter XIII is a two-part survey exploring the role of data integration in E-CRM Analytics for both B2B and B2C firms. The first part of the survey looks at the nature of the data integrated and the data architecture deployed and the second part analyzes technology and organizational value added with respect to the e-CRM initiative. Interestingly, (and as one's intuition may lead one to believe) they find that an organization that integrates data from multiple customer touch points has significantly higher benefits, user satisfaction, and return on its investment than organizations that do not do so. They propose an e-CRM Value framework as a model for generating greater total benefits for organizations engaging in e-CRM projects.

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