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# Organizational Applications of Business Intelligence Management

## Emerging Trends



Richard Herschel



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# Organizational Applications of Business Intelligence Management: Emerging Trends

Richard Herschel  
*Saint Joseph's University, USA*



**BUSINESS SCIENCE**  
*Reference*



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Published in the United States of America by  
Business Science Reference (an imprint of IGI Global)  
701 E. Chocolate Avenue  
Hershey PA 17033  
Tel: 717-533-8845  
Fax: 717-533-8661  
E-mail: [cust@igi-global.com](mailto:cust@igi-global.com)  
Web site: <http://www.igi-global.com>

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Library of Congress Cataloging-in-Publication Data

Organizational applications of business intelligence management: emerging trends / Richard Herschel, editor.  
p. cm.

Includes bibliographical references and index.

ISBN 978-1-4666-0279-3 (hbk.) -- ISBN 978-1-4666-0280-9 (ebook) -- ISBN 978-1-4666-0281-6 (print & perpetual access)

1. Business intelligence--Management. 2. Knowledge management. 3. Information technology--Management. 4. Data warehousing--Management. I. Herschel, Richard T.

HD38.7.O74 2012

658.4'038--dc23

2011049865

British Cataloguing in Publication Data

A Cataloguing in Publication record for this book is available from the British Library.

All work contributed to this book is new, previously-unpublished material. The views expressed in this book are those of the authors, but not necessarily of the publisher.

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## Preface

### INTRODUCTION

This book provides insights into the many issues surrounding the field of business intelligence (BI). BI is still an emerging field, but it is one that has grown rapidly. The reason for this growth is derived from the fact that BI enables better decision-making. BI uses analytics to evaluate data, and this helps organizations to overcome the limitations inherent in traditional decision-making processes.

It is well known that human beings oftentimes do not approach decision-making from an objective and rational perspective. Rather, despite our best intentions, we often, consciously or unconsciously, apply biases based on our beliefs and/or our prior experiences in decision-making processes. We often use “rules of thumb,” or heuristics, to help us assess situations. These heuristics enable us to have an idea about how to weigh our options, even though they might sometimes lead us astray.

BI provides an important alternative to heuristic-based decision-making. It uses data, analytics, and technology to better assess actions, intentions, and capabilities. More specifically, this book defines BI as the *application of data, technology, and analytics in pursuit of insights and knowledge to enable decisions and actions that will yield positive economic value for a firm*.

This definition acknowledges the critical components of BI while allowing for a human component. That is, BI informs decisions and actions, but it also should incorporate other forms of insights and knowledge (e.g. experience, tacit knowledge) that can inform decision-making. Moreover, and maybe most importantly, this definition stresses that the important objective of BI is to facilitate value creation for a firm. Without value creation, BI is simply an exercise in analytics.

When I created the *International Journal of Business Intelligence Research* (IJBIR) I wanted the journal to provide a research forum for demonstrating how BI creates value and/or to discuss issues that inhibit the contribution of BI in decision-making activities. And I wanted to accomplish this by taking a multidisciplinary perspective of BI.

As a result I was eager to solicit papers that examined a wide range of BI issues. BI technologies, analytics, and data issues are certainly important topics to be researched and discussed, but so are peripheral issues such as management behavior, BI education, ethical issues, and other organizational issues.

### SYNOPSIS OF PAPERS

I think the goals of providing a forum for discussing BI issues and taking a multidisciplinary approach to BI were both realized in the very first issue of IJBIR. This issue included five papers.

## Issue 1

Tom Davenport of Babson College contributed the paper, *Business Intelligence and Organizational Decisions*. In this article, Tom notes that the focus on traditional Information Systems is beginning to shift from transactions to decision-making. To discover the nature of this change, he interviews 32 managers in 27 organizations where an attempt has been made to use information to support decision-making. He discovers three different levels of relationships between information and decision-making: loosely coupled information and decisions, structured human decision environments, and automated decisions. The loosely coupled relationship makes information broadly accessible to analyst and decision-makers. It is similar to traditional decision support systems. Here the information can be supplies without regard for difficult and sensitive issues such as managerial psychology, organizational politics, and decision rights. The structured human decision environment is different from this approach in that it has a narrower focus. While the decisions are still made by professionals or managers, a specific effort has been made to improve targeted decision processes or contexts by determining the specific information and other process resources needed to make better decisions faster. In automated decisions, people are not the primary decision-makers – systems are. Here companies embed decision rules and algorithms into key business processes. Tom concludes by proposing a four-step process that will help organizations to better link decisions to the information that informs them.

In the second article of this issue, Barbara Wixom and Hugh Watson examine *The BI-Based Organization*. In this paper, the authors provide a brief history of BI and then their own definition of BI, with a focus on using data extraction for decision-making. They then proceed to define a best practice environment for the BI information systems architecture and propose three targets that organizations can aim for when implementing BI: addressing a few applications, establishing a BI infrastructure, and organizational transformation. The authors then discuss the important movement by organizations such as Continental Airlines to real-time BI, and they detail the value that this real-time BI is creating for both the company and its customers. Three BI targets and their costs and benefits are presented where it is explained that in BI, companies often get what they pay for. That is, there is an association between the kinds of benefits realized by BI and an organization's BI target.

In *Decision Support as Knowledge Creation: A Business Intelligence Design Theory*, David Steiger details a business intelligence design theory for decision support as knowledge creation. In doing so, he proposes process design kernel theories for each of the four types of knowledge creation in Ikujiro Nonaka's influential "knowledge spiral," as well as testable design hypotheses. He then provides an example of instance-based decision support systems (DSS) as knowledge creation that satisfies both the product design hypothesis and the process design hypotheses of the business intelligence design theory. He concludes his paper by discussing potential applications and research directions of DSS as knowledge creation.

The paper, *Business Plus Intelligence Plus Technology Equals Business Intelligence*, reveals BI's development as a strategic application. Authors Ira Yermish, Virginia Miori, John Yi, Rashmi Malhotra, and Ronald Klimberg explain how the parallel developments of Information Technology at the operational business level and decision support concepts progressed through the decades of the twentieth century with only minimal success at supporting strategic applications. However, they then posit and detail how the twin technological developments of the World Wide Web and very inexpensive mass storage provided a new environment that facilitated the convergence of business operations and decision support, emerging into what is now known as BI.

The last article of the first issue deals with the important issue of finding information needed for decision-making. In *Strategies for Document Management*, Karen Corral, David Schuff, Gregory Schymik, and Robert St. Louis examine ways to improve keyword search performance. They argue that existing keyword search techniques have failed to adequately meet the needs of enterprise users, due to the size of document stores, the distribution of word frequencies, and the indeterminate nature of languages. Taking a different approach, they draw on the successes of dimensional data modeling and subject indexing and test their approach by performing search queries on a large research database. The authors find that by incorporating readily available subject indexes into the search process, they obtain order of magnitude improvements in the performance of search queries. Their performance measure is the ratio of the number of documents returned without using subject indexes to the number of documents returned when subject indexes are used. The authors then explain why the observed tenfold improvements in search performance using their research database can be expected to occur for searches on a wide variety of document stores.

## Issue 2

The second issue of *IJBIR* was a special issue edited by Ronald Klimberg and Virginia Miori, both colleagues of mine at Saint Joseph's University. Both Ron and Ginny have an analytics background. Collaborations presented in this issue range from the classical application of production scheduling, to innovative approaches to developing private-public research partnership, data mining, knowledge transfer, and the use of analytics in support of business processes and decision making. The title of the issue was *Special Issue on Closing the Gap: Academic and Industry Collaborations in Business Intelligence*.

The first paper is actually written by eight coauthors from Villanova University: Thomas Coglein, George Diehl, Eric Karson, Matthew Liberatore, Wenhong Luo, Robert Nydick, Bruce Pollack-Johnson, and William Wagner. Their paper, *The Current State of Analytics in the Corporation: The View from Industry Leaders* reports the results of a questionnaire developed and administered to senior-level executives regarding their views on business analytics. The results show that despite the executives' acknowledgement of BI's importance, there is no consensus as to how best to apply or organize business intelligence efforts.

The second paper, entitled, *Application of Triplet Notation and Dynamic Programming to Single-Line, Multi-Product Dairy Production Scheduling*, is by Virginia Miori and Brian Segulin. In this paper, the authors present triplet notation applied to the production scheduling of a single production line used for milk, juice, and carnival drinks. The authors state that once production and cleaning cycles are characterized as triplets, the problem is then formulated and the Lagrange Relaxation method is applied, and the final solution is generated using dynamic programming. The authors find that their analysis creates a pull process yielding reductions in cost, consistency in scheduling, and greater plant efficiency.

Greg Smith, Thilini Ariyachandra, and Mark Frolick, all from Xavier University, then present a paper entitled, *Business Intelligence in the Bayou: Recovering Costs in the Wake of Hurricane Katrina*. As we all know, during the 2005 Atlantic hurricane season, Hurricane Katrina wreaked havoc on New Orleans. Significant damage to the Gulf region forced the Federal Emergency Management Agency (FEMA) to begin an unprecedented cleanup effort. The removal and disposal of debris was not only a challenge for landfill capacity but also for the administration of drivers, trucks, and debris type. With the debris removal workforce and certified hauling vehicles changing rapidly, record keeping and fraud detection proved difficult. In this paper, the authors introduce the results of a data driven manpower audit for one parish in



the greater New Orleans area that consolidated records and reconciled multiple record keeping systems. The authors' findings bring to light the failings in record keeping during this disaster and highlight how a simple business intelligence application can improve the accuracy and quality of data and save costs.

The fourth paper, by Alan Olinsky and Phyllis Schumacher of Bryant University, is entitled *Data Mining for Health Care Professionals: MBA Course Projects Resulting in Hospital Improvements*. In this paper, the authors discuss a data mining course that was offered for a cohort of health care professionals employed by a hospital consortium as an elective in a synchronous online MBA program. The students learned to use data mining to analyze data on two platforms, Enterprise Miner, SAS (2008) and XLMiner (an EXCEL add-in). The final assignment for the semester was for the students to analyze a data set from their place of employment. This paper describes the projects and resulting benefits to the companies for which the students worked.

The fifth paper also describes a classroom experience with BI. George Sillup, Ronald Klimberg, and David McSweeney's paper entitled *Data-Driven Decision Making for New Drugs: A Collaborative Learning Experience* discusses how two courses, advanced decision-making and pharmaceutical marketing, are combined in a collaborative process to mimic how the pharmaceutical industry determines the potential of new drugs. Integrated student teams worked together to complete semester-long projects and taught each other their respective knowledge areas—marketing and statistics. Real-world data for medical and pharmacy claims payments were “cleaned” and mined by students to analyze usage and cost patterns for anti-hypertensive and anti-hypercholesterolemia drugs currently on the market. Analyses included merging the medical and pharmaceutical data records to derive individual electronic patient records, which were the basis of financial projections for the new drugs. Importantly, the single patient record was found to be congruent with the needs of the stakeholders currently working to reform U.S. healthcare delivery.

*Towards Private-Public Research Partnerships Combining Rigor and Relevance in DWH/BI Research: The Competence Center Approach* was the last paper presented in this issue and is written by Anne Cleven, Robert Winter, and Felix Wortmann, all from the University of St. Gallen, Switzerland. The authors argue that business intelligence (BI) and data warehousing (DWH) research represent two increasingly popular, but still emerging fields in the Information Systems (IS) academic discipline. As such, the authors assert that they raise two substantial questions: Firstly, “how rigorous, i.e., fundamental, constituent, and explanatory, is DWH BI research?” and, secondly, “how relevant, i.e., useful and purposeful, is this research to practitioners?” In this article, the authors uphold the position that relevance and rigor are by no means dichotomous, but two sides of the same coin. They assert that this requires well-defined approaches and guidelines—for scholarship in general and DWH/BI research in particular. Therefore, their paper proposes the competence center (CC) approach—a private-public partnership between academia and practice. The authors illustrate how the CC approach can be applied within the field of DWH/BI and suggest that a close link between research and practice supports both enhancing relevance to practice and strengthening rigor of research.

### Issue 3

The third issue of *IJBIR* contained five articles. The first paper examines *The Role of Culture in Business Intelligence*. Authors Jore Park, Wylci Fables, Kevin Parker, and Philip Nitse argue that global business intelligence will struggle to live up to its potential if it fails to take into account, and accurately interpret, cultural differences. Their paper supports this assertion by considering the concept of culture, explaining

its importance in the business intelligence process, especially in foreign markets, and demonstrating that attention to culture is currently inadequate in most international business intelligence efforts. Without a tool capable of modeling social interaction in disparate cultures, the authors believe that BI efforts will under perform when extended to the global arena. They present a Cultural Simulation Modeler that they assert can be used as a means for enhancing essential cultural awareness. The core components of the modeler are explained, as are the limitations of automated information gathering and analysis systems.

In *Do Users Go Both Ways?: BI User Profiles Fit BI Tools*, Hamid Nemati, Brad Earle, Satya Arekapudi, and Sanjay Mamani state that a challenging task for a data warehouse team is that of identifying users by their information needs and skills, and then providing the BI (Business Intelligence) tools that support each group to do their job effectively and efficiently. They note that recent studies have shown that the BI market place is saturated with a bewildering array of capabilities, functions, and software suites and that the current lack of consistent interpretation of Business Intelligence has created some confusion in the market place. Their paper defines a framework to identify different user groups in an organization and map their needs and requirements to the different functionalities offered by different BI tool vendors. Through a literature review, the authors establish clear definitions of users groups and a mapping of BI tools to functional needs are defined. Based on that information, a questionnaire is developed that probes for the relationships between user types, tools, functions and other perceived values. Responses from 154 professionals are then used to develop a road map for a data warehouse project teams selection of BI tools.

Kenneth Lawrence, Dinesh Pai, Ronald Klimberg, and Sheila M. Lawrence examine *Enterprise Information System and Data Mining*. Lawrence et al. state that the advent of Information Technology and the consequent proliferation of Information Systems have lead to the generation of vast amounts of data, both within the organization and across its supply chain. Moreover, they assert that enterprise Information Systems (EIS) have added to organizational complexity, and at the same time, created opportunities for enhancing its competitive advantage by utilizing this data for business intelligence purposes. The authors note that various data mining tools have been used to gain a competitive edge through these large databases. The authors then discuss EIS-aided business intelligence and data mining as applicable to organizational functions, such as supply chain management (SCM), marketing, and customer relationship management (CRM) in the context of EIS.

Arjen Vleugel, Marco Spruit, and Anton van Daal present their paper *Historical Data Analysis through Data Mining From an Outsourcing Perspective: The Three-Phases Model*. In it, they point out that the process of historical data analysis through data mining has proven valuable for the industrial environment. They note that there are many models available that describe the in-house process of data mining, but that many companies either do not have in-house skills or do not wish to invest in performing in-house data mining. The authors investigate the applicability of two well-established data mining process models in an outsourcing context. They observe that both models cannot properly accommodate several key aspects in this context; therefore, they propose the *Three-Phases Method*, which consists of data retrieval, data mining and results implementation within an organization. Each element is presented as a visual method fragment, and the model is validated through expert interviews and an extensive case study at a large Dutch staffing company. Both validation techniques substantiate the authors' claim that the *Three-Phases Model* accurately describes the data mining process from an outsourcing perspective.

In the final paper of this issue, Nenad Jukic and Miguel Velasco state that defining data warehouse requirements is widely recognized as one of the most important steps in the larger data warehouse system development process. Their paper, *Data Warehousing Requirements Collection and Definition: Analysis of a Failure* examines the potential risks and pitfalls within the data warehouse requirement collection

and definition process. A real scenario of a large-scale data warehouse implementation is given, and details of this project, which ultimately failed due to inadequate requirement collection and definition process, are described. The presented case underscores and illustrates the impact of the requirement collection and definition process on the data warehouse implementation, while the case is analyzed within the context of the existing approaches, methodologies, and best practices for prevention and avoidance of typical data warehouse requirement errors and oversights.

## Issue 4

The first paper of the fourth issue is entitled, *What is Business Intelligence?* In this paper, authors Éric Foley and Manon G. Guillemette argue that there has been growing corporate interest in business intelligence (BI) as a path to reducing costs, improving service quality, and refining decision-making processes. However, they note that while BI has existed for years, it has difficulties reaching what specialists in the field consider its full potential. The authors then examine disparities in how the constructs of business intelligence are defined and understood, which they assert may impede an understanding of what BI represents to business leaders and researchers. The main objective of this research is to more clearly understand the emerging concept of BI. In this regard, the authors analyze articles from the scientific and professional literature to have a comprehensive understanding of business intelligence as both a product and a process. This research proposes a global overview of the conceptual foundations of BI, which can help companies understand their BI initiative and leverage them to the strategic level.

Olivera Marjanovic [now Co-Editor of IJBIR] contributes *The Importance of Process Thinking in Business Intelligence* as the second article in this issue. Olivera discusses the fact that while the growing field of operational BI has resulted in increasing interest in BI-supported Business Processes (BPs), including their management and ongoing improvement, this has led BI practitioners to treat these efforts in a manner similar to Business Process Management (BPM) – a field that is closely related to business performance management. However, she asserts that current approaches to BPM and operational BI integration have been limited and reduced to dealing with issues related to technical integration of BPM and BI systems. Olivera contends that instead, firms should adopt process-thinking BI. By doing so, she says, more opportunities for business value creation could be discovered through an analysis of the non-technical aspects of BI and BPM integration - including strategy alignment, human-centered knowledge management, and ongoing improvement of BI supported processes. She proposes a theoretical framework founded in the related research conducted in the BPM, BI, and Knowledge Management (KM) fields, describing the ways it has been used to guide ongoing empirical research in diverse case organizations across different industry sectors.

The third article is by Dorothy Miller, who provides commentary about *Improving Business Intelligence: The Six Sigma Way*. Miller argues that BI has never been examined with the same rigor as demanded for any other organization investments. She states that although global investment in BI has reached over 6 billion dollars, business managers continue to follow tradition and leave the management of business intelligence to the technocrats. In this paper, she asserts that a critical need exists to apply the same Six Sigma methods (that have worked for the rest of the organization) to business intelligence operations and products. This proven structured approach, including the associated rigor and metrics, can be customized and integrated into a program that will allow effective management of business intelligence. Miller states that the proposed Six Sigma program for business intelligence will ensure that an organization can gain control, improve understanding of operations and products, and improve the value of this crucial organization investment.

In the concluding paper, Rubén A. Mendoza examines *Business Intelligence 2.0: The eXtensible Markup Language as Strategic Enabler*. Mendoza explains that BI 2.0 is an umbrella term used to refer to a collection of tools that help organizations extend their BI capabilities using Internet platforms. He states that BI 2.0 tools can enable the automatic discovery of distributed software services and data stores, greatly increasing the range of market options for an organization. The development cycle for these tools, he says, is still in its early stage, and much work remains. However, some technologies and standards are already well understood in order to make a significant impact. His paper provides an overview of the eXtensible Markup Language (XML) and related technologies supporting the deployment of web services and service-oriented architectures (SOA). Mendoza summarizes the critical importance of these technologies to the emergence of BI 2.0 tools. He also explores the current state of Internet-enabled BI activities and strategic considerations for firms considering BI 2.0 options.

## HOW THESE PAPERS ARE ORGANIZED FOR THIS BOOK

Having provided a summary of all of the papers included in the first volume of IJBIR, I decided that for this book, they should be presented in an order different than they appeared in the four issues. I found that they could be organized around three key themes -- Organizational Issues, Analytic Issues, and Technology Issues. While there is potential overlap in these categories, each one presents a good overview of the types of BI concerns being examined relative to the three themes. Hence the papers are presented in the following chapter order in this book.

### *Organizational Issues*

Article	Authors	Issue
Business Intelligence and Organizational Decisions	Thomas H. Davenport (Babson College, USA)	<i>Volume 1: Issue 1</i>
Business Plus Intelligence Plus Technology Equals Business Intelligence	Ira Yermish (Saint Joseph's University, USA), Virginia Miori (Saint Joseph's University, USA), John Yi (Saint Joseph's University, USA), Rashmi Malhotra (Saint Joseph's University, USA), and Ronald Klimberg (Saint Joseph's University, USA)	<i>Volume 1: Issue 1</i>
Business Intelligence in the Bayou: Recovering Costs in the Wake of Hurricane Katrina	Gregory Smith (Xavier University, USA), Thilini Ariyachandra (Xavier University, USA), and Mark Frolick (Xavier University, USA)	<i>Volume 1: Issue 2</i>
The Role of Culture in Business Intelligence	Jore Park (IndaSea, Inc., USA), Wylci Fables (IndaSea, Inc., USA), Kevin R. Parker (Idaho State University, USA), and Philip S. Nitse (Missouri Western State University, USA)	<i>Volume 1: Issue 3</i>
What is Business Intelligence?	Éric Foley (Université de Sherbrooke, Canada), and Manon G. Guillemette (Université de Sherbrooke, Canada)	<i>Volume 1: Issue 4</i>
The Importance of Process Thinking in Business Intelligence	Olivera Marjanovic (University of Sydney, Australia)	<i>Volume 1: Issue 4</i>



### *Analytic Issues*

Article	Authors	Issue
Strategies for Document Management	Karen Corral (Boise State University, USA), David Schuff (Temple University, USA), Gregory Schymik (Arizona State University, USA), and Robert St. Louis (Arizona State University, USA)	<i>Volume 1: Issue 1</i>
The Current State of Analytics in the Corporation: The View from Industry Leaders	Thomas Coghlan (Villanova University, USA), George Diehl (Villanova University, USA), Eric Karson (Villanova University, USA), Matthew Liberatore (Villanova University, USA), Wenhong Luo (Villanova University, USA), Robert Nydick (Villanova University, USA), Bruce Pollack-Johnson (Villanova University, USA), and William Wagner (Villanova University, USA)	<i>Volume 1: Issue 2</i>
Application of Triplet Notation and Dynamic Programming to Single-Line, Multi-Product Dairy Production Scheduling	Virginia M. Miori (St. Joseph's University, USA), and Brian Segulin (RoviSys Co., USA)	<i>Volume 1: Issue 2</i>
Data Mining for Health Care Professionals: MBA Course Projects Resulting in Hospital Improvements	Alan Olinsky (Bryant University, USA), and Phyllis A. Schumacher (Bryant University, USA)	<i>Volume 1: Issue 2</i>
Data-Driven Decision Making for New Drugs: A Collaborative Learning Experience	George P. Sillup (Saint Joseph's University, USA), Ronald K. Klimberg (Saint Joseph's University, USA), and David P. McSweeney (Healthcare Data Management, Inc., USA)	<i>Volume 1: Issue 2</i>
Towards Private-Public Research Partnerships Combining Rigor and Relevance in DWH/BI Research: The Competence Center Approach	Anne Cleven (University of St. Gallen, Switzerland), Robert Winter (University of St. Gallen, Switzerland), and Felix Wortmann (University of St. Gallen, Switzerland)	<i>Volume 1: Issue 2</i>
Improving Business Intelligence: The Six Sigma Way	Dorothy Miller (Industry Consultant in Business Intelligence, USA)	<i>Volume 1: Issue 4</i>

## FUTURE BI RESEARCH

While the chapters provided in this book are important to BI research, I hope that BI research will be further expanded to address other pressing issues. For example, in the past year I identified 10 opportunities that I think warrant BI research:

### 1. BI and Censorship

I read an article in the March 28<sup>th</sup> Wall Street Journal that was entitled "U.S. Products Help Block Mideast Web." The article discusses how telecommunication companies can use Netsweeper's Internet content filtering and Web threat management solutions. Netsweeper is marketed to educational institutions, government organizations, businesses, service providers, and OEM partners around the world services to block Web content that the client deems to be inappropriate. Relative to the Mideast, the

### *Technology Issues*

Article	Authors	Issue
The BI-Based Organization	Barbara Wixom (University of Virginia, USA), and Hugh Watson (University of Georgia, USA)	<i>Volume 1: Issue 1</i>
Do Users Go Both Ways?: BI User Profiles Fit BI Tools	Hamid Nemati (University of North Carolina at Greensboro, USA), Brad Earle (KB Earle Associates, USA), Satya Arekapudi (CommScope, Inc., USA), and Sanjay Mamani (Republic Mortgage Insurance Company, USA)	<i>Volume 1: Issue 3</i>
Enterprise Information System and Data Mining	Kenneth D. Lawrence (New Jersey Institute of Technology, USA), Dinesh R. Pai (Penn State Lehigh Valley, USA), Ronald Klimberg (Saint Joseph's University, USA), and Sheila M. Lawrence (Rutgers University, USA)	<i>Volume 1: Issue 3</i>
Historical Data Analysis through Data Mining From an Outsourcing Perspective: The Three-Phases Model	Arjen Vleugel (Utrecht University, The Netherlands), Marco Spruit (Utrecht University, The Netherlands), and Anton van Daal (In Summa, The Netherlands)	<i>Volume 1: Issue 3</i>
Data Warehousing Requirements Collection and Definition: Analysis of a Failure	Nenad Jukic (Loyola University Chicago, USA), and Miguel Velasco (University of Minnesota, USA)	<i>Volume 1: Issue 3</i>
Business Intelligence 2.0: The eXtensible Markup Language as Strategic Enabler	Rubén A. Mendoza (Saint Joseph's University, USA)	<i>Volume 1: Issue 4</i>

story mentions that the product is used to block content by using a pre-established list of 90+ categories to meet government rules and regulations, based on social, religious, or political ideals.

Then on Sunday, June 13<sup>th</sup>, the New York Times reported that the Obama administration was leading a global effort to launch a "shadow" Internet and mobile phone systems that dissidents can use to undermine repressive governments that seek to silence them by censoring or shutting down telecommunications networks.

Besides the fact that the US seems to be facilitating both Internet censorship and ways around it, I could not but help to wonder about the impact of censorship on BI. If organizations are censoring information, then some people surely have more access to data than others. This obviously presents a clear disparity in BI sense-making capabilities.

I have no idea how much organizations censor data, but it seems to me that this is a topic worth exploring. Censorship compromises what people know, what data they base their decision upon, and eventually what they do. By manipulating data, organizations may inadvertently adversely affect the integrity of their own decision-making capabilities, and compromise firm actions in unintended ways. From a research perspective, it would be interesting to know how much censorship occurs in firms and whether employees find measures to thwart it.

## 2. BI Education

I recently reported the results of a survey of BI professionals. One of the findings was that these individuals recognize the need for more BI talent and for continuing BI education. The problem is that

there are only a handful of academic institutions worldwide that offer comprehensive business intelligence/analytics programs that can address this issue. While there are institutions that offer BI courses or MBA BI concentrations, these are inadequate for developing the full repertoire of skills needed by these professionals. Hopefully, other institutions of higher education will recognize the educational need here and develop new BI-specific comprehensive programs. However, to do this model BI undergraduate and graduate curriculums will need to be developed.

### 3. BI Organization

There are basically three means by which BI can be organized: centralized, decentralized, or automated. A centralized approach tends to focus on BI competency centers, while the decentralized approach focuses on client mentoring and support. Automated BI is a whole other animal where the process of developing, deploying, and maintaining BI solutions is streamlined with automation and where BI solutions are delivered on demand. Each approach provides its own rationale and proposes its own benefits while typically condemning the other approaches. Which is the better or preferred approach is open to opinion and experience. Hence, I suspect that this topic is one that should be scrutinized in more depth to establish parameters for choosing among and deploying any one of these options.

### 4. BI and Value Creation

The Gartner Group has reported that BI and value creation are of key interest to CIOs. Gartner states that in 2011, CIOs are focusing on three key things: increasing enterprise growth, reducing costs, and attracting new customers. It seems to me that these are things that CIOs should be focusing on every year! Anyhow, what is not clear is how BI is impacting these objectives. Research should provide evidence as to how BI is making a tangible difference in these endeavors.

### 5. Crime Management

According to the company Corporate Crime Management (CCM) (<http://www.assesstherisk.com/>), crime is escalating at an alarming rate. Some of the reasons that CCM cites for this increased crime are reduced corporate loyalties, global economic turmoil, and technology. In fact, an chapter in the February 4, 2011 Wall Street Journal reported that a Deloitte survey revealed that 79% of strategic buyers aborted or renegotiated a deal over corruption issues.

More research is needed to understand the impact of BI on crime management. In corporate crime management, we need to better comprehend opportunities and issues in investigative intelligence, risk analysis, and counter and competitive intelligence. In addition, it would probably be prudent to understand the successes and failures when BI is used to modify policing tactics in public crime management

### 6. Crisis Management

It is important to explore how BI is employed to help organizations learn about and deal with a major unpredicted event. In other words, how good is BI at crisis prevention and management? A crisis involves incidents that can threaten or do harm to an organization, its stakeholders, or the general public. Heaven knows that there have been a lot of calamities recently – upheaval in the Mid East, European

economic uncertainties, and the US debt and its credit rating! More research is warranted to understand how and when firms become aware of these situations and whether BI helps them to prevent or manage any associated risk.

## 7. Customer Feedback Management

According to Gleanster Research (<http://www.gleanster.com/>), BI can be used to improve customer feedback management. Gleanster's research finds that customer problem resolution effectiveness, customer retention, and customer satisfaction can all be increased via the use of BI. Research needs to be done to better understand how BI is improving the customer experience via the capture, analysis, and actions taken based on customer feedback. Moreover, critical success factors and mitigating issues need to be identified.

## 8. Location Data

Businesses are being built and enhanced by using people's cell data! For example, insurers, carmakers, and shopping malls want cell data to track customers. And it is pretty easy to get since 47 of the 101 most popular cell-phone apps (iPhone and Android) can share location information with interested parties. Heck, the Dutch government used it to set speed traps! Although the US Senate plans a hearing to consider a law to protect consumer privacy, it is currently legal to use this data in the US. Hence, it seems reasonable to call for research that explores how BI is utilizing this data and to understand how it is being combined with other data to complement and expand BI analyses and related decision-making activities.

## 9. Mobile BI

A study by Howard Dresner (March 16, 2011) reports that Mobile BI will grow from 10% of the BI applications market to 90% in 24 months. The problem is no one is quite sure how it will be used! Moreover, there is no proof that this concept will work, despite the assertions that it will enable BI usage on shop floors, in conference rooms, and for anytime/anywhere decision-making. It is asserted that the most important mobile BI apps will be alerts, KPI monitoring, balanced scorecard, and Six Sigma, but there is little empirical evidence that these mobile BI efforts can be effectively implemented. The research opportunity is to follow the development of mobile BI and to ascertain the underlying causes for both successes and failures as it is deployed.

## 10. Sentiment Analysis

We use BI to discover what you do, how you do it, where you do it, and now how you feel about what you do! Sentiment analysis is about mining the web for feelings not facts. Social media is an incredibly rich vein for market intelligence (opinion data) and it is obtained by monitoring blogs, online forums, and social networking sites for trends in opinions. Essentially, sentiment analysis attempts to translate the whims of human emotion into hard data.

BI research should explore this trend and report how it is being used, how it complements or supplements other data, and whether its use creates any unanticipated consequences or issues. Clearly there



are consumer concerns about how this data is acquired and shared. Nevertheless when it is used, how valuable are these insights for BI? Feelings can be both volatile and transient so just how much credence should BI afford them?

I sincerely hope that some of these topics will be pursued and that chapters discussing these topics will appear in future issues of *IJBIR*. At the very least, we should be aware that BI is an important element in decision-making and that there are a plethora of research opportunities that could help to enhance its value creation potential for organizations.

*Richard Herschel*

*Saint Joseph's University, USA*