Preface

AN EMERGING VIEW OF STRATEGIC DATA-BASED WISDOM IN THE BIG DATA ERA

The Challenge

The original purpose of this book was to define, precisely, the rather ambiguous nature of Data-Based Wisdom and to clearly articulate how Big Data is or could be used to create wisdom at the strategic level of organizations. Although this may have been a lofty goal when the journey began, as time rolled on, the editorial team realized that clarity and consensus in an emerging domain is difficult to achieve. Not only is it difficult to achieve, but also, it might not even be desirable, as developing fields need time to mature. As a result, the goal was modified somewhat to add clarity to the subject rather than rigidly define the field.

As is often the case when the academic and business worlds collide, there is necessary debate about the exact meaning of the term Data-Based Wisdom. We did not attempt to curtail this deliberation, as it would be premature to expect harmony in this nascent field. That said, we did provide the following characterization to the chapter authors as a catalyst to the conversation:

Data-Based Wisdom is the use of technology, leadership, and culture to create, transfer, and preserve the organizational knowledge embedded in its data, with a view to achieving the organizational vision.

As the book title suggests, our interest focuses on the so-called Big Data Era. Without wishing to focus entirely on the issue of definitions, it may be worth examining exactly what is meant by the term Big Data. Several chapter authors offered possible meanings for the term, including:

1. A term coined to reflect very large and very complex data sets.
2. An amount of data close to the upper bound of the volume and complexity that a human can manage to manipulate and learn from for purpose with the aid of available information technology.
3. Big data is a term for any collection of large and complex data sets that it becomes difficult to process using basic database management tools or traditional data processing applications. The trend to larger data sets is due to the additional information derivable from analysis of a single large set of related data, as compared to separate smaller sets with the same total amount of data, allowing hidden patterns or correlations to more easily surface. Analyzing trends in business processes, like in Sales data will become a new field of science in sales as these approaches continue to evolve.
4. Data set that is beyond the capacity of relational database applications.
5. Term for a collection of large and complex data sets that it becomes difficult to process with traditional tools.

We have no intention of forcing a single definition; however, a review of the proposed definitions suggests that Big Data exhibits several characteristics. First, most of the definitions include descriptors such as large and complex, two terms that cause many managers to cringe. Second, several of the definitions suggest an element of difficulty in dealing with the necessary processing. Finally, perhaps on a more positive note, is the idea that organizations can analyze, evolve, or learn from Big Data. The first two characteristics represent the challenges while the final one highlights the opportunities.

This book is particularly unique in several distinct ways. First, this is one of the very first collections to consider the idea of data-based wisdom. Second, the book considers data-based wisdom in the broadest possible way. To be sure, some will question the breadth and depth of the domain as articulated by the authors. In fact, as we launched this book we underestimated the scope of the domain and we have been surprised at how many innovative tools, techniques, and technologies are in place or under consideration. If you doubt the wide scope, take a moment to review the glossary that is a summary of the key terms proposed by authors. Third, this book includes chapters from a diverse group of interested parties; this diversity is geographic, linguistic, professional, and experiential. We believe the diversity highlights the global interest in the domain.

The book is organized into 15 chapters based on three sections of data-based wisdom. The first five chapters chronicle data-based wisdom in action. In this section, the authors have examined real-world organizations or sectors with a view to illustrating how data-based wisdom creates value. The next five chapters focus on the challenges associated with data-based wisdom. To be sure, as with any emerging domain, there will be challenges; however, wise organizational leaders will capitalize on these challenges to create real value. The final five chapters examine data-based wisdom tools, techniques, and technologies. Together these three sections provide an exciting look at how executives may use the enablers and components to achieve their organizational vision.

SECTION 1: DATA-BASED WISDOM IN ACTION

In Chapter 1, Rhoda Joseph examines the use of big data in the public sector. The public sector pertains to government related activities and can be classified into three main areas: local, state, and federal levels. The specific context in this chapter looks at the use of big data at the country level, also described as the federal level. Conceptually, data is processed through a “knowledge pyramid” where data is used to generate information, information generates knowledge, and knowledge begets wisdom. Using this theoretical backdrop, Joseph presents an extension of this model and proposes that the next stage in the pyramid is vision. Vision describes a future plan for the business, based on the current survey of the organization’s environment. Arguably, the collection and analysis of big data provides the catalyst for moving raw data to a more refined state to create a vision. To develop these concepts, the use of big data is examined for three different countries. Both opportunities and challenges are outlined, with recommendations for the future. The concepts examined in this chapter are within the constraints of the public sector, but may also be applied to private sector initiatives pertaining to big data.
In Chapter 2, Milan Vemić explores whether and to what extent a systemic approach to optimal management of working capital stemming from data-based wisdom exists in a transition economy. Within the framework of experimental research, the chapter portrays the level of optimization of all key components of working capital management and address indispensable strategic directions for Serbian entrepreneurs and managers that could have broader application in transition context. Ultimately, Vemić explores whether it is possible to achieve better and more effective results in the development of medium enterprises by optimizing database wisdom for working capital management.

In Chapter 3, Douglas Weidner and John Girard trace the evolution of algorithmic, evidence-based wisdom in disciplines outside business – Healthcare and Psychology. In addition, the chapter traces analytics in business from early Operations Research (or Management Science) of the mid-1900s to modern Big Data and improved analytics enabled by information technology. Finally, these historical tracks and their intersection will inform where analytics is likely to go as it enriches knowledge management, which is the enabler of successful, and has transformed organizations in the post-industrial, knowledge age.

In Chapter 4, Eldar Sultanow and Alina Chircu illustrate the potential of data-driven track-and-trace technology for improving healthcare through efficient management of internal operations and better delivery of services to patients. Track-and-trace can help healthcare organizations meet government regulations, reduce cost, provide value-added services, and monitor and protect equipment and materials. The chapter provides two real-world examples of commercially available track-and-trace systems that support data-based wisdom. The systems use RFID and sensors to prevent counterfeiting and quality problems in pharmaceutical supply chains, and to monitor objects and people. The data about tracked entities generated by these systems can be characterized as big data. Sultanow and Chircu discuss the challenges related to data capture, storage, retrieval and ultimately analysis in support of organizational objectives.

In Chapter 5, Cindy Gordon examines the evolution of selling, as well as the software solutions that sales professionals have been using to support Customer Relationship Management (CRM) practices. Tracing over thirty years of selling and four eras of selling, including product to solution selling, customer centric selling, social selling and Big Data: Predictive analytics selling. Underpinning this chapter is the stark reality that after three generations of CRM solutions, less than 50% of sales organizations’ worldwide do not achieve their sales quotas. It is time to seriously challenge the current approaches to CRM, as quota attainment is seriously underperforming, despite what sales software market leaders espouse to customers. Gordon reviews research from a variety of sources and suggests that organizations should Think Big and Smarter! She concludes the next era’s growth resides in Big Data and predictive analytics as advanced sciences and mathematics will pave the way to unlock productivity and growth challenges that have plagued the first three eras.

SECTION 2: THE CHALLENGE OF DATA-BASED WISDOM

In Chapter 6, Suzanne Ross-Wexler provides a brief review of literature on big data as well as wisdom, after which she turns to defining data-based wisdom in the context of healthcare organizations and their visions. Ross-Wexler addresses barriers and ways to overcome barriers to data-based wisdom. Insights from interviews with leading healthcare professionals add practical meaning to this discussion. Ross-
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Wexler suggests future research directions and questions. The role of synchronicity and serendipity in data-based wisdom is explored. Developing data-based wisdom systems that flourish Wisdom, Virtue, Intellect, and Knowledge are encouraged.

In Chapter 7, Gino Maxi and Deanna Klein consider generational differences relative to data-based wisdom. This chapter builds on our proposed definition data-based wisdom: the use of technology, leadership, and culture to create, transfer, and preserve the organizational knowledge embedded in its data, with a view to achieving the organizational vision. With time, technology, leadership, and culture have transformed into more than tangible items, social leadership concepts, and learned behavioral patterns. The latter three ideas have evolved along with the technological advances infused into society, as we know it today. Therefore, the value and emphasis, to develop and maintain, intricate and efficient knowledge management databases suitable to create, transfer, and preserve organizational knowledge embedded in its data, has never been more vital. The importance will continue to grow as changes in technology, leadership concepts, and culture continue to inundate.

In Chapter 8, Brandon Olson reviews data-based wisdom projects in the form of Knowledge Management System (KMS) initiatives that exhibit a high degree of failure. These failures are caused by technical, people, and organizational challenges. Although the literature provides some degree of guidance for improving the success of KMS initiatives, an overall approach to ensure the KMS meets the needs of the organization does not exist. Olson highlights the common challenges to KMS implementations and evaluates the factors leading to more successful KMS implementation. Using the findings from the challenges and success factors, a conceptual framework Olson presents as an approach to increase the success of KMS initiatives. The proposed framework uses strategic alignment and organizational value as drivers in the KMS efforts. The conceptual framework provides a high-level guide for approaching KMS initiatives.

In Chapter 9, Dimitar Christozov and Stefka Toleva-Stoimenova address the problems of digital divide in the light of learning from data in the era of accumulated, available and accessible Big Data. The phenomenon of Big Data arose in the last years and offered new dimensions of digital divide - the challenge that the human society faces since the appearance of computer technology. Christozov and Toleva-Stoimenova objectives are to highlight problems and barriers in learning from Big Data and to initiate discussion on the ways to overcome those new challenges. They define the “Big Data Phenomenon,” identify the phases and activities in the process of learning from data and relate them to learning from Big Data. As a result, a paradigm of competences and barriers for acquiring Big Data literacy are proposed as a new dimension of literacy in dividing the human society.

In Chapter 10, Cristiano Ciaippei and Maria Cinque explore how in an increasingly complex world, efficiently extracting meaning from the available amount of raw data is critical. We need a different view of technology, leadership, and culture to meet this challenge. Ciaippei and Cinque propose a theoretical framework that reformulates the DIKW (Data-Information-Knowledge-Wisdom) model with the use of Aristotelian categories concerning the profiles of action (praxis and poiesis) and taking into account the dimensions of the agent (autos and nomos). Furthermore, they match the DIKW Pyramid and the DBW (Databased-Wisdom Model) in a new framework for Strategic Data-based Wisdom, which can also be applied to the different phases of the Problem solving process.
SECTION 3: DATA-BASED WISDOM TOOLS, TECHNIQUES, AND TECHNOLOGIES

In Chapter 11, Amir Basirat, Asad I. Khan, and Heinrich Schmidt examine pattern recognition for large-scale data processing. One of the main challenges for large-scale computer clouds dealing with massive real-time data is in coping with the rate at which unprocessed data is being accumulated. Transforming big data into valuable information requires a fundamental re-think of the way in which future data management models will need to be developed on the Internet. Unlike the existing relational schemes, pattern-matching approaches can analyze data in similar ways to which our brain links information. Such interactions when implemented in voluminous data clouds can assist in finding overarching relations in complex and highly distributed data sets.

In Chapter 12, Goran Klepac and Kristi Berg propose a new analytical approach, which consolidates the traditional analytical approach for solving problems such as churn detection, fraud detection, building predictive models, segmentation modeling with data sources and analytical techniques from the big data area. Klepac and Berg present solutions offering a structured approach for the integration of different concepts into one, which helps analysts as well as managers to use potentials from different areas in a systematic way. By using this concept companies have the opportunity for introducing big data potential in everyday data mining projects. As it is visible from the chapter, neglecting big data potentials results often with incomplete analytical results, which imply incomplete information for business decisions, and can imply bad business decisions. The chapter also provides suggestions on how to recognize useful data sources from the big data area, and how to analyze them, along with traditional data sources for achieving more qualitative information for business decisions.

In Chapter 13, Dragana Milin discusses transferring data to wisdom in project management. Today more and more companies organize their business through projects, and project management becomes a necessity rather than a luxury, and permeates all aspects of business. Therefore, managing knowledge in projects environments become key component in project success. Since the nature of knowledge keeps changing, tacit and explicit knowledge are constantly transferred between projects and parent organizations. Project Management Office (PMO), as an organizational unit, established to help project managers, project teams as well as different levels of management in carrying out the principles of project management, has the potential to act as knowledge broker between projects, between project and top management, as well as between project and the organization itself. Software tools for project management can play an important role in knowledge transfer since it has been shown that both the systems that facilitate communication between people and the systems that facilitate storage, search and retrieval of knowledge carry an important influence on the organization effectiveness.

In Chapter 14, Aleksandar Gubic provides an overview of generating data by gamifying education. He cites one of the challenges facing modern society as the overall lack of engagement. This is particularly the case in education when frequent tasks and assignments are not approached with a high level of commitment. A relatively new technique has been developed and is showing great potential in a wide array of fields including education. Gamification is a process of applying game mechanics and a way of thinking to real-world tasks with a goal to improve engagement. Gamifying education generates new types of data that can be used in the process of assessing a student’s performance as well as effectively improving engagement. The key to implementing gamification is to understand what types of data can be generated. As the amount of data varies depending on which specific components are applied, the task of its interpretation and contextualisation is vital for a successful outcome.
In Chapter 15, Anh Ta, Marcus Tanque, and Montressa Washington provide a specification framework for Big Data initiatives. Given the emergent of big data technology and its rising popularity, it is important to ensure that the use of this technology directly addresses enterprise goals required to maximize the return-on-investment. This chapter aims to address a specification framework for the process of transforming enterprise data into wisdom or actionable information through the use of big data technology. The framework is based on proven methodologies consisting of three components namely: Specify, Design, and Refine. The framework provides a systematic, top-down process for deriving big data collection requirements from high-level technical enterprise goals. The framework also provides a process for managing the quality and relationships of raw data sources, along with big data products.

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