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BUSINESS ANALYTICS FOR MANAGERS

TAKING
BUSINESS
INTELLIGENCE
BEYOND
REPORTING

2ND
EDITION

WILEY

Business Analytics for Managers

Second Edition

*Taking Business Intelligence Beyond
Reporting*

**Gert H. N. Laursen
Jesper Thorlund**

WILEY

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Foreword

This book provides more fuel for this era of strategic and unified views of business analytics for value creation. In the same vein as *Competing on Analytics* and *Analytics at Work*, *Business Analytics for Managers: Business Intelligence beyond Reporting* adds another interesting and worthwhile perspective on the topic. In times of rapid change and growing complexity, rapid learning becomes more valuable. This book provides the strategic view on what's required to enable rapid learning and ultimately value creation.

Making decisions using huge, noisy, messy data requires business analytics. It is important to have a true appreciation of and advocacy for the analytical perspective on the whole of business analytics—on data (a strategic asset), on methods and processes (including refinement and optimization), and on people (the diverse skills it takes to formulate and execute on a well-thought-through strategy).

It starts with an analytical view of data: What is being measured, and is it what matters? Measurement (data generation and collection) is itself a process—the process of manufacturing an asset. When data is viewed this way, the analytical concepts of quality improvement and process optimization can be applied. The authors essentially ask, “What are you doing with your data? How are people in your organization armed to make better decisions using the data, processes, and analytical methods available?”

Business analytics, as portrayed by these analytical thinkers, is about value creation. Value creation can take different forms through greater efficiency or greater effectiveness. Better decisions to reduce costs, reveal opportunity, and improve the allocation of resources can all create value. The authors provide valuable business analytics foundational concepts to help organizations create value in a sustainable and scalable way.

Why business analytics? Even though some have tried to expand the definition of the relatively aged term *business intelligence* (BI), there is no real consistency, so a new term reflecting a new focus

is warranted. Further, through promotion of a process view, we break out of some of the silothink and see the importance of closing the loop—on data (to monitor data quality and measure what matters), on process (to continuously learn and improve), and on performance (to make the best decisions, enable the best actions, and measure impact). How many organizations continue producing text-heavy, tabular reporting on old and perhaps out-of-date metrics that few take the time to consume? How old are some of the processes driving key decisions in organizations? What opportunity costs are you incurring, and how could you be creating more value?

This book provides a synthesized view of analysis, traditional BI, and performance management, all of which are connected and need to be orchestrated strategically for maximum impact. The chapter advocating a shared strategic resource—a competency center or center of excellence—is an excellent way to drive best practices and create more value, making the case for treating data as a strategic asset and investing in the appropriate analytic infrastructure to maximize value.

Wherever you may be on your business analytics journey, you will find worthwhile thinking, shared expertise, and solid practical advice in this book to help you create more value in a sustainable and scalable way. The book is not just about analytics as a step in any given business process, but about the analytical perspective on any process that is key to understanding what it takes to drive continuous learning and improvement.

Anne Milley,
Senior Director of Analytic Strategy
SAS Institute

Introduction

Imagine a company. It could be an American manufacturer of home computers. Try to imagine, too, all the things such a company must be able to do: purchasing from suppliers, assembling and packaging the parts, preparing manuals and marketing plans, selling the products. The company also has a large number of support functions. Someone must look after the well-being of its employees, new staff must be hired, people must be paid, the place must be cleaned, and a canteen must work to feed everyone. There is an entire financial function, ensuring that the crediting and debiting of banks, suppliers, owners, and customers runs smoothly. Finally, there are all the planning processes related to product lines and customer groups on which the company has chosen to focus.

Now imagine how much of this the company could outsource. Without too much effort, all production could be moved to East Asia. That could probably bring huge advantages since assembling computers is typically salary-heavy and standardized production work. Others could handle the logistic side of things. The company could get professionals to write and translate the manuals. In addition, the company wouldn't need its own outlets; its products could be sold through some of the major retail chains. Alternatively, a Web shop could be commissioned to create an Internet site where customers could order the products they want. There is no real need for the company to have its own warehouse for parts and computers, from their arrival to their delivery to the customers. A lot of the support functions could be outsourced, too. Many companies outsource the process of recruiting the right people. Routine tasks such as paying salaries, developing training plans, and executing them in external courses could be outsourced, once the company has put the routines in place. Cleaning, the running of the canteen, refilling vending machines, and mowing grass are functions that are already, as a rule, outsourced by large IT companies.

By now, there is not much left of our company. We have removed all the functions that others can do almost as well or, in some cases,

even better. What we have left is what we call the company's core competencies. These competencies are the things that the company is especially good at and that can secure its survival in the future, provided it is capable of developing these so that they continue to meet the requirements in the marketplace.

As shown in our example, core competencies have little to do with the physical world. Machinery, warehouses, and distribution can be outsourced. A company's core competencies lie in knowing how to handle internal processes, and knowing what customers want now and in the future. In other words, the key is to have the right knowledge in the company. More specifically, what the company needs is for the right people to have the right data and information at the right time. When that happens, we have rational decision making that meets strategic, operational, and market conditions. And this is exactly the first half of this book's *business analytics (BA)* definition:

Definition 1: Delivering the right decision support to the right people at the right time.

In this definition, we have chosen the term *decision support*, because BA gives you, the business user, data, information, or knowledge, that you can choose to act upon or not. Here's a familiar example: An analysis of check-out receipts can inform the manager of a 7-Eleven store which products are often purchased together, thus providing the necessary decision support to guide the placement of goods on the shelves to increase cross-selling.

There is a saying that "people don't buy drills; they buy holes," and this definition of BA points out that "people don't buy servers, pivot tables, and algorithms; they buy the ability to execute, monitor and control their business processes, along with insights about how to improve them."

Regardless of whether predictive models or forecasting is used, it's the historical information that can give companies a status on the situation they are in right now. Maybe the company's analysts and their scenario models can present different alternatives, but ultimately it's the responsibility of the decision makers to choose which business processes they want to alter or initiate based on decision support. BA is about improving the business's basis for decision making and its

operational processes, as well as achieving the competitiveness possible when a business is in possession of relevant facts and knows how to use them. In our work as consultants, we have too often experienced BA as purely an IT discipline, primarily driven by the organization's technical environment, which results in BA initiatives floating aimlessly. Successful BA initiatives are always closely interlinked with the organization's strategy (mission, vision, and goals) and are put in place to strengthen the ability of business processes to move in the right direction toward business objectives. Unfortunately, these points are often overlooked, which is one of the reasons for this book.

Over the last ten years, BA has, however, undergone some major developments, which means the definition of BA must be redefined. One big change has been labeled *big data*. This term is coined to describe the phenomenon of increasing amounts and variability of data—including formats like images, videos, and audio files. But the fact that the volume, variance, and velocity of available data have gone up is still covered by the above definition. Neither do new technologies, such as in-memory prestored calculations or the increasing use of clouding solutions (where software and data are not hosted at the user location), call for a new definition of BA.

What does call for a new definition of BA is not really the huge volume of data and the new software to store and process it, but the intensified use of analytical models to control operational processes in an intelligent way. We might say that artificial intelligence is beginning to make decisions in the digital area. Here are some examples:

- Pure digital processes like omnichannel marketing, where customer communication is sent directly to the customers based on what the customer most likely wants from a specific electronic channel. Think of last-minute-offers from Booking.com. Also the automated investment programs based on algorithms that day trade shares and currencies automatically. Of course, the most successful investor will be the one using the best algorithm.
- Semiphysical digitalized business processes, such as when analytics are used to predict future market demand and automatically reorder new stock for inventories based on, for example, season, campaigns, market growth, or price levels.

Again, in this case, the market winner will be the company that runs its digital processes based on the most well-configured algorithms. The *Internet of Things* is another new term, describing how physical assets can coordinate their actions based on more or less complex algorithms. For example, there are milking cattle farms where the cows are almost entirely served by robots; humans are only called upon when needed to do services such as make decisions about replacing cows, treat detected illness among cows, repair or maintain the machines, or fill and empty inventories.

- Fully physical digitalized processes, like robots in the forms of automated cars and vacuum cleaners that respond to external physical input based on algorithms. Soon, these robots must be able to respond based on algorithms that handle voice, face and tone recognition, next to understanding the nonhuman physical environment they are acting in.

Over the last ten years, a huge amount of processes have been automated and digitalized, and the manual decisions that come with these processes have vanished. In many ways, what we see now is what people expected to see during the dot-com era, which was all about the opportunities of new automated digitalized business process that allowed organizations to compete globally based on extremely scalable business models. Back in these early days, market disrupters like Amazon.com redefined how books were sold on the Internet. Later on, Apple and Kindle started to produce physical devices to increase people's experience of consuming books, music, and movies via the Internet. Now we are at a point where market disrupters can operate across all platforms based solely on apps. Some of the most spoken-about market disrupters in 2016 are social media providers or the taxi service provider Uber.

Less noticed by the public, it is evident that physical production processes are being increasingly digitalized and intelligent. However, we are still waiting for the robots that can serve us intelligently in our private homes to have their breakthrough.

During the last ten years an increasing amount of business processes have been digitalized to the degree that the next competitor

only is an app away. The market-winning app is often the one that provides the best user experience based on intuitive user-centric design, customer-made data feeds, advanced analytics providing relevant suggestions, and the ability to store the relevant user history. Examples could be suggested friends on LinkedIn or Facebook, good offers and purchase tracking in virtual stores, banks, airline companies, or other service providers.

Because BA is increasingly applied and automated in digital processes, BA today is also much more than providing decision supports to humans within an organization, it is also about the provisioning of data to drive digitalized processes in an intelligent way.

This gives us this updated and final definition of *BA*:

Definition 2: Delivering the right decision support to the right people and digital processes at the right time.

This current intensified digitalization of business processes also means that although ten years ago we had to argue for the relevance of analytics, today we only discuss where analytics can be used efficiently as market challengers are constantly moving forward causing the extinction of “infosauric” companies—organizations that fail to see the direct linkage between analytical ability and competitive position.

WHAT IS THE SCOPE OF BUSINESS ANALYTICS? INFORMATION SYSTEMS—NOT TECHNICAL SOLUTIONS

It’s quite easy to imagine a bank that runs all its customer processes and dialogue programs entirely without using IT—and what really hard work that would be. The point is, of course, that we can have BA without deploying software and IT solutions; at a basic level, that has been done for centuries. However, today it just wouldn’t stack up. In this book, we look at BA as information systems consisting of three elements:

1. The information systems contain a *technological element*, which will typically be IT-based, but which in principle could be anything from papyrus scrolls and yellow sticky notes to clever heads with good memories. A characteristic of the

technological element is that it can be used to collect, store, and deliver information. In the real world, we're almost always talking about electronic data, which can be collected, merged, and stored for analysts or the so-called front-end systems that will deliver information to end users. A front end is the visual presentation of information and data to a user. This can be a sales report in HTML format or graphs in a spreadsheet. A *front-end system* is thus a whole system of visual presentations and data.

2. *Human competencies* form part of the information systems, too. Someone must be able to retrieve data and deliver it as information in, for instance, a front-end system, and analysts must know how to generate knowledge targeted toward specific decision processes. Even more important is human decision support: those who make these decisions and those who potentially should change their behavior or the configuration of processes based on the decision support are people who must be able to grasp the decision support handed to them.
3. Finally, the information systems must contain *specific business processes* that make use of the information or the new knowledge. A business process could be the way inventory is optimized or products are priced. After all, if the organization is not going to make use of the created information, there's no reason to invest in a data warehouse, a central storage facility that combines and optimizes the organization's data for business use.

The considerable investment required to establish a data warehouse must render a positive return for the organization through improved organization-wide decision making and enabling of digital processes. If this doesn't happen, a data warehouse is nothing but a cost that should never have been incurred. An information system is therefore both a facility (for instance a data warehouse, which can store information) as well as a set of competencies that can retrieve and place this information in the right procedural context.

When working with BA, it is therefore not enough to just have an IT technical perspective—that just means seeing the organization as

nothing but *a system technical landscape*, where another layer of costs is added. It is essential to look at the organization as a large number of processes. For instance, the primary process in a manufacturing company will typically consist of purchasing raw materials and semi-manufactured products from suppliers, manufacturing the products, storing them, and selling them on. In relation to this primary process there are a large number of secondary processes, such as repairing machinery, cleaning, employing and training staff, and so on.

Therefore, when working with BA, it is essential to be able to identify which business processes to support via the information system, as well as to identify how added value is achieved. Finally, it's important to see the company as an accumulation of competencies and train staff, some of whom undertake the technical solution, and others who bridge the technical and the business-driven side of the organization focusing on business processes. Added value can be achieved in two ways: by an improved deployment of the input resources of the existing process, which means that efficiency increases, or by giving the users of the process added value, which means that what comes out of the process will have increased user or customer satisfaction. We'll discuss this in more detail in Chapter 3.

In other words, successful deployment of BA requires a certain level of abstraction. This is because it's necessary to be able to see the organization as a system technical landscape, an accumulation of competencies, and a number of processes—and, finally, to be able to integrate these three perspectives into each other. To make it more difficult, the information systems must be implemented into an organization that perceives itself as a number of departments with different tasks and decision competencies, and that occasionally does not even perceive information systems as being members of the same value chain.

PURPOSE AND AUDIENCE

We have written this guide to BA in order to provide:

- A guide to fuel what we refer to as the *analytical age*, which, as the title of the book indicates, is to take business intelligence (BI) beyond reporting. In this book, we will introduce

terms like *lead information*, which is the innovative decision support needed in order to revolutionize the processes landscape—typically done via BA. This should be seen as opposed to traditional BI producing lag information in the form of reports that help users to monitor, maintain, and make evolutionary improvements of their processes. These two types of decision support should be seen as supporting sets of information. However, as shown in Exhibit I.1, the value from a business perspective is different. We can compete on lead information, where lag information to a larger extent is maintaining and optimizing already existing processes.

- The ability to make an information strategy, which basically is a plan of what the BA department should focus on according to company strategy. After you have read this book, you should have a framework that allows you to make a link between your overall organizational strategy and which specific data you should source in your data warehouse. You need this framework not just for standard reporting, but also to support your company's ability to innovate in the future by using analytics in Chapter 8.
- An understanding of BA as a holistic information discipline with links to a business's strategy, source data from the operational systems, as well as the entire value chain in between—not just IT. BA is a combination of IT, human competencies, and organizational processes.
- An understanding of the ever-increasing role of BA, a role that today is aimed at optimizing at a business process level but that, we believe, in the near future will be aimed at optimizing individual human behavior, as discussed in Chapter 9.
- A reference work containing the most frequently used BA concepts, definitions, and terminology. We have developed a BA model that gives a helicopter perspective and that provides the company's employees with one common frame of reference for objectives and means—and that clarifies the individual contributor's role and the interaction in the process. Our BA model constitutes the analytical framework, which is the pivot of the

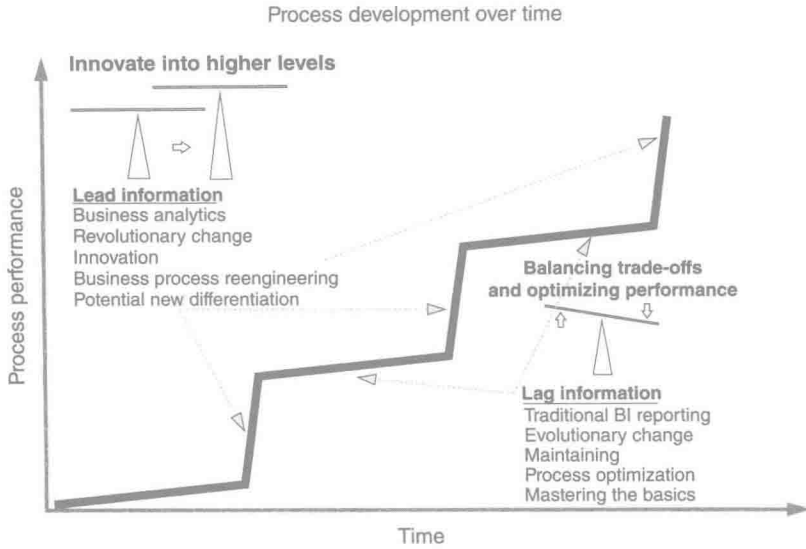


Exhibit I.1 The Stairway Chart: Emphasizing the Difference between Lead and Lag Information

subsequent chapters. The model focuses on BA as an interaction of IT, strategy, business processes, a broad spectrum of human competencies, organizational circumstances, and cooperation across the organization.

The book is relevant for all businesses that want to define information strategies or fine-tune existing programs with a view to maximizing their effect. It's written for anyone working with the implementation of information systems—that is, project managers, analysts, report developers, strategists or CIOs, CEOs, CFOs, CxOs, IT professionals, social media specialists, and database specialists. But we should add that the book is of relevance to anyone working operationally with these information systems, since it will highlight the role of these systems in terms of the overall strategy of the company. Thus, the book is also for everyone in business-focused functions in sales, marketing, finance, management, production, and human resources who works at a strategic level.

If, for instance, you are working with customer relationship management (CRM) and wish to focus systematically on customer

retention via churn analyses, you need the involvement of product managers, who, based on the customer profiles to be retained, must develop retention products. Customer service functions such as call centers need to be integrated in the information flow, too, when handling campaign response. The communication department that designs the dialog with the target groups about their needs via text—and basically any creative universe—needs to be working systematically with the given customer profiles. In addition, there's a data warehouse that must be able to present and store relevant information about customers over time, as well as customer information that continuously must be adapted based on a mix of customer behavior and company strategy. Even though we often look at our organization through an organization chart, where some people work in marketing and others in procurement and production, it makes more sense to see the organization as a large number of processes that, across the different departments, create value chains to satisfy the organization's customers and their needs.

One example of a traditional value chain could be procurement of raw material, manufacturing, sales, delivery, and follow-up services. The mere fact that someone is part of this value chain means that he or she is measured at some point. We may not be calling it BA, but instead performance targets, budgets, or key performance indicators (KPIs). Regardless of name, these are measuring instruments established to inform management functions about whether the established processes are achieving the organization's various targets.

BA is relevant in both large and small businesses. As shown in the BA model in Chapter 1, it doesn't say anywhere that a company must be a large financial institution with hundreds of data warehouse tables placed on large and expensive mainframes to deploy BA. Small and medium companies are known to carry out excellent BA, using the most popular BA tool in the world: spreadsheets (as do large companies).

We have endeavored to make this technically complex discipline more easily accessible and digestible to a broader group of readers. Students at business schools with a couple of years' work experience should therefore be able to obtain maximum benefit from the book, too.

ORGANIZATION OF CHAPTERS

The book is structured in a way that shows the role of BA in the individual parts of this process and explains the relationship between these parts. You may read the chapters out of order, depending on the area that is of particular relevance to you. The intention of the book is to describe BA coherently and comprehensively while at the same time offering each chapter as a work of reference.

Compared to other publications on the subject, this book is less about describing the individual small subelements of BA, and more about demonstrating the link between them. Specific examples are also offered showing how to add value in the business by using BA solutions.

In Chapter 1, we examine the BA model. The chapter covers the spectrum from business strategies to sourcing of data from the operational systems (data sources) as well as a case study. The model is the pivot of the subsequent Chapters 2 through 6, and the radio station case study illustrates a BA process that will work as a point of reference throughout the subsequent chapters.

In Chapters 2 through 6, we go through the five layers of the BA model, each of which is allocated a chapter. Chapter 2 addresses the relationship between business strategies and the BA function.

Chapter 3 focuses on the creation and use of information at a functional level. The question is how BA can work to support the improvement and maintenance of the company's various business processes (e.g., in sales, marketing, finance, management, and HR) so that they support the overall strategic goals as discussed in Chapter 2.

In Chapter 4, we look at business analytics through processes and present options as well as analytical methods for the transformation of data into information and knowledge.

In Chapter 5, we explain the functionality of a data warehouse and the processes in connection with the availability of data for business use.

In Chapter 6, we discuss the different operational systems and data sources in the organization's environment.

Chapter 7 shifts gears and focuses on the structuring of BA initiatives in so-called business analytics competency centers (BACCs).

Chapter 8 looks at how businesses can assess and prioritize BA projects, and Chapter 9 focuses on the future of BA. The big question is “Where is BA heading?”

WHY THE TERM *BUSINESS ANALYTICS*?

This book could also have been given the title, *How to Make an Information Strategy*, or *How to Use Information as a Strategic Asset*. We chose the title *Business Analytics for Managers: Taking Business Intelligence Beyond Reporting* because we felt that this is the next stepping stone for companies in today’s information age. Today most business processes are linked together via electronic systems that allow them to run smoothly and in a coordinated way. The very same information systems generate electronic traces that we systematically collect and store, primarily for simple reporting purposes.

BA allows business to go beyond traditional BI reporting. Had we therefore called our book *Business Intelligence*, we feared that it would be bundled with all the technical literature on the subject that it attempts to counterbalance. We are entering the analytical age, a window in time where competitive advantages will be gained from companies making increasingly more advanced use of information. It will also be a period when other companies will fail and falter as *infosaur*s, with only muscles and armor, and not the brainpower needed to survive in changing market conditions.

So to make it clear: *Analytics is an advanced discipline within business intelligence*. BI today as a term is heavily associated with large software vendors that offer only simple technical reporting solutions for the end users. We will use the term *business analytics* to put extra focus on these missing elements of the BI equation, and which are by far the most exciting ones; if mastered, they will drive your company into a prosperous future.