Should You Pursue a Career in BI/Analytics?

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Business intelligence (BI), big data, and analytics are hot topics in both the popular and business press. Articles in publications including the New York Times, Wall Street Journal, and Financial Times, and books such as Super Crunchers (Ayres, 2007), Competing on Analytics (Davenport and Harris, 2007), and Analytics at Work (Davenport, Harris, and Morison, 2010) have spread the word about the potential value of analyzing data to improve employee productivity, enhance customer service and satisfaction, optimize the supply chain, provide a competitive advantage, and ultimately improve the bottom line.

There is particular interest in big data, which is characterized by high volume, variety, and velocity. It streams into organizations from sensing devices on machines; websites; social media; RFID chips; GPS systems; and voice, image, and video files. The challenge is to store, analyze, and take action based on the data, and this requires new storage technologies (such as Hadoop), analysis tools (for example, R), and people who know how to work with big data (including data scientists).

Big data is creating IT jobs. Gartner (2012) predicts that by 2015 the need to support big data will create 4.4 million information technology (IT) jobs globally, with 1.9 million of these in the U.S. For every IT job created, up to an additional three jobs may be generated outside of IT.

Big data is also directly creating jobs outside IT. Organizations need people who can analyze and use big

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1 This article is adapted from three previous articles (Watson, 2013; Watson, 2014; and Watson, 2015).
data. A 2011 study by the McKinsey Global Institute predicts that by 2018 the U.S. alone will face a shortage of 140,000 to 190,000 people with deep analytical skills as well as 1.5 million managers and analysts to analyze big data and make decisions (Manyika, et al, 2011). This shortage is significant because inadequate staffing and skills are the leading barriers to the use of big data analytics (Russom, 2011).

Is Analytics for You?
Because of the high demand for people skilled in analytics, you may be thinking that it’s a field you should enter. It might well be, but it is important to understand what the field is all about, who uses analytics, and the skills analysts require. Even if you do not plan a career in analytics—a specialized career in analytics is not for everyone—you are likely to use analytics in your work.

You also need to honestly reflect on your aptitudes and interests. Let me share a personal experience. I majored in electrical engineering as an undergraduate and worked in the aerospace industry but never really liked the field. I majored in engineering because my parents encouraged it and I was good in math and science. I ignored the fact that I wasn’t good at it, didn’t have patience for it, and didn’t enjoy fixing things. I could do engineering work but I didn’t enjoy it. Ultimately, I went to graduate school in business to take a different career path.

Analytics Variety
The analytics term is used broadly. It is helpful to understand the various kinds of analytics because each serves a different purpose, which affects what today’s workers use and need to know.

The objective of descriptive analytics is to describe what has occurred. Reporting, online analytical processing (OLAP), dashboards/scorecards, and data visualization are all examples of descriptive analytics.

Predictive analytics focuses on what will occur in the future. The algorithms and methods for predictive analytics include regression analysis, factor analysis, and neural networks; applications include demand forecasting, customer segmentation analysis, and fraud detection.

Prescriptive analytics investigates what should occur and is used to optimize system performance. Revenue management, which strives to optimize the revenue from perishable goods (such as hotel rooms and airline seats), is a good example. Through a combination of forecasts, predictions of consumer behavior, price sensitivity analysis, competitive information, inventory data, and mathematical programming, the price of a good or service is set dynamically to optimize revenues.

Most organizations progress from descriptive to predictive to prescriptive analytics. First, organizations monitor what is taking place. With that mastered, they turn to predicting what’s ahead. Finally, they want to shape the future.

Skills Analytics Users Need
There is no such thing as a “typical” user of analytics; see Figure 1.

Casual end users are at one end of the continuum. They access analytics-related information through reporting, OLAP, and dashboards/scorecards. They have solid knowledge of the business and need to understand what data is available, how to access and manipulate it, and how to use the data to perform their jobs. They don’t need to be technical experts.

Power end users are next on the continuum. They are often experts with Excel and can create information using the company’s BI tool (such as MicroStrategy). Power users often answer questions for casual users, help them with analyses, and can build new reports for themselves and their colleagues. They have strong business skills and sufficient technical skill to access data, perform analyses, and create reports, dashboards, and scorecards.

If you plan to become a casual user—and especially a power user—don’t underestimate the importance of analytics skills. A case study I conducted with First American Corporation (FAC), a regional bank headquartered in Nashville, Tennessee, illustrates this point (Watson, Wixom, and Goodhue, 2002). FAC made it clear that the good jobs of the future will require analytical skills.
FAC attracted my interest because it had been on the brink of failure, but a new management team turned the bank around by employing a customer intimacy strategy that relied heavily on analytics. It used analytics to understand its customers’ needs and preferences; determine the profitability of customers, products, and services; and redesign its distribution channels (including branches and ATMs). Analytics and fact-based decision making replaced intuition and many previous banking practices.

I interviewed the CEO, who drove the changes. I asked him about the impacts to personnel. He said the most dramatic change was in marketing. The size of the staff hadn’t changed, but none of the 12 team members was in the same job. The previous staff thought marketing was “giving out balloons and suckers along the teller line and running focus groups.” Marketing was now analytical. New staff with the necessary analytical skills and experience had to be hired to do the work. The previous marketing people either left the bank or took other positions.

In the middle of the continuum you’ll find two categories of analysts. BI analysts are part of the BI or analytics team and work throughout the organization. They typically understand the organization’s data well and usually work on enterprise-wide applications such as scorecard systems. Business analysts, on the other hand, are located and work in business units (say, marketing or manufacturing) and focus on analytic applications such as customer segmentation analysis in marketing or optimizing supply chain processes in manufacturing. They typically have strong business knowledge and can work with specific analytics tools.

Power business analysts are next on the continuum. They know the business well and possess strong analytics skills. Because of the high demand for and limited supply of data scientists, some of these analysts have seized the opportunity to do data scientist-type work. They operate in a very specific domain, such as finance.

Finally, the job of a data scientist is to discover patterns and relationships in data that no one else has seen or wondered about and turn these discoveries into actionable information that creates organizational value. To do this requires a rich mixture of data understanding, analytical skills, and business knowledge.

Where Do You Fit In and What Skills Do You Need?
To be proficient with analytics, you must be an analytical thinker and enjoy problem solving. Beyond that, the skills you’ll require depend on where your job is on the analytics user continuum. The movement from casual user to data scientist requires ever-increasing aptitude and training in analytics.

Users
Casual users access analytics-related information and use descriptive analytics tools and applications in their work. What skills do they need? I’d argue that they
must (1) understand how data is stored in relational
databases, (2) be able to access and analyze data using a
variety of analysis tools, and (3) have data-gathering and
data analysis experience. You can develop these skills in
statistics, database, and BI/analytics courses.

Analysts
Analysts use tools and applications to understand
business conditions and drive business processes. These
users access and analyze data and generate information
for themselves and others. Analysts should be analytical
and inquisitive. Many are business school graduates with
MBAs, but others have degrees in statistics, mathematics,
engineering, or other fields where they gained analytical
skills. If they are business school graduates, MIS, market-
ing, and finance are common majors.

Many universities are gearing up to produce business
analysts (and data scientists) through degree programs,
MBA concentrations, and certificate programs. These
offerings are commonly in business, engineering, and
statistics and the instructional delivery varies from on
campus to online. One of the first and best-known
programs is the Master of Science in Analytics at North
Carolina State University. SAS has been an important
contributor to the program; it is offered through the
Institute for Advanced Analytics and has its own facility
on campus. Deloitte Consulting has partnered with the
Kelly School of Business at Indiana University to offer
a certificate in business analytics for Deloitte’s profes-
sionals. Northwestern University offers an online Master
of Science in predictive analytics through its School of
Continuing Studies.

Data Scientists
Much has been written about data scientists. A Harvard
Business Review article calls it “the sexiest job of the
21st century” (Davenport and Patil, 2012). Despite this
attention, confusion persists about who these people are,
what skills they have, and what they do.

Data scientists use “rocket science” algorithms (such as
neural networks) and interactive exploration tools (for
example, SAS Enterprise Miner) to uncover non-obvious
patterns in data. Some data scientists are also proficient in
prescriptive analytics, such as mathematical programming.
They often have advanced training in multivariate statistics,
artificial intelligence, machine learning, mathematical
programming, and simulation. Data scientists need to
understand the different types of data and how they can
be stored (RDBMS vs. Hadoop, for instance), write code
(in Java, Python, or R, among other languages), access data
(in SQL or Hive, for example), analyze it (using regression
analysis, social networks, and similar techniques), and
communicate findings to management in business terms.
Data scientists are typically curious, like to solve difficult
problems, and have advanced degrees in fields such as
analytics, statistics, computer science, management science/
operations research, physics, and mathematics. Ideally,
data scientists should have the characteristics and skills
described in the following list, although it is unlikely that
any one person will be strong in all areas:

■ Curiosity: A desire to understand relationships in data
and solve problems

■ Intuition: Good “business sense” and a feel for possible
relationships and solutions

■ Data gathering: The ability to access and integrate
data from different sources

■ Experimental design: The ability to design experi-
ments (e.g., control and experimental groups) to test
suspected relationships

■ Statistics: An understanding of basic (e.g., expected
value) and advanced (e.g., logistical regression analysis)
statistical methods

■ Analytical modeling: The ability to use analytical
methodologies (e.g., CRISP DM), algorithms (e.g.,
neural networks), and tools (e.g., R, SAS Enterprise
Miner)

■ Communication: Clear explanations of analytics
results using business terminology

Organizations don’t need many data scientists, but they
are useful for the most challenging problems. Because
their strong suit is often data and modeling, data scientists may need to be paired with business users and analysts to provide sufficient business knowledge to the team.

Conclusion
There are many great career opportunities in BI, big data, and analytics, but having a career in any of these areas is not for everyone. You’ll need analytic aptitude, the right training, and hard study. The requirements for success increase as you move across the analytics user continuum.

To prepare for a career in analytics, take courses in statistics, databases, business intelligence, and analytics. Find an internship where you’ll perform analytics work in order to develop your business and analytics skills and experience. Read about analytics beyond what is required in your courses. To advance in analytics, think about and plan to earn a graduate degree in an analytics-related field.

References


