Science Research

Opportunities and Challenges of Business Analytics

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# **Abstract**

Advances in technology have created great varied opportunities for corporations and large enterprises around the world to adequately manage and effectively operate their business. With current developments, big employers set high demands on recruiting people who have proficiency working with large data. Therefore, more and more students choose to study Business Analytics (B.A.). The objective of this science research is to clarify what B.A is and also to define what the differences between “analytics” and “analysis” are. Not only will this study give the authentic information about areas that B.A. could apply to, but it also brings knowledge to the audience of two B.A. sides: Opportunities and Challenges of the B.A. career. The research will not only help students who do not have a data and computer background deeply comprehend the major that they are studying, it also helps them create the right path for their future career.

1. **Introduction of Business Analytics**
2. **What is Business Analytics?**

      All big companies and corporations in the world need a business analysis team to create positive change and to ensure as well as maintain value and increase the profit on investment for projects. It is predicted that a large number of jobs for all U.S business analysts will increase from the current 364,000 openings to 2,720,000 by 2020, as indicated by IBM (Arora). With this information, the demand of this major will increase so will the salary, so we can assume that the percentage of B.A. students who have a job when they graduate will be higher than other majors of students, such as philosophy, art, and history. Thus, we need to understand what the definition of B.A. is.

According to Dursun Delen, Professor, Business Analytics Consultant, Professional Educator, Textbook Author, Research Director, and Data Scientist, and Sudha Ram, Professor of Management Information Systems at University of Arizona, we have a plethora of translations of B.A., but we can interpret it in this way:

In most general terms, business analytics is the art and science of discovering insight – by using sophisticated mathematical, statistical, machine learning, and network science methods along with a variety of data and expert knowledge – to support better and faster/timely decision-making. Therefore, business analytics can be thought of as an enabler for decision-making and problem solving [based on data] (“Delen and Ram”).

In other words, B.A. is how we know to read and understand data on spreadsheets as a report, such as the company’s profit. Additionally, we use some technological tools to analyze it. For instance, Excel, SQL—Structured Query Language, Python, SAS—Statistical Analysis System. Then, we can detect failures as well as find ways most effectively and accurately to recover the business.

1. **The differences between “analytics” and “analysis”**

When you search for the job for B.A. major, the internet will bring thousands of results to you, including Business Analysis and Business Analytics. These various job titles will make you confused. If you look up these two words in the dictionary, they will have a similar explanation; even these two words “analytics” and “analysis” are used mutually, but they are not the same (Delen and Ram). Therefore, I will clarify the meaning of these two words.

1. ***Analysis***

As reported by Dursun Delen and Sudha Ram, in its general interpretation, analysis is defined as the process of analyzing data that segregates into steps and transforming data into actions. Delen and Ram explained that “analysis refers to the process of separating a whole problem into its parts so that the parts can be critically examined at the granular level”, which means this process will be divided from a big problem in data into small parts in order to delve into the source to find the core of the problem. Thence, finding solutions will be more accurate.

1. ***Analytics***

On the other hand, analytics is an approach of a variety of technologies that combines some tools to translate complex datasets into simple visualizations. There is the analysis step in the manipulation to interpret datasets which is called analytics.

There are four categories in the analytics process, according to Matthew J. Liberatore, Professor, Department of Management and Operations, and Wenhong Luo, Associate Professor, Accountancy & Information Systems, at Villanova University, such as data, analysis, insights and action.

Timeline

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Source: Liberatore, Matthew J. and Luo, Wenhong. The Analytics Movement: Implications for Operations Research. Interfaces. 314. July–August 2010, <https://pubsonline.informs.org/doi/pdf/10.1287/inte.1100.0502?casa_token=FoR2NfzB8KkAAAAA:rU66OlBSo34XBtGb4YNMGfsbZ79W5KU7RhMh_PFzWtRKdKFhAHNKgLjrHitFfkZc3V9ZVqnjfd0>

The first step in the diagram is data where data will be collected, extracted, and manipulated. Then the second step is analysis, in this step, there is the visualization which is created from the data step to gain optimization. The following step is insight: from this step, problems in the dataset are found to explain a reason—what happened—to predict what will happen in the future, and to express an outcome in advance—what should happen. Action is the last step, such as operational decisions, process changes, and strategic formulations. In the action step, all resolutions will be reached to solve all the problems which are detected from the analysis step.

To conclude, analytics has four steps and one of them is analysis. When you see the job title in business analysis, that means the job requires professional technical tools to analyze raw data and work on it from the start. In contrast, the business analytics job will ask prospective candidates for additional other skills, who can work through all the steps shown in the diagram. This position will not require the same high level of technical knowledge as a business analysis job, but the candidates have to be good at reading through all datasets from the business analysis team in order to be strategic to find solutions and bring benefits to clients.

1. **The popularity of Business Analytics**

It is true that the B.A. is very popular in the world because of its high demand. As James R. Evans wrote in his book *Business Analytics/Methods, Models and Decisions*, he said “what makes business decisions complicated today is the overwhelming amount of available data and information” (3). The author makes his point that the complexity of solving business problems has become increasingly challenging due to the big data collected, so the Business Analysis team role in every company is very crucial.

Neelam Tyagi, a versatile and creative technical writer for *Analytics Steps*, points out so many areas that the B.A. can work in which means we have great opportunities for confidently choosing our future career, such as Agriculture Business Analytics, Stock Marketing, Finance Marketing, Manufacturing Industry, Medical Methodology, and Customer Relation Management.



Business Analytics Application

Source: Tyagi, Neelam. Real-World Applications of Business Analytics. analyticssteps.com. Aug 02, 2019, <https://www.analyticssteps.com/blogs/real-world-applications-business-analytics>

1. ***Agriculture Business Analytics***

People apply data analysis to agriculture to increase the production of crops, as well as to reduce crop losses. Neelam Tyagi points out that “[B.A.] can assure the availability of crops on time, crop impact, quality, and quantity of seeds. The effect of climate change, monsoon changes, rainwater storage, crop loss, … can be controlled by predictions of business analysts.” For that reason, B.A. in agriculture will bring more opportunities to boost the growth for agricultural products.

1. ***Stock Marketing***

As Neelam Tyagi shares “Business analyst improves the performance of the organization in terms of business process and profit by analyzing the variance in the market and updating the changing price or fluctuation in stock trends.” The business analyst will analyze the past and current data to predict the trend in the near future. They also keep updating the stock market figures in order to make flexible strategies and create ideas. Then they will provide valuable information to clients.

1. ***Finance Marketing***

A B.A. team in almost all corporations will take advantage of various analytical techniques to recover financially relevant issues. For instance, “…in fraud detection issues, a business analyst can find out the number of customers who are not making payments on time. Similarly, loan defaulters can be traced through a graphical representation that shows the defaulter’s age, gender, name, customer ID,…” (Tyagi). Thus, all technical skills and core skills from the B.A. major will perfectly fit the Finance Marketing field.

1. ***Manufacturing Industry***

B.A. knowledge can apply to manufacturing and supplying in the market. Business analysts will work on the report of the detailed datasets to sort out which items are most purchased as the best sellers and which ones are not so that they can track business development. They can tell “the highest number of customers for a specific product or service, the product’s performance, … and product advertisement” (Tyagi). The business analyst’s work will help the companies predict when the sale market is high to announce a discount offer or make their business strategy to boost their sale.

1. ***Medical Methodology***

Neelam Tyagi describes: “In the medical or healthcare department, the Business analyst makes predictions about the stock of medicine available in the hospital or medical store, the shipment of medicines in the local market, predictions related to disease, impacts of different medicines on same diseases, appointment and availability of doctor, arranging slots for patients, to a medicine available for cure”. For example, when you need to order medicine from CVS, an allotment for the medicine will show it available for you to pick up.

Furthermore, the pandemic of Covid-19 in 2020 has brought massive damage, so how do we have all information to track the virus spreading across the U.S? The B.A. team collects data that is reported from the hospital to calculate how the Covid-19 cases increased. Then, they also follow the process of producing the vaccine by gathering the report of how many percentages are completed. Without data management, the whole health system will collapse, so the health industry will be an ideal field for B.A. students.

1. ***Customer Relation Management***

For every business from family and individual to corporation type, the customer relationship is the most crucial element to build a successful business. The analyst team will communicate with customers through datasets so that they can analyze them to create a strategy for the organization. Neelam Tyagi discusses that the B.A. team helps the business in increasing various productivity based on customer demands and enhances internal and external factors for boosting customer service and building a strong and healthy customer relationship with the organization.

# **The opportunities of Business Analytics**

## **Business Analytics Major**

More and more universities have started the B.A. major for their prospective students. The universities will provide professional skills, as well as valuable knowledge to the students; the schools ensure that their students will meet their dream jobs with the B.A. major and also help them fit the requirements from employers for the B.A. position specifically.

According to George Hom, EMBA, Instructor of Information Systems and Operations Management at Suffolk University, “B.A. has only been a buzzword recently, because of the extra media coverage that is taking place. Besides, businesses have started to realize that the data assets that they have had on their hands and how they can leverage this asset to run their businesses better to create a competitive advantage.” Although I explain [the differences between business analysis and business analytics](#Heading) as well as their roles in work above, they are trained from the same discipline in a B.A. major with core skills and technical skills.

1. ***Core business analytics skills***

The core skills formed from the B.A. program create a solid foundation for the B.A. career. This allows individuals to know how to handle the big data daily changes. Harvard Business Analytics Staff shows there are six essential core competencies to be a great B.A. professional, but I will bring up the top three from the article.

Firstly, a good communicator will have the ability to confidently give presentations and write reports to clients and be able to tell the story with data (Harvard). Secondly, inquisitive, “people in this field [B.A.] should have a natural curiosity and drive to continue learning and figuring out how things fit together” (Harvard). Because the industry and the market keep changing every day, B.A. professionals have to constantly update new changes to implement the best service to the clients. Finally, the most important thing is being a problem solver. The author states that B.A.s use “a combination of logical thinking, predictive analytics and statistics” (Harvard) to effectively solve problems.

Furthermore, critical thinking, visualizing, and “both detail-oriented and a big picture thinker” (Harvard), are mentioned in the article. However, the top three core skills in my opinion are must-have for candidates applying for a B.A. career. You have to be analytical to self-study about the changing of the industry trend in order to determine explanations. Then you combine all of these skills to bring out the story from data and persuasively give a presentation to the clients.

1. ***Technical skills***

If the core skills of B.A. are important, technical skills will be very crucial. Using tools to read data is the first step to deal with. In the same article from Harvard Business School, they list the top three popular and powerful tools used to “translate data source into tangible solutions”.

The first tool is SQL, “the coding language of database and one of the most important tools in an analytics professional’s toolkit” (Harvard). As Harvard mentions that “Professionals write SQL queries to extract and analyze from the transactions database and develop visualizations to present to stakeholders.” Using SQL is the very first essential tool to work on data. This helps to sketch the path from gathering information in order to draw the line to solving problems. Without knowing about SQL, it will be more challenging for you to get a job in the data world. The second tool is knowing statistical languages like R or Python (Harvard). You can bring so many benefits not only to you but also to companies.

The last tool is statistical software. Harvard Business School notes “the ability to program is helpful for a career in analytics,….as SPSS, SAS, Sage, Mathematica, and even Excel can be used when managing and analyzing data”. Because the companies prefer to hire employees who can use multiple programming languages as well as know how to code, they are willing to pay a higher salary compared to hiring a person who works only in one computer language. Although there is the high demand in the B.A. career, it is still very competitive. Therefore, the more technical skills you are proficient in, the more out-standing you are, which can widen your opportunities of getting a dream job.

The B.A. curriculum will prepare for you all crucial skills to become a B.A. professional. In the technical classes you will be able to improve the core skills through personal school projects and team projects. In my perspective, it is crucial to have Excel and SQL on your resume, whereas the others are optional. However, if you want to make yourself competitive, you should learn how to use other tools, too.

1. **The growing of Business Analytics Careers**

According to Hom, “In the past, the tools that we were using were adequate to solve the simpler problems that we faced. However today, due to the factors of Big Data, where data is more comprehensive and challenging to deal with, the tools of old like Microsoft Excel will be limited to help us to address these bigger problems.” Hence, people no longer limit themselves in using Exel and only make decisions based on personal judgment and their own experience, so companies need a professional team with the updated modern knowledge to analyze data to come up with convincing tactics for the company’s interests. For example, “IBM reorganized its consulting business and established a new 4,000-person organization focusing on analytics. Companies are increasingly seeking business graduates with the ability to understand and use analytics” (Liberatore and Luo). In that event, the growth of the B.A. career has opened to welcome students from the B.A. program.

Bernhard Schroeder reports in *Forbes*, “The January 2019 report from Indeed, one of the top job sites, showed a 30% increase in demand for data scientists year over year and a 348% increase since 2013, a dramatic upswing. But while demand, in the form of job postings, continues to rise sharply, searches by job seekers skilled in data science grew at a slower pace (15%), suggesting a gap between supply and demand”. We live in the data era, so the dramatic upswing for data scientists keeps increasing without a stop sign. As a way of showing support for Schroeder’s data, Victoria Pinheiro, MSc. MSBA, Content Strategy Writer at University of Washington, discusses from Glassdoor data that “As the data piles up, so does the demand for professionals skilled in business analytics. ‘Data Scientist’ has been Glassdoor’s number one job in America for the last three years in a row, with a median base salary of $110,000.” In fact, B.A. is not only a fast-growing career path, but it also has achieved the high salary level. There are four main groups of the B.A. career path as Pinheiro separates in her article:

1. ***Business Analyst***

Data Architect, Data Scientist, and Data Analyst belong to this group. The main responsibilities in this group are to manage the database, build statistical models, and create data visualizations. Additionally, the average annual incomes of management analyst are around $81,320 (Hung).

1. ***Quantitative Analyst***

Pinheiro said this group is ideal for the financial field because being a quantitative modeler and financial analyst will “help assess risk and generate profits through trading strategies. They design and use mathematical models that allow financial firms to price and trade securities.” Therefore, if you are interested in working in the financial field, you have to master technical skills and be good at math since the quantitative analyst requires the exact numbers in every strategy without any mistakes.

1. ***Operations Research Analyst***

There are two job titles in this group, such as business operations analyst and operations analyst. An operations research analyst uses “data mining, optimization, modeling and statistical analysis” (Pinheiro), which means they will analyze large databases in order to generate new information. For example, the operations analyst team in Amazon will “update and maintain multiple dashboards and data sources to feed automated reporting to the extended team…[and]…translate data into actionable insights for stakeholders while proactively identifing new areas of opportunity to drive further improvements” (Amazon). As a result, they will see how much value is in the business to ensure the company operations are guaranteed. The salary for this group career is around $78,630 (Hung).

1. ***Market Research Analyst***

A market reseach analyst can make around $62,150 per year (Hung). The core thing about being a successful market research analyst is how to “optimize” the impact and the revenue of new products or new services (Pinheiro). You have to see the potential of new products in the current market. Then, you have to follow up on this potential and make a prediction for the future market. Furthermore, Pinheiro said, “They [market research analysts] also help to identify a company’s position in the market place by completing rigorous competitive analysis.” In other words, the market research analysts will work on the bigdata regarding market performance to create a strategy on whether the service or the product is appropriate for the market or not.

As the B.A. major prepares us for so many core skills and modern technical skills that are very benificial, also the career path is very broadened as Hom said, “The next evolution is the deployment of better analytics tools and the automation of these tools to make repetitive processes simpler to manage and implement. The business opportunities here are huge and very profitable.” That means you have great opportunities for confidently choosing your future career with the B.A. degree.

1. **The challenges of Business Analytics**
2. **Human**

Sean Kim, a manager at PwC, brought a straight point when he shared his thoughts about the chance of being chosen by employers of the B.A. would be higher than other students from other majors. He stated “I would say it depends on many other elements, your ability, your soft skills, and your attitudes, not just only have strong hard skills.” Specifically, most employers will not only look for an employee who has professional skills that meet their job description, but they also expect something higher, such as the mindset and the passion from the employees.

For example, imagine there are two applicants that apply to the same position in the same company, they come to the company interview. The first one, a person who just graduated with a B.A. major, brings positive energy to impress the employer by answering their questions very confidently, showing them their passion, the clear goal, and their achievements in school. Hence, the employer will think this person is willing to learn to add value to the company. However, the other person, who has five years working in the professional data field, is proficient with any computer tools, but this person does not bring their passion for this job, they only show how they can work on computer, and ask the company to pay them a high salary. After the interview, the employer may choose the first person who has less experience than the other one. Therefore, the hard skills can be improved by time as long as they are willing to learn, but not everyone has the passion.

Hom also brings a profound point to support Kim. He discusses that one of the challenges in B.A is that not everyone can absorb the data analytics’ skills, although schools have been trying to educate their students. He emphasized, “…there are just not enough talented students with STEM skills”. The B.A. major brings you the higher percentages of getting a job and you have the passion, but you have to consider your true talents as well, and what you actually enjoy doing.

1. **Environment**
2. ***Data***

In reality, the nature of B.A. is working on bigdata. However, bigdata is not as simple as you think, Dursun Delen says:

Big Data is not just big; it is unstructured, and it is arriving at a speed that prohibits traditional collection and processing means. And it is usually messy and dirty. For an organization to succeed in analytics, it needs to have a well-thought-out strategy for handling Big Data so that it can be converted to actionable insight.

The data that we practice in B.A. class cannot compare to bigdata in the real world. Because, in a course, most of the professors will organize data files; they look very clean and well-organized to read so that their students can comfortably apply tools that they just have learned. So, B.A. students have to practice how they work on actual data from the start including beyond in class. At this point, getting a job offer as a part-time intern while you are in school will give you advantages. That means your advanced experience makes you more outstanding than your peers.

1. ***Technology***

Even though the development of technology has increased day by day which helps people do more with less to solve complex business problems, one tool cannot fix all problems. Kim shares “In the real world, we receive thousands of spreadsheets every year, they would take a lot of time to get information, work on them if you just only know about Excel. Hence, we need to use high-end tools, such as Tableau, PowerBI to solve all of them more effectively”. Thus, we have to learn how to use multiple tools and continue discovering new tools to keep up with the growing complexity of technology.

Even though we have learned as many tools as we can in school does not mean that is enough. This is very stressful and challenging for all who work as B.A. analysts when they have to be always ready to approach new technologies. Additionally, technical tools are not inexpensive, and they cost a significant amount of money to purchase them. Delen writes in his article*,* *Real-World Data Mining: Introduction to Analytics,* “Although establishing an analytics infrastructure is affordable, it still costs a significant amount of money …some businesses may not be willing to invest in needed technology”. Therefore, it depends on a company that you work for; if the company cannot afford all the needed tools, you will have more challenges to work on data.

1. **Conclusion**

The bigdata field has continued to expand exponentially, so more and more people have taken the B.A. degree because it has become a buzzword in the corporate world. This research interprets what B.A. is and explains the reason why this major has become so popular. Also, the core skills and technical skills that B.A. trains us in are so beneficial, as Professor Ken Hung, PhD., Chair, and Director of MSBA—Master of Science in Business Analytics at Suffolk University, said: “…they [MSBA students] will be able to tell the story of the data and help leaders make better decisions. In this way, they will create value for their companies”.

Moreover, the opportunities for B.A. are not only the right path of training us how to tell the story and using powerful tools to solve the problems with data, but it also brings to us various areas with significant illustrations in the data field to apply for the job. B.A. challenges in this research are also clarified so that we can understand the downside to leverage the upside of B.A.

Even though we are MSBA—Master of Science in Business Analytics students without the data background, and we are career changers, so we are very new in the field of what we are studying now, it does not mean we cannot land our dream jobs. As Kim expresses “what you are studying now is very helpful and it brings you a lot of advantages, so you keep studying, keep improving yourself, and do not forget to build up your networking”. For this reason, we have to take an action in enhancing new knowledge and leveraging what we have. The most important thing is always to show our passion in the career path to employers.

# **Add ons**

## *Personal interview with George Hom, Instructor, Information Systems and Operations Management at Suffolk University, by Flora Tran. 09/30/2020.*

**Why has Business Analytics become a buzzword recently? Do you have any statistics/numbers to show the change of students taking this major recently?**

To be honest, Business Analytics has been around for a long time. It has only been a buzzword recently, because of the extra media coverage that is taking place. In addition, businesses have started to realize that the data assets that they have had on their hands and how they can leverage this asset to run their businesses better to create a competitive advantage.

I do not have many of the numbers that you are looking for, because I have only been teaching here at Suffolk for three years. However, I have seen the MSBA program grow every year since I have been here.

**What trends of this major have brought that changes economic systems as well as developing business?**

The single major trend that I am seeing is the implementation of newer technologies into the application and deployment of Business Analytics. In the past, the tools that we were using were adequate to solve the simpler problems that we faced. However today, due to the factors of Big Data, where data is more comprehensive and challenging to deal with, the tools of old like Microsoft Excel will be limited to help us to address these bigger problems.

The next evolution is the deployment of better analytics tools and the automation of these tools to make repetitive processes simpler to manage and implement. The business opportunities here are huge and very profitable. As you can see in the news, very large companies like Microsoft, Google and of course, Amazon (with Amazon Web Services) have taken the lead in Machine Learning and Artificial Intelligence.

**Besides the opportunities of this major, what are challenges?**

There are many challenges in this space. Some challenges are related to the data environment and some are human. On the environment side, there are many tools that are starting to separate themselves from the rest. However, some tools are better than others and not a single tool will solve everyone’s problems.

On the human challenge, there are just not enough people with data analytics’ skills to address all of our problems. We have been trying to educate more students; however, there are just not enough talented students with STEM skills. Many are also afraid to tackle this harder subject after graduating high school and colleges.

## *Personal interview with Sean Kim, Manager at PwC by Flora Tran. 10/09/2020.*

**Why do you think people who take Business Analytics ( B.A- Business Analytics) Major will have more oppotunities to find a good job in big coperations than other students?**

The entire world is riding a tour to the direction of data. Data is all information. With B. A. knowledge you can do much work with less which means, you can solve problems on data in easy ways. Compared to Accountant Student, for example. They do the same thing, receive more and more spreadsheets, calculate them as data preparation. However, with B. A. 's major, they can add more value into data beyond just normal calculating them. Therefore, B.A's students are more outstanding, and as a manager at PWC, I would say B.A. students are prospective employees for PWC.

**What is the PwC expectations in their employees , other corparations in general?**

As I mentioned in the previous question, the highest expectation is you know how to add more value in data to our clients, which means you know how to show the strategy by telling the stories in those data. Furthermore, knowing how to code, and how to program as B.A. students take in school will help them become potential employees.

In the real world, we receive thousands of spreadsheets every year, they would take a lot of time to get information, work on them if you just only know about Excel. Hence, we need to use high-end tools, such as Tableau, PowerBI to solve all of them more effectively. B.A. employees will know how to set up the workflow and they can skip a lot of processes and get work done easily. What you learn with your B.A. major will bring you a lot of advantages.

**B.A students have more skills, they can code, and read data, how to program, so employers will choose them over other competitors?**

I would say it depends on many other elements, your ability, your soft skills, and your attitudes, not just only have strong hard skills. However, what you are studying now is very helpful and it brings you a lot of advantages, so you keep studying, keep improving yourself, and do not forget to build up your networking.

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