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Charlotte: Embracing Big Data & Analytics

As the revolution in big data and analytics gears up across the nation, Charlotte is in an enviable position.

It is home to a wide range of major businesses and organizations whose leaders are increasing applications of big data and analytics to run more profitable and efficient operations.

At the same time, UNC Charlotte, the state’s urban research university, is leading the charge to provide skilled talent and research on undergraduate, graduate and executive education levels.

In May 2012, UNC Charlotte and the Charlotte Chamber sponsored a daylong summit that drew more than 300 attendees and fueled the momentum to make Charlotte a hub for big data and analytics expertise. Since then, organizations from a wide range of perspectives have formed the Analytics & Big Data (ABD) Society (see page 18), whose vision is to further Charlotte as an analytics center.

“We have a lot going for us here — the biggest thing is type of industries,” said Allen Naidoo, vice president of advanced analytics at Carolinas HealthCare System. “They require strong data and analytics skills. I also think UNC Charlotte and other education programs will be an attractor as well. They represent a tremendous opportunity for research and talent development.”

The “type of industries” Naidoo refers to is Charlotte’s concentration of organizations in banking and finance, health care, energy and retail — a sampling of which are represented here speaking about how they use big data and analytics, how they see the field and their needs.

In the banking and finance sector, Bank of America is No. 26 on the Fortune 500 list and headquartered in Charlotte, while Wells Fargo makes the city its East Coast base. In health care, Carolinas HealthCare System is the one of the largest hospital systems in the country, and Premier, a buying cooperative and member organization, serves approximately 2,900 hospitals and approximately 100,000 other health care providers across the country.

Duke Energy, the largest utility in the U.S. by assets and a Fortune 500 company, headlines the energy sector, which includes AREVA, Toshiba, Siemens and Babcock & Wilcox. Fortune 500 members Lowe’s and Family Dollar Stores, coupled with Belk, the largest privately held department store chain in the country, give Charlotte a major presence in retail.

Overall, the Charlotte region is home to eight Fortune 500 headquarters. Beyond that, more than half of the Fortune 500 — 270 to be exact — have facilities in Mecklenburg County.

The following profiles spotlight how organizations in the Charlotte region have made big data and analytics a priority.
What is the **Big Data & Analytics Revolution?**

When Kurt Lueck of tech giant Pactera opened a North Carolina Technology Association meeting in August 2013, he called big data and analytics one of the biggest trends in business today. “It’s a game changer,” the manager of business intelligence and analytics told the crowd. This is why.

Since the early 2000s, an ongoing proliferation of digital data, the dramatically lower cost of bandwidth and data storage, and an increase in software to mine large data sets has yielded a revolution in business and organizational management often dubbed “big data and analytics.”

It’s also known as data analytics, business analytics, data science, business intelligence and informatics.

“Big data” refers to enormous data sets that far eclipse the kilobytes, megabytes and gigabytes familiar to consumers. Big data generally starts at the terabyte level (one trillion bytes) and goes up. Wal-Mart, for example, handles 1 million customer transactions in an hour, populating a database estimated at 2.5 petabytes (a petabyte equals a quadrillion bytes), noted a 2010 article in The Economist.

Organizations are assembling and evaluating data from sensors, social media, computers, mobile phones and other devices, then crunching it for insights to enhance performance and, in many instances, to stay competitive in their fields.

Gaining a competitive edge can be more difficult in today’s wired global economy. Fewer businesses possess unique niches in their industries, and innovation is often harder to achieve because proprietary software is more easily duplicated, noted the book “Competing in Analytics” by Thomas H. Davenport and Jeanne G. Harris.

In late 2012, an MIT Sloan Management/ SAS study showed a big rise in companies seeing big data and analytics as a competitive necessity.

More than two-thirds of the 2,500 executives interviewed said analytics made their organizations more competitive. The 67 percent figure represented an 80 percent jump from two years earlier, when only 37 percent of executives voiced the same view.

The interviews were primarily with vice presidents, business unit heads or higher positions. They represented 18 industries in more than 100 countries.

Ways that organizations are using big data and analytics are diverse. They include improving customer service and retention, identifying fraud, boosting patient care and lowering costs, designing better products and services, and reducing supply chain costs.

There is demand in Charlotte and elsewhere for people with big data and analytics skills — and the positions are not just IT jobs by a different name.

They usually require individuals adept at statistics, collating data and communicating its meaning to an organization. One organization calls such employees “Ph.D.s with personality.” They are also known as data scientists, data analysts and business analysts.

Demand for such talent is expected to continue. By 2018, McKinsey Global Institute predicts a national gap of 140,000 to 190,000 jobs in deep analytical talent and 1.5 million jobs in related managerial and analyst positions.
“Imagine our sales associate doing an algorithm search on his iPhone for the blue shirt in the size you want and finding out the closest store, the lowest cost and the quickest delivery. That would be terrific.”

~ Tim Belk
‘Channeling’ the Future
Belk Inc. Steps Up to Fund Higher Education

To begin understanding why the country’s largest privately owned department store chain cares about big data and analytics, listen to its chief executive officer and chairman:

“Suppose you shop at Belk, you might want to start your purchase on your iPad and then finish on your iPhone if you’re on the go,” said Tim Belk, who runs Charlotte-based Belk Inc. “Or, you might want to do something from your desktop (computer) or go to the store. That’s four channels right there.”

Today many large retailers are keenly focused on what’s called “omnichannel retailing.” They want customers to make purchases just as easily from an electronic device as from a traditional store. “We want our customers to be able to move seamlessly among a lot of channels,” Belk said, “and we want to put all our inventory in front of you no matter where you are.”

The company also wants to be able to mine this data and other data it has — from social media, charge cards and call centers — to improve everything from sales and product selections to efficiency and customer satisfaction. “We are just at the beginning stages of this,” said Belk, whose company has 301 stores in 16 states.

In 2013, the company hired its first executive over omnichannel retailing, Dorlisa Flur, and it stepped forward to make the largest gift to date to the Belk College of Business at UNC Charlotte — $5 million to bolster teaching and research in analytics and innovation, a gift that includes creating an endowed chair for marketing analytics.

Belk, who chaired the Charlotte Chamber in 2009, sees the gift to UNC Charlotte accelerating the learning curve not only at his business but in the region.

“We would like to see other companies do something similar to what Belk did in making an investment,” he said. “They can help build the data analytics curriculum like we are doing, and UNC Charlotte can be an important source of labor for them and a jobs generator for the region.”

One role of the new marketing analytics chair is to develop a learn-work-hire program to produce graduates skilled in big data and analytics. “It’s a new and emerging field and the demand outstrips the supply,” Belk said.

Among many future applications, he sees analytics helping his company refine customer service. “Imagine our sales associates having an electronic clientele book that automatically sends emails to customers when something they want comes in,” Belk said. “Or, imagine the sales associate doing an algorithm search on his iPhone for the blue shirt in the size you want and finding out the closest store, the lowest cost and the quickest delivery. That would be terrific.”
PROFILE: DEREK WANG, TASTE ANALYTICS

An Entrepreneur Makes Data Visual

While local businesses, UNC Charlotte and the Analytics & Big Data Society are prime movers on big data and analytics within the region, a significant part of the story also rests with people like Derek Wang.

Wang began Taste Analytics after finishing his doctorate in computer science at UNC Charlotte in 2011 and understanding the growing analytics hunger among businesses and other organizations.

Analytics is “fertile ground for business startups requiring low capital and high skill,” said Yi Deng, dean of UNC Charlotte’s College of Computing and Informatics.

Taste Analytics combines data analytics and interactive visualization in a specialized field known as “visual analytics,” which was Wang’s doctoral research specialty. The field still keeps him busy as associate director of the Charlotte Visualization Center, located in the College of Computing and Informatics. He also mentors graduate students as a full-time research assistant professor.

“Interaction is the key,” Wang said. “All analytics need to be placed in front of humans in a way that they can make decisions from the information. We want humans to interact with their data and ‘taste’ the big data. We are not going to orchestrate your thoughts. But rather we are in a facilitation role by putting data in a more human, graspable format.”

Taste Analytics assembles and crunches data and then displays it through interactive visualization techniques for desktop computers, smartphones or other devices. “We want the data to speak, anywhere and anytime,” Wang said.

The university’s strong data visualization program lured Wang, a native of Beijing, to Charlotte for his doctoral work. Then in 2005, when the U.S. Department of Homeland Security (DHS) started visual analytics centers around the country — including one at UNC Charlotte — the field took off.

Wang incorporated Taste Analytics in 2012 and has two full-time and four part-time employees as of mid-2013. The firm serves a wide variety of customers but focuses most of its energy on serving clients in education, government and banking.

The company projects a release of late 2013/early 2014 for its News Briefing app for consumers who use Apple devices.
“We want humans to interact with their data and ‘taste’ the big data. We are not going to orchestrate your thoughts. But rather we are in a facilitation role by putting data in a more human, graspable form.”

~ Derek Wang
Charlotte can be an analytics hub for the region, and even for the U.S. We have a lot going for us here – the biggest thing is the different types of industries.”

~ Allen Naidoo

Wanted: Data Scientists
Carolinas HealthCare System Likes Charlotte as Analytics Center

One of the most sophisticated users of big data and analytics in the Charlotte region is Carolinas HealthCare System (CHS), which owns or manages 41 hospitals and other medical facilities as one of the largest health care systems in the United States.

Yet, finding enough talent for CHS’s Dickson Advanced Analytics group is a major challenge for Allen Naidoo, who holds a doctorate in community health and biostatistics and heads what the hospital system calls “DA Squared, or DA².” DA² now numbers close to 100 employees and is expected to grow by 10 to 20 percent in the next three years.

The talent shortage “is not peculiar to any one region; it just seems to be a trend,” said Naidoo. “We don’t have enough qualified people for these roles. The market is competitive, and schools are not turning out data analysts and data scientists fast enough.”

He’s happy to see UNC Charlotte, the Analytics & Big Data Society and the Charlotte Chamber joining hands to encourage workforce development in this field.
“I firmly believe Charlotte can be an analytics hub for the region and even for the U.S.,” he said. “We have a lot going for us here — the biggest thing is the different types of industries. They require strong data and analytics skills.

“Charlotte is also a great location,” he added. “It’s a couple of hours to the sea and the mountains, and the weather is great. I think the location has a lot of attraction to high-powered talent.”

With the hiring of Naidoo in early 2012, CHS began centralizing and expanding its analytics function. Yet, as of mid-October 2013, DA² had 12 openings. “If you get two or three resumes per position you’re really lucky,” Naidoo said.

“Now we are starting to look for people who have a data scientist background — they know how to program, know statistical analysis, understand business concepts and then can communicate in meaningful ways to people who take care of patients,” he said.

Improving patient care and reducing costs have been the main drivers of the hospital system’s increased focus on big data and analytics. System leaders are particularly interested in mining their own data to see factors that predict patient outcomes.

DA² recently tapped its clinical, billing and scheduling data to come up with a predictive readmission risk model. Data analysts used nearly 40 factors to identify ones that tend to determine if a patient will be readmitted to the hospital.

“Now our care managers can utilize this information to identify patients at risk in real time, organize resources and lay out transition plans to reduce readmission rates,” Naidoo said.
Anticipating the need for talent and education has spurred Lowe’s Home Improvement to join the regional economic development push on big data and analytics.

That’s the word from Kelly Ross, who keeps an eye on analytics as senior vice president of finance and measurement for the Fortune 500 retailer based in Mooresville, N.C., just north of Charlotte.

Though Lowe’s hasn’t had trouble attracting talent so far, including relocations of midlevel managers from around the country, the firm sees a challenge on the horizon.

“We anticipate the demand for data scientists and analytics talent is going to grow much faster than the supply to fill those positions,” Ross said. “Ultimately, the value of big data is derived by its ability to improve the decisions we make, either by identifying new market opportunities or improving a business process. And turning data into insights is ultimately done by people.”

The data explosion/talent gap has led Ross to become active in Charlotte’s Analytics & Big Data Society (see page 18) and to begin talks with UNC Charlotte leaders who are ramping up what the university offers.

Lowe’s has long used its own data to help manage store inventory, decide product assortments, determine staffing levels and more. “What has changed in the past 10 years is the explosion of online data — people shopping our website, being mobile and using social media,” Ross said.

“Lowe’s used to be a single-channel operation; you would drive to a store and buy something,” he continued. “Now we want to be able to sell and fulfill a customer’s need the way they want it, whether it’s using a PC at home or a mobile device or going into a store.”

Lowe’s also wants to use data to help customers manage and improve their homes. Establishing the “My Lowe’s” online program is a step in that direction. The program helps customers record their purchases, warranties and product information, plan projects, create wish lists and more. “We want to help customers manage — and love — their homes,” Ross said.

Knowing that Lowe’s is one of many major organizations in Charlotte ramping up its analytics function, Ross believes the region is on the cusp of developing a new growth industry.

“What makes me optimistic is the focus of the Charlotte Chamber and that UNC Charlotte is creating partnerships with industry as it develops an analytics infrastructure in Charlotte,” Ross said. “I don’t know if we’ll ever be a Silicon Valley, but I think we can become known in the region and Southeast over the next 10 years.”
“We anticipate the demand for data scientists and analytics talent is going to grow much faster than the supply to fill those positions. What makes me optimistic is the focus of the Charlotte Chamber and that UNC Charlotte is creating partnerships with industry as it develops an analytics infrastructure.”

~ Kelly Ross
While UNC Charlotte has had analytics-related courses for years within a variety of degree programs, its Data Science and Business Analytics (DSBA) effort is providing a much higher concentration of courses and a more intense focus on the topic.

The university is working closely with regional businesses and organizations to create education, training and research programs to meet the DSBA need.

Leading UNC Charlotte’s effort is the College of Computing and Informatics and the Belk College of Business, with strategic input from the College of Health and Human Services. The DSBA is focused on the following:

**Increasing Graduate Degree Programs**
UNC Charlotte wants to develop the data scientists, analysts and managers whom businesses and other organizations need to evaluate, present and communicate data in meaningful ways.

**Adding Executive Education and Professional Development**
Certificate programs and other courses will allow organizations to send existing employees for DSBA education.

**Creating an Industry-University Consortium**
The consortium will be made up of research partnerships between the university and industry, spurring new ideas and technology within companies and in the marketplace.

**Current Degrees With DSBA Components**
The number of UNC Charlotte degrees with analytics and big data components is substantial and will continue to grow based on the DSBA initiative. Here are the offerings as of fall 2013.
In 2011, Yi Deng, dean of the UNC Charlotte College of Computing and Informatics, and Joan Lorden, university provost, made an important visit to the school’s chancellor. They wanted to tell Philip Dubois about the talent squeeze in big data and analytics and the potential for UNC Charlotte to become the pivotal leadership partner to regional businesses.

Dubois, whose university is the state’s urban research institution, was all ears. “Yi and Joan stated how big data was emerging as a major national need and that shortages were projected to emerge in banking and finance, retail, health care and energy, which are fundamentals of our regional economy,” Dubois recalled. Furthermore, local executives were eager for university leadership and education.

“It’s the job of a chancellor to appropriate good ideas when you hear them,” Dubois said, noting that this was one.

Soon after, the trio and other university leaders began focusing on how to grow resources to make UNC Charlotte the region’s go-to educational institution for big data and analytics. With related courses already in many degree programs and the College of Computing and Informatics being the largest IT college in the state based on several measures, the university was well positioned.

“We have the capacity and horsepower to do this,” Dubois said. “Our strategy was to raise local awareness, to approach the Charlotte Chamber early on, develop a legislative strategy and to get UNC system President Tom Ross on board.”

Today, those goals have been accomplished, and Dubois still marvels at how UNC system support fell neatly in place. Independent of the university, the UNC Board of Governors (to which Tom Ross reports) identified data science and analytics as one of its six “game-changing” strategies. Ross allocated funds this year to support the UNC Charlotte effort. “It was serendipitous,” Dubois said.

One major Charlotte business has stepped up as well. In early 2013, retailer Belk Inc. announced it was giving the Belk College of Business $5 million over five years to help grow curriculum and research in analytics and innovation (see page 7).

The university expects more businesses to step forward with gifts, whether to the business college, the College of Computing and Informatics (CCI), the College of Health and Human Resources or other academic areas that are increasing offerings as part of what UNC Charlotte calls its Data Science and Business Analytics (DSBA) initiative.

“The DSBA has incredible momentum,” noted Steve Ott, dean of the business college, in an article for UNC Charlotte magazine. “Companies from a wide range of industries are eager to learn more about how they can leverage data to drive strategy, and we’re confident that the DSBA provides solutions to the key challenges of the big data economy.”

Said CCI Dean Yi Deng, “The DSBA initiative responds to the challenges of big data and will position the Charlotte region as a leading hub for innovation and economic development.”
In 2010, Jared Lawrence joined his group at Duke Energy to help the company sharpen its retail customer strategy. Little did he realize that in just three years he would be spending about 40 percent of his time with data and analytics.

“I love it,” said Lawrence, whose title today is general manager of customer planning and analytics. “I have an engineering background so that helped me adjust.”

While Lawrence believes Duke Energy is in the top half or higher among the nation’s electrical utilities in applying analytics to operations, utilities “still lag other industries that have had a more competitive imperative to develop it,” noted Lawrence, citing banking, health care and retail as examples.

That’s one of the reasons he has become active in Charlotte’s Analytics & Big Data Society. “I love getting together and having dialogue on challenges we are facing and learning from each other,” he said.

“There seems to be a strong community sense around the analytics movement in Charlotte,” Lawrence continued. “It is really a sense we all need to work together to lift the tide and cultivate the city’s reputation as an analytics hub.”

Duke Energy already applies analytics in many ways. Among them are designing customer services and contact strategies, gaining insights about employee satisfaction and retirement trends and helping customers and the company reduce costs through grid-modernization programs.

As the company grows its analytics function, “we are finding we need to go to the market to tap some of those data science experts, people who have the talent to develop new algorithms to extract value from big data,” Lawrence said.

PROFILE: JARED LAWRENCE, DUKE ENERGY
Part of Charlotte’s ‘Analytics Movement’

PROFILE: DOUG VINSON, PACTERA
Fortune 500 Are Big Charlotte Draw

Not long after Pactera Technology International announced its U.S. headquarters in Charlotte, the automated message at its local office noted the company provides “soup to nuts” tech services for clients. Then, the message listed “predictive analytics” first in a short list of examples.

“This is a hot area,” said Doug Vinson, Pactera’s vice president of sales and marketing in Charlotte. “It’s one thing to gather data, but most clients are interested in what is going to happen in the future, banks in particular.”

Predictive analytics is part of the big data and analytics emphasis in the Charlotte region. “The past 10 to 12 years companies have been acquiring software to automate, and at the core of that software are databases,” Vinson said. “All that data can be captured, and companies are wising up to use that data to make analytical decisions.”

Based in Beijing, Pactera has approximately 24,000 employees worldwide and is the largest IT consulting firm in China based on number of employees.

The company announced Charlotte as its U.S. hub in April 2013 mainly because of Fortune 500 companies in the region, Vinson noted. Pactera already had strong relationships with several such companies, having acquired them through a former Charlotte-based management consulting firm named Nouveon, which a Pactera predecessor bought in 2011, he said.

“Our organization in China deals mainly with the Fortune 500,” Vinson continued. “Its largest vertical (market) is financial services with a very technological focus. Nouveon was built around high-level management consulting; now Pactera can complement that with technology.”

In Charlotte, Pactera is adding approximately 200 employees to the approximately 60 it already employs near SouthPark Mall. Most of the new hires will work directly with clients. “We are looking for technical expertise, an understanding of the industry they’re working in and social skills — our clients expect good communication,” Vinson said.
Sean Cassidy hopes the day comes when he can do his job without flying all over the country.

The manager of Enterprise Provider Analytics at Premier — a Charlotte-based alliance of approximately 2,900 hospitals and approximately 100,000 other health care providers — leads a team that helps members gain knowledge and capabilities in analytics related to patient care. Premier also focuses on analytics related to supply chain management.

With one of the nation’s largest health care databases, Premier has information on one in four hospital discharges in the country and adds approximately 2.5 million transactions to the database daily, said Todd Wilkes, Premier’s vice president of Enterprise Solution Development, speaking to a N.C. Technology Association meeting in August 2013.

One of Cassidy’s big tasks is checking out the latest analytical software in patient care and making recommendations to members. “I’m on airplanes a lot going to Boston, San Francisco, Austin and Dallas,” he said. “I would rather stay here and tuck my kids in at night.”

He hopes an increase in local software entrepreneurs will be a by-product of Charlotte’s momentum in big data and analytics. “We are interested in people who are building solutions, who are creating analytically focused software organizations. That will (also) create a lot of value for the city of Charlotte,” he said.

Rising costs and shifting reimbursement models are driving change in health care. “Having to connect the dots between costs and the quality side and the patient experience side is a fairly new development,” Cassidy says. “It’s causing a perspective change among our providers. They are in the early stages of the journey.”

“They are focused on understanding the health, costs and general well-being of populations they serve,” he said. “This is why it’s an analytical problem. In the past, the industry looked at individual patients and individual episodes of care.”
In 2012, Wells Fargo took a major step into the world of big data and analytics — it invested in a centralized technology platform to focus on the function. “Despite the hype about big data, it’s real,” Steve Page of Wells Fargo told a N.C. Technology Association meeting in August 2013.

“We generate a lot of data, and people are interested in it — the government is interested, people in the bank are interested, regulators are interested,” said Page, an area manager in technology for the bank. “We have a lot of data from interactions with customers, and the importance to the banking industry is simple. We want to manage risk better and take better care of customers.”

The bank is in the early stages of employing big data and analytics in a broad way. Wells Fargo has spent a lot of money with consultants to “show us how to do the work,” Page said, noting that the bank is now forming its own internal staff in this specialty. “Right now what we do is not tied hard to deliverables … we are trying to find the right applications for big data technology.”

One project has already produced a “360-degree” view of customers by combining online, call center and store (banking locations) data. As a result, Wells Fargo was “able to see a pattern that led to (customer) attrition,” Page said.

Among other projects, the bank is examining data for fraud patterns, mining blog information on the Web and studying customer emails for positive and negative messages.

“We also have a small project called ‘mobile wallet,’” Page explained. If someone with a cellphone walks by a merchant that does business with Wells Fargo, the person could receive notices of sales and offers on his cellphone. Consumer privacy is a concern, he noted, as with other big data and analytics applications related to marketing.
In 2007 when Rishi Bhatnagar’s company decided to focus strictly on big data and analytics, clients didn’t exactly beat down its door. “I wouldn’t say it was overwhelming,” said the co-owner of Syntelli Solutions, which has offices in Charlotte and Dallas. Charlotte was “a little slower adopting the technology.”

Today is another story. Bhatnagar is the first president of the Analytics & Big Data (ABD) Society, a group formed in 2013 that draws from major industries in Charlotte and includes leaders from UNC Charlotte as well.

The group’s vision is to make the city a hub for big data and analytics. Bringing together individuals and organizations seeking value from the field and who want to learn from others is a key focus of the group. “We want to provide a common platform for people to share ideas,” Bhatnagar said.

Apparently it’s working. When the ABD Society held a founders’ meeting in February 2013 and then an initial general meeting about three months later, they were gratified at the response. “We anticipated about 30 people but wound up with about 90,” Bhatnagar said of the first general meeting. Attendees came from banks, retailers, health care organizations, analytics software and service providers, the Charlotte Chamber, UNC Charlotte and other organizations.

The program featured a founders’ panel comprised of Bhatnagar and other ABD board members, representatives from Bank of America, Duke Energy and the Premier health care alliance. The moderator was from Belk Inc. Keynote speakers were David Kiron of the MIT Sloan Management Review, Akhil Uniyal from Dell and Richard Rodts III from IBM.

In late 2013, the ABD Society is upgrading its website, abdsociety.org, and planning a daylong conference for February 2014.

Bhatnagar is upbeat about Charlotte becoming a hub for big data and analytics. “Analytics is transforming every industry in this world,” he said. “Charlotte has the underpinnings to become a major player. There is a growing education system here; the Raleigh area and its universities are not far; and a lot of good businesses here need it.”
Charlotte is one of the fastest-growing cities in the nation. With our great location, world-acclaimed international hub airport, professional sports, low energy costs, diverse and talented labor, and a nationally ranked education system, it's easy to see why more businesses are flocking here every year.

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