

CENTER FOR ANALYTICS AND INNOVATION

INTRODUCTION

The Center for Innovation and Analytics (Center) will *Forge a Bold New Future*¹ for the College of Business and Economics (COBE). The overarching goal of the Center is to *Invest in the Lifetimes of students, faculty, staff, alumni, industry partners, and all the communities of Southwestern Virginia.*²

In keeping with the vision and mission of the COBE, the Center will

Be recognized for challenging minds, cultivating talents and connecting people in a technology-rich learning environment; and

Be known for providing an active learning environment that develops analytical and innovative business professionals for a dynamic global economy

The Center will assist the College of Business and Economics and Radford University as a whole

*To become increasingly known as a model for student-centered learning, transforming its students into graduates who will be among the most sought after by the nation's best employers and will become leaders in their communities and chosen careers.*³

ENVIRONMENTAL ANALYSIS

TECHNOLOGY AND BIG DATA

Technology—from the printing press to the Internet—has been a huge disruptive force in changing the status quo of government, business, and society globally. Today the sheer ubiquity of technology and the speed of change are almost unfathomable and, to some businesses, almost unmanageable.

Technology allows businesses to start and gain scale with stunning speed while using little capital. Entrepreneurs and start-ups now frequently enjoy advantages over the giants of industry. “The furious pace of technological adoption and innovation is shortening the life cycle of companies and forcing executives to make decisions and commit resources much more quickly.”⁴

Companies capture data from a variety of sources including transactions; financials; human resources; econometrics; email and other unstructured text; distribution and logistics; marketing research; media usage; customer spending habits; competitive and business intelligence; POS scanners; market basket analyses; internet marketing including web searches and navigation; video/cameras; and social media. One emerging and potentially very disruptive source of huge amounts of data is the Internet of Things (IoT) which provides objects (automobiles, refrigerators), animals and people a unique identifier that provides “the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction”⁵. The IoT is becoming a force that is “driving innovation and new opportunities by bringing every object, consumer, and activity into

¹ Radford University's Strategic Plan 7-17, Forging a Bold New Future.

² The slogan created under President Dr. Douglas Covington for Radford University's first Capital Campaign.

³ From the vision statement of Radford University as stated in 7-17.

⁴ **No Ordinary Disruption**, excerpt Richard Dobbs, James Manyika, and Jonathan Woetzel. McKinsey & Company (April 2015)

http://www.mckinsey.com/insights/strategy/the_four_global_forces_breaking_all_the_trends ALSO found in **The four global forces breaking all the trends**. Insights & Publications. McKinsey & Company (April 2015)

⁵ **What is the Internet of Things (IoT)?** Definition from WhatIs.com (n.d.)

<http://whatis.techtarget.com/definition/Internet-of-Things>

the digital realm. Major corporations are making similar changes within their enterprises by digitizing every employee, process, product, and service”⁶.

Data of enormous size and complexity is being created, aggregated, analyzed, and used for strategic purposes within companies and industries worldwide. Data and the analysis of it have become a disruptive global phenomenon and is “destined to help organizations drive innovation by gaining new and faster insight into their customers.”⁷ However, the business world is only beginning to harness the power of Big Data and learning how to use Analytics to gain actionable insights from it.

The proliferation of technology-enabled business models is accelerating the type and amount of information gathered every nanosecond, giving businesses and government the ability in real time to “predict who will click, buy, lie, or die”.⁸

Analyzing what has become gargantuan repositories of data is expected to become an integral part of business intelligence”⁹ and will become a key basis of competition, productivity growth, innovation, and consumer surplus.

Clearly, the environment for which we are preparing the next generation of business professionals is evolving rapidly in both in the amount of data available for decision making and the use of those data to innovate. The world in which we are preparing our students to enter is well described by Dobbs, Manyika, and Woetzel:

“It took more than 50 years after the telephone was invented until half of American homes had one. It took radio 38 years to attract 50 million listeners. But Facebook attracted 6 million users in its first year, and that number multiplied 100 times over the next five years. China’s mobile text- and voice-messaging service WeChat has 300 million users, more than the entire adult population of the United States. Accelerated adoption invites accelerated innovation. In 2009, two years after the iPhone’s launch, developers had created around 150,000 applications. By 2014, that number had hit 1.2 million, and users had downloaded more than 75 billion total apps, more than ten for every person on the planet. As fast as innovation has multiplied and spread in recent years, it is poised to change and grow at an exponential speed beyond the power of human intuition to anticipate.”¹⁰

Just as in the classic advertising campaign, “Not your father’s Oldsmobile”, this is not your father’s business environment.

⁶ “**Digital Business Era: Stretch Your Boundaries**” Accenture Technology Vision 2015 Survey (2015) <http://techtrends.accenture.com/us-en/business-technology-trends-report.html> ALSO found in **Digital Business Era: Stretch Boundaries** http://www.pega.com/system/files/docs/2015/Aug/Accenture-Technology-Vision-for-Pega-2014_1.pdf

⁷ **Big Data Management & Analytics**, Gartner (2015) <http://www.gartner.com/technology/topics/big-data.jsp>

⁸ **Predictive Analytics: The Power to Predict Who Will Click, Buy, Lie, or Die** Eric Siegel (February 19, 2013)

⁹ **The Future of Analytics: 3 Predictions for BI in 2015**, KDnuggets,(2014) <http://www.kdnuggets.com/2014/11/the-future-analytics-3-predictions-bi-2015.html>

¹⁰ No Ordinary Disruption by Richard Dobbs, James Manyika, and Jonathan Woetzel. McKinsey & Company (April 2015) http://www.mckinsey.com/insights/strategy/the_four_global_forces_breaking_all_the_trends

INNOVATION

Importance of Innovation

Innovative products, services, and processes are being witnessed everywhere. Innovation is transforming how, what, when, and where consumers purchase; how individuals communicate, and is changing the nature of social space collaboration. Businesses have never witnessed greater demands for organizations to innovate; and “to innovate faster and at scale. In response, data and analytics are being used to motivate radical new business models and disrupt traditional industry structures.”¹¹

According to Peter Drucker, “There is only one valid definition of business purpose: to create a customer. Therefore, any business enterprise has two—and only two—basic functions: marketing and innovation.”¹² CEOs say innovation is the most important factor for growth.¹³ According to the Veterans Administration Center for Innovation, “No enterprise, public or private, can endure without innovation”.¹⁴

Innovation by definition represents a significant positive change in a product, service or process.¹⁵ Innovation is a catalyst for the growth and success of a business, and a means for a company to adapt, grow, and remain competitive in the marketplace.

“Innovation is not a single event or activity; it is a process. In terms of business, innovation is the generation of fresh ideas, the ongoing development of products, services and processes and their commercial application.”¹⁶

A key phrase in the quote is, “their commercial application” because it is not just about being creative, about having a new idea, or even about the invention of a revolutionary new product or service that is important. What is important is bringing the innovation to market; exploiting it in a manner that leads to new products, services or systems; adding value; or improving quality.¹⁷ To innovate may require the transformation of existing technology; restructuring of management; and the adoption and application of out-of-the-box thinking to generate significant change.

Studies have consistently reported that essentially all businesses want to be more innovative; it has become a necessity for survival, long-term growth, and wealth creation. The importance of innovation across all business sectors is increasing significantly and becoming a major factor in

¹¹ **Driving Innovation through Data.** By Rashik Parmar, David L. Cohn and Anthony Marshal, IBM Global Business Services, (2014). http://www.ibm.com/big-data/au/en/big-data-and-analytics/Driving_innovation_through_data_Exec_Report_0520.pdf

¹² **The Practice of Management,** Peter Drucker (1954), pp. 39–40 New York: Harper & Row Publishers – Found in “Drucker’s insights on market orientation and innovation: implications for emerging areas in high-technology marketing” by Jakki J. Mohr & Shikhar Sarin, Academy of Marketing Science, (2008)

¹³ **CEOs Say Innovation Is Most Important Factor For Growth** by Bill Fischer, contributor. Forbes/Leadership. (Jun 4, 2011). <http://www.forbes.com/sites/billfischer/2011/06/04/ceos-say-innovation-is-most-important-factor-for-growth-voxy-co-nz/>

¹⁴ **VA Embraces Risk through Innovation Center.** Mathew G. Robinson (October 2012) <http://www.govexec.com/excellence/promising-practices/2012/10/va-embraces-risk-through-innovation-center/59166/>

¹⁵ **The best definition of Innovation,** Scott Berkum Blog, Posted on April 3, 2013 in [Innovation](http://scottberkun.com/2013/the-best-definition-of-innovation/). <http://scottberkun.com/2013/the-best-definition-of-innovation/>

¹⁶ **Introduction to Innovation.** SmallBiZConnect. Small Business Tool Kit. Funded by the NSW Government. (n.d.) <http://toolkit.smallbiz.nsw.gov.au/part/14/69/291>

¹⁷ **What is Innovation? Why Innovation is important?** PAGGU.com, Posted by Amitabh Shukla (May 30, 2009) <http://www.paggu.com/getting-into-roots/what-is-innovation-why-innovation-is-important/>

strategic planning. “Even though organizational efficiency is essential for business success, efficiency alone cannot sustain business growth.”¹⁸

Innovations can represent incremental change, step-change, major change, breakthrough or nascent change. Incremental change with improvements to products, services, and processes is expected; but, breakthrough innovations may significantly cannibalize existing products and markets, disrupt the current processes, and “challenge the embedded ways of thinking and working, e.g., Uber, Tesla, iPad.”¹⁹

Innovation is not a standalone concept. It has supporting sub-components of critical thinking, analytical reasoning, creativity, entrepreneurship, intrapreneurship,²⁰ and problem solving.

Creativity’s Link to Innovation

Creativity and innovation are not identical concepts as there are clear and important distinctions between them. Businesses must understand the distinction between the concepts before instituting a company-wide innovation initiative.²¹

Creativity is defined as the ability to conceptualize or imagine new, unusual or unique ideas; to see connections between seemingly unrelated things. Thus, an individual or company is creative when looking at things in a new forward-thinking way. Innovation is defined as the process that adds value by transforming those new ideas into commercial products, services, or processes. Thus, creativity is a necessary but not sufficient condition for being innovative.

Steve Jobs, the founder of Apple, was creative because he had a proven ability to imagine new ideas for products, and to see new connections between things not previously connected, e.g., “combining an iPod, the iTunes store, an Internet browser, a camera, a GPS, and a cell phone to create the iPhone.”²² Apple continues to be innovative “in the manner in which they interpret and execute forward-thinking ideas to create inspired, highly desirable products of value.”²³ Jobs was able to create in Apple an innovation-driven culture continuously striving to “elevate the aesthetics, functionality and simplicity of their product design to museum quality levels.”²⁴

Information, imagination, creativity and initiative are individually and collectively elements used in deriving an innovation. For success, a company must identify the wants, needs, and desires of customers and differentiate the company from competitors by innovating to satisfy these expectations at a profit to the firm. However, a company cannot wait for an innovative idea just to drop out of the sky – companies must have an innovation strategy.²⁵ Creativity and innovation also act within, and impact, society creating opportunities for new alliances, partnerships, and facilitating

¹⁸ **Ibid.** (May 30, 2009)

¹⁹ **Innovation: It's Not The Idea, It's What You Do With It**, Forbes Leadership, Kotter International (November 22, 2013) <http://www.forbes.com/sites/johnkotter/2013/11/22/innovation-its-not-the-idea-its-what-you-do-with-it/>

²⁰ **Definition:** Intrapreneurship is the act of behaving like an entrepreneur while working within a large organization.

²¹ **The Relationship Between Creativity and Innovation**, SmartStorming, (n.d.) <http://smartstorming.com/the-relationship-between-creativity-and-innovation>

²² **Ibid.** SmartStorming (June 2009)

²³ **Ibid.** SmartStorming (June 2009)

²⁴ **Ibid.** SmartStorming (June 2009)

²⁵ **You Need an Innovation Strategy** Gary P. Pisano. Harvard Business Review, (June 2015 Issue). <https://hbr.org/2015/06/you-need-an-innovation-strategy>

joint venturing, Creativity and innovation have the potential to alter why, when, where, and how customers purchase.²⁶ Together, creativity and innovation drive economic growth.²⁷

As stated earlier, creativity and generating new ideas are a necessary but not sufficient conditions for being innovative. An idea must add value to become an innovation, i.e., the idea must be commercialized. That role of an innovator is often the purview of entrepreneurs.

Innovation's Link to Entrepreneurship

Peter Drucker defines innovation as “a specific tool of entrepreneurs, the means by which they use changes as favorable opportunities for some other business or service activity, so entrepreneurs must create something new, something different, they must change or transform value.”²⁸

Big businesses capture many of the headlines, but small businesses are the engine that drives much of the economy. Big corporations are not as agile, adaptable or quick to change as small businesses. Thus, innovation may be a greater lever in small businesses as it is essential to their development and success. Entrepreneurs are the typical drivers of small businesses and, thus are the innovators of the economy. “By embracing innovation to keep up with the pace of change in the dynamic world of business, entrepreneurs are surging steadily forward with a wealth of creative and innovative ideas that transform into competitive products and services, allowing entrepreneurs and their small businesses to garner financial gains that, in turn, help boost the country’s economy.”²⁹

The Innovation Trilogy: Creativity, Innovation, and Entrepreneurship

Creativity, innovation, and entrepreneurship are intrinsically connected. To become an entrepreneur, an individual must find a creative, innovative way to solve a problem or successfully meet a market need. As everyone understands, ideas are rarely “new”; whatever the idea is created, it seems someone else has or has had the same idea. However, this is where the entrepreneur separates himself or herself from the rest of the business herd. An entrepreneur has the capability of ‘doing’, transforming an idea into reality. An entrepreneur can never do this without creativity and innovation.^{30&31}

“Most of us would agree that innovation has something to do with the tangible manifestation of novel ideas. But entrepreneurship is about the creation of tangible value. Ideas help, but the

²⁶ **Intellirise** Corp Home, <http://intellirisecorp.com/>

²⁷ **Innovation Drives Economic Growth – News from Nesta** by Paul Hobcraft, Innovation Excellence, (June 29, 2013) <http://www.innovationexcellence.com/blog/2013/06/29/innovation-drives-economic-growth-news-from-nesta/>

²⁸ P. F. Drucker, **Innovation and Entrepreneurship: Practice and Principles**, 1st ed., New York: Harper & Row (1985). Found in **Creativity and innovation as the driving power of entrepreneurship** by Jasmina Lukić, Electronic International Interdisciplinary Conference 2012, (September, 3. - 7. 2012). <http://www.eiic.cz/archive/?vid=1&aid=3&kid=20101-113&q=f1>

²⁹ **The Importance of Innovation in Entrepreneurship** SME Corp. Malaysia March 18, 2013. <http://www.smecorp.gov.my/vn2/node/86>

³⁰ **What are commonalities between creativity, innovation and entrepreneurship?** QUORA, quoting Anthony Saneh <https://www.quora.com/What-are-commonalities-between-creativity-innovation-and-entrepreneurship>

³¹ **Worthless, Impossible and Stupid: How Contrarian Entrepreneurs Create and Capture Extraordinary Value**, Daniel Isenberg, HBR Press, July 9, 2013 <https://hbr.org/product/worthless-impossible-and-stupid-how-contrarian-entrepreneurs-create-and-capture-extraordinary-value/an/11143-HBK-ENG>

sine qua nons for entrepreneurs – hard work, ambition, resourcefulness, unconventional thinking, salesmanship, and leadership – will usually trump brilliant ideas.”³²

Creativity, innovation, and entrepreneurship are individually and collectively important -- the three intersect. Companies must embrace the connection between creativity, innovation, and entrepreneurship and put aside the artificial distinctions between them,³³ because “innovation and entrepreneurship are crucial for long-term economic development.”³⁴

ANALYTICS

Importance of Analytics

As previously stated, companies globally are witnessing an unprecedented growth of the data available and the velocity at which it is collected; and find they are ill prepared to turn that growth into meaningful information for optimizing management decisions. Data Analytics is helping enterprises to find new ways to leverage information to drive innovation and growth. Analytics and fact-based decision making are changing job functions within organizations more than any other technologies. “Analytics tools give decision-makers the best possible intelligence about customers, finances, operations, suppliers, and the market.”³⁵ Thus, data analytics is a growing source of value and competitive advantage for businesses.³⁶

Business agility is being derived from the convergence of cloud, social, mobile, video, and big data.³⁷ “The rising popularity of cloud computing and outsourcing is expanding the realm of big data and the possibilities to innovate and maintain a competitive advantage”³⁸ for large and small companies.

Analyzing the vast data found in gargantuan repositories is expected to become an integral part of business intelligence³⁹ and will become a key basis of competition, productivity growth, innovation, and consumer surplus. “The increasing volume and detail of information captured by enterprises, the rise of multimedia, social media, and the Internet of Things will fuel exponential growth in data for the foreseeable future.”⁴⁰

³² **Are Creativity, Entrepreneurship & Innovation the Same Thing?** by Tim Kastle The Discipline of Innovation, (2013) <http://timkastle.org/blog/2013/08/are-creativity-entrepreneurship-innovation-the-same-thing/>

³³ **Op. Cit.** Kastle (2013)

³⁴ “**Innovation and entrepreneurship are crucial for long-term economic development.**” Technology and the Innovation Economy, By: Darrell M. West, Brookings, (October 19, 2011), <http://www.brookings.edu/research/papers/2011/10/19-technology-innovation-west>

³⁵ **Driving Business Innovation and Improving Job Performance.** IDC Go to Market Services, Sponsored by SAP, 2015. <http://www.innovationsinanalytics.com/> And Akili, (n.d.) <http://www.akili.com/akili-blog/business-intelligence/arguably-no-technology-is-changing-job-functions-within-organizations-more-than-analytics/>

³⁶ **Competing on Analytics: The New Science of Winning.** Gillon, Kirstin; Aral, Sinan; Lin, Ching-Yung; Mithas, Sunil; and Zozulia, Mark (2014) and “**Business Analytics: Radical Shift or Incremental Change?**” *Communications of the Association for Information Systems*: Vol. 34, Article 13. <http://aisel.aisnet.org/cais/vol34/iss1/13>

³⁷ **Creating Business Agility: How Convergence of Cloud, Social, Mobile, Video, and Big Data Enables Competitive Advantage.** Heisterberg, Rodney and Alakh Verma, Wiley, (September 2014).

³⁸ **Sustainable Improvement Through Big Data**, by Stephen Chick, INSEAD Professor of Technology and Operations Management (February 19, 2015) <http://knowledge.insead.edu/blog/insead-blog/sustainable-improvement-through-big-data-3854>

³⁹ **The Future of Analytics: 3 Predictions for BI in 2015**, KDnuggets,(2014) <http://www.kdnuggets.com/2014/11/the-future-analytics-3-predictions-bi-2015.html>

⁴⁰ **Op. cit.** Manyika et. al. (May 2011)

Business Analytics drives organizational insights; insights lead to greater understanding of customers and markets; and that understanding yields innovative products and services, better customer targeting, improved pricing, and superior growth in both revenue and profits. Companies are viewing Analytics and employees who can create and use them as essential for creating value.

Analyzing past trends historically has given companies an ability to plan for the future. In fact, many once believed that the best forecast of total sales for the next year would simply be the total sales during this year. “That approach is like relying on the Farmer’s Almanac to predict the weather, but the past is never a completely accurate indicator of what will happen in the future.”⁴¹ In the past data were kept in different systems and corporate silos that were unable to talk to each other, e.g., the silos of finance, human resources or marketing. Today organizations can connect all their data, “both inside and outside the enterprise, to enable smarter, more precise action and planning than ever before.”⁴² Companies are using analytics to get a complete picture of their operations.

Analytics has moved deeper into the language of business and “has garnered a burgeoning interest from business and IT professionals looking to exploit huge mounds of internally generated and externally available data.”⁴³ Today many fields use analytics including accounting; marketing; financial services, economics, management, human resources and talent management, insurance, telecommunications; retail; travel; healthcare; pharmaceuticals; and biology.⁴⁴ But analytics is not restricted solely to private-sector, profit-seeking businesses. Governmental and nonprofit organizations can use business analytics to advance their objectives as well, and, in fact, many do just that.⁴⁵

Big Data and Big Analytics are fast becoming the bridge to innovation and growth for companies worldwide. Whether competing globally or locally within an interconnected global economy, businesses need a deeper understanding of markets, customers, products, competitors, employees and emerging technologies. The past decade has witnessed an exponential growth in the number of enterprises recognizing the value of business analytics. With the adoption of business analytics has come new numerical technologies permitting data analysis of structured and unstructured (e.g. text, video), machine learning (IBM Watson, Rocket Fuel), and enhanced and powerful software (SAS Enterprise Miner, SPSS Modeler, R).

Analytics today is all about mining enormous datasets, looking for patterns in them, bringing meaning to the patterns found, and then using those findings to optimize business decisions. Analytics extensively uses data -- Big Data – exploratory models derived from advanced statistical, quantitative, and mathematical analyses, data mining, predictive analytics, and fact-based management to drive or influence decisions and actions.^{46 & 47}

⁴¹ **Big Data requires changes within (your business)** Colin Mahoney (July 17, 2015). *Thoughts on Cloud: Insights, news, and analysis for the cloud community.* <http://www.thoughtsoncloud.com/2015/07/big-data-requires-changes-within-your-business/>

⁴² **Ibid.**

⁴³ **IT Glossary** Gartner, Inc. (2013) (<http://www.gartner.com/it-glossary/analytics>)

⁴⁴ **Webopedia** (http://www.webopedia.com/TERM/B/business_analytics.html)

⁴⁵ Thomas H. Davenport, International Institute for Analytics, (2010) http://www.sas.com/resources/asset/IIA_NewWorldofBusinessAnalytics_March2010.pdf

⁴⁶ **Competing on Analytics: The New Science of Winning.** Davenport TH and Harris J (2007). Harvard Business School Publishing Corporation: Boston, MA.

⁴⁷ **Op. cit.** Gartner, Inc. (2013)

Industries worldwide are experiencing rapid growth in unstructured and semi-structured data analytics.⁴⁸ Eighty-four percent of the respondents in a recent survey reported, “The organizations they work for are currently processing and analyzing unstructured data sources, including weblogs, social media, e-mail, photos, and video.”⁴⁹ The other sixteen percent of the survey respondents indicated that steps would be taken over the next year or so to implement the same approaches to analyzing unstructured data. The meshing of business analytics with big data has given rise to more sophisticated industry applications resulting in improvements in unstructured data mining and processing capabilities.⁵⁰

As more companies embrace fact-based decisions, gaining and keeping an edge with analytics will become more challenging. “In light of this, nearly nine in ten survey participants agreed that it is important for their organizations to step up their use of analytics to make better decisions.”⁵¹ Survey participants reported that senior management is increasing the pressure to become more analytical and data-driven.

Data is everywhere, but having huge repositories of data without employees capable of mining it and putting the findings into a business context is poor business planning. Data analytics on large and complex datasets requires a new breed of employee – one who can fully embrace data analytics while also being fully grounded in the domain of business. Crunching numbers without understanding the context in which they were gathered or understanding the business context of the patterns in the data is a waste of time and money.

Companies today are seeking employees that understand the business domain in which decisions are made and who possess depth and breadth of understanding of the analytics to optimize decision. But the reality is the demand for individuals grounded in Analytics, particularly in Data Mining and Predictive Analytics, and with a solid foundation in a business discipline far exceeds the supply of graduates.

Due to the importance placed on data and the analysis of it, analytics has come to be an indispensable element in business school curricula. Business schools worldwide today acknowledge graduates need a solid analytics foundation to be fully prepared to assume leadership roles in a data-driven fact-based decision environment.

The U.S. Bureau of Labor Statistics predicts that, over the next seven years, there will be almost a 19 percent increase in demand for business professionals with domain specific analysis skills. This projected growth is “faster than the average for all occupations”.⁵² McKinsey Global Institute predicts there will soon be a shortage in the supply of talent necessary for organizations to fully utilize the power of Big Data. “By 2018, the United States alone could face a shortage of 140,000 to 190,000

⁴⁸ **10 Reasons Why Big Data Analytics is the Best Career Move**, Edureka!, (January 2015) <http://www.edureka.co/blog/10-reasons-why-big-data-analytics-is-the-best-career-move> citing Intel's IT Center's **Peer Research Big Data Analytics: Intel's IT Manager Survey on How Organizations Are Using Big Data** <http://www.intel.com/content/www/us/en/big-data/data-insights-peer-research-report.html>

⁴⁹ **Ibid.** Edureka! (January 2015)

⁵⁰ **Big Data in finance industry to drive analytics demand in China says IDC** by FinTech Innovation Editors (2015-05-12) <http://enterpriseinnovation.net/article/idc-says-big-data-will-drive-analytics-demand-china-2078681897> ALSO found in **IDC: China Business Analytics Services Market Undergo Accelerated Growth Including Big Data Developments** (May 2015) <http://www.idc.com/getdoc.jsp?containerId=prCN25609415>

⁵¹ **Five questions to help bridge the analytics gap** by Pamela Prentice, Chief Research Officer, SAS http://www.sas.com/en_us/insights/articles/analytics/five-questions-to-help-bridge-the-gap.html

⁵² **Occupational Outlook Handbook: Management Analysts**. (January 2014) <http://www.bls.gov/ooh/business-and-financial/management-analysts.htm>

people with deep analytical skills as well as 1.5 million managers and analysts with the know-how to use the analysis of big data to make effective decisions.”⁵³

According to Gartner, the ingredient most important to a game-changing Analytics program is smart people, not technology.⁵⁴ During the past few years, analytics has become a career field in great demand,⁵⁵ but a huge gap exists between the demand and supply of qualified applicants. Businesses expect colleges and universities to prepare future business graduates with more comprehensive and advanced analytics skills and abilities, and all fully grounded in a business discipline.⁵⁶ The talent gap will not be filled overnight, but beginning to take intentional and purposeful steps can reduce it.⁵⁷

Big data is impacting and transforming virtually all academic disciplines, and the consequences, opportunities, and methods for gaining intelligence from the stores of data are being integrated into the curriculum at college and universities worldwide.⁵⁸ Big Data as an element of almost all academic disciplines has attracted the interest of analytics software giants such as SAS and IBM. These companies have partnered with many colleges and universities worldwide to help close the talent gap and prepare the next generation of business and analytics professionals. The COBE is a partner in the IBM Academic Alliance and SAS has provided tremendous support and resources to the faculty within the College.

The Director of IBM’s Global University Programs, Jim Spohrer, has said, “About 40 percent of the institutions that participate in its big data program are business schools. Another 40 percent are engineering schools, with the balance comprised of other academic fields, such as social science or health.”⁵⁹ Mr. Spohrer went on to say:

“It’s not like we could solve the problem if we had more computer scientists in data analytics. The fact of the matter is we need marketing people who know big data analytics. We need health care people who know big data analytics.”⁶⁰

⁵³ **Big data: The next frontier for innovation, competition, and productivity.** (May 2011). James Manyika, Michael Chui, Brad Brown, Jacques Bughin, Richard Dobbs, Charles Roxburgh, Angela Hung Byers McKinsey & Company, McKinsey Global Institute.

⁵⁴ **Gartner Business Intelligence & Analytics Summit 2014** (October 2014) page 3.

<http://www.gartner.com/imagesrv/summits/docs/emea/business-intelligence-german/BI-EMEA-GERMAN-2014-Brochure.pdf>

⁵⁵ **10 Reasons Why Big Data Analytics is the Best Career Move**, Edureka!, (January 2015)

<http://www.edureka.co/blog/10-reasons-why-big-data-analytics-is-the-best-career-move>

⁵⁶ **University of Queensland Business School meets demand for business analytics savvy graduate**, SAS Institute (n.d.) http://www.sas.com/en_nz/customers/uq-business-school.html

⁵⁷ **What can universities do to fill the analytics skills gap?** Waynette Tubbs, SAS Learning Post (October 2014) <http://blogs.sas.com/content/sastraining/2014/10/23/what-can-universities-do-to-fill-the-analytics-skills-gap/>

⁵⁸ **Why “Big Data” Is a Big Deal: Information science promises to change the world.** Jonathan Shaw. Harvard Magazine (March-April 2014) <http://harvardmagazine.com/2014/03/why-big-data-is-a-big-deal>

⁵⁹ **As Demand for Big Data Analysts Grows, Schools Rush to Graduate Students with Necessary Skills**, Steven Overly, The Washington Post, (September 15, 2013).

http://www.washingtonpost.com/business/capitalbusiness/as-demand-for-big-data-analysts-grows-schools-rush-to-graduate-students-with-necessary-skills/2013/09/13/afbab3e-1a66-11e3-82ef-a059e54c49d0_story.html

⁶⁰ **Ibid.** (September 15, 2013).

Evidence of the Demand for Analytics Professionals

It is easy to see the demand for analytics-trained professionals within areas within or supported by the College of Business and Economics. In preparing this proposal, data were captured at 10:15 a.m. on Aug 1, 2015, for job postings in areas of importance to students with the COBE. Data were gathered for entry level (baccalaureate), associate level (MBA) and all levels for each area within analytics posted. The data are presented in Table 1 below (See Resource Report A for a comprehensive analysis of the areas of growth in analytics).

TABLE 1
Analytics U.S. Position Ads on LinkedIn*

Area of Analytics	Entry or Associate**	All Levels
All Analytics Position Ads	31,501	131,878
Social Media Analytics	9,842	31,125
Marketing Analytics	7,546	31,160
Healthcare Analytics	7,438	25,279
Financial Analytics	6,083	30,594
HR/Talent Analytics	5,773	17,241
Media Analytics	4,212	13,502
Pricing Analytics	3,153	7,129
Retail Analytics	2,960	11,848
Digital Analytics	2,859	17,153
Fraud Analytics	2,621	20,519
Supply Chain Analytics	1,031	6,761
Credit Analytics	831	9,079

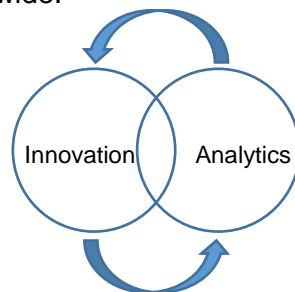
*Data Captured at 10:15 a.m. on Aug 1, 2015

**Associate Level generally requires 3-5 years of experience or an MBA or other Advanced Degree

The concepts of Innovation and Analytics not new. What is new is the increasing capacity of businesses, non-profits, and government agencies to access, store, analyze, interpret and use data, and the information it provides, to innovate and optimize opportunities.

THE NEXUS OF INNOVATION AND ANALYTICS

Analytics is driving innovation and innovation is driving analytics – they overlap --and together they are transforming industries worldwide.



Businesses need a deeper understanding of markets, customers, products, competitors, employees and emerging technologies to compete either globally or locally in an interconnected global economy. Companies seek to find creative approaches to become more operationally efficient and to develop innovative ways for growth. Increasing numbers of companies are applying analytics and

sophisticated methods to analyze their enormous stores of data to generate ideas and innovate. Data warehoused in multiple locations, including the well-protected corporate silos, are being brought together and mined in hopes of discovering new patterns and relationships that may lead to competitive advantage.

For organizations to be competitive and survive in the global marketplace, they need to be more innovative in their operations and market offerings. Organizations need to innovate rapidly and do it in a more cost-effective manner. Companies own or have access to massive amounts of data that could be used to innovate, grow, and become more competitive.⁶¹ Some strongly believe that analytics drives business innovation.⁶² According to Evan Stubbs, Big Data leads to Big Innovation.⁶³

“Innovation is happening everywhere. It is transforming how and what people purchase, and how they communicate and collaborate. There are ever-greater demands on organizations to innovate faster and at scale. In response, data and analytics are being used to motivate radical new business models and disrupt traditional industry structures.”⁶⁴

Increasingly, companies large and small are leveraging data analytics to drive growth and innovation.⁶⁵ Leading companies are using this blend of Innovation and Analytics to identify and act on new product and service opportunities, enhance existing products or services, and better deliver on customer expectations.

Data-Driven Innovation presents tremendous economic and social value capable of transforming the way we communicate, teach, learn, work, live, and play.

BOTTOM-LINE:

INNOVATION IS THE NEW MANTRA FOR BUSINESS⁶⁶

DATA IS THE NEW RAW MATERIAL^{67 & 68}

ANALYTICS PROVIDES THE INFORMATION NECESSARY TO INNOVATE, GAIN COMPETITIVE ADVANTAGE, AND CREATE WEALTH.

⁶¹ **The New Patterns of Innovation: How to use data to drive growth.** Parmar, Rashik, Ian Mackenzie, David Cohn, and David Gann. Harvard Business Review. (January-February 2014).

⁶² **Analytics drives business innovation.** Heather Johnson. (May 27, 2015).

<http://siliconangle.com/blog/2015/05/27/analytics-drives-business-innovation-ibmvision/>

⁶³ **Big Data, Big Innovation: Enabling Competitive Differentiation through Business Analytics** Stubbs, Evan., (2014) SAS Institute, Inc. Cary, NC.

http://www.sas.com/storefront/aux/en/spbigdatainnov/66506_excerpt.pdf

⁶⁴ **Driving innovation through data. IBM Global Business Services. Strategy and Analytics.** Parmar, Rashik, David L. Cohn and Anthony Marshall. Executive Report. IBM Institute for Business Value. (2014) ALSO found in **IBM Interactive Experience: Think: Data.** (n.d.)

⁶⁵ **Leveraging Data Analytics to Drive Growth and Innovation** by Dave Zwiker, Earley Information Science. <http://www.earley.com/blog/leveraging-data-analytics-drive-growth-and-innovation>

⁶⁶ **Driving Innovation Through Analytics**, Executive Strategy Series, Oracle, (2012)

<http://www.oracle.com/us/solutions/ent-performance-bi/business-intelligence/driving-innovation-analytics-1505189.pdf>

⁶⁷ **Data is new raw material of business – almost on a par with capital, labour** by Richard Topham, Experian, (2012) <https://www.experianplc.com/media/news/2012/data-is-new-raw-material-of-business-almost-on-a-par-with-capital-labour/>

⁶⁸ **Conversations with Tomorrow: 2015** video presentation by Kenneth Cukier. Angler, Institutional Investor. (September 30, 2015) <http://www.institutionalinvestor.com/media/3493384/Big-Data-The-New-Raw-Material-of-Business.html#.VkCq07erTGg> Also found on CityWire Global (29 September 2015) <http://citywireglobal.com/news/big-data-the-new-raw-material-of-business/a844860>