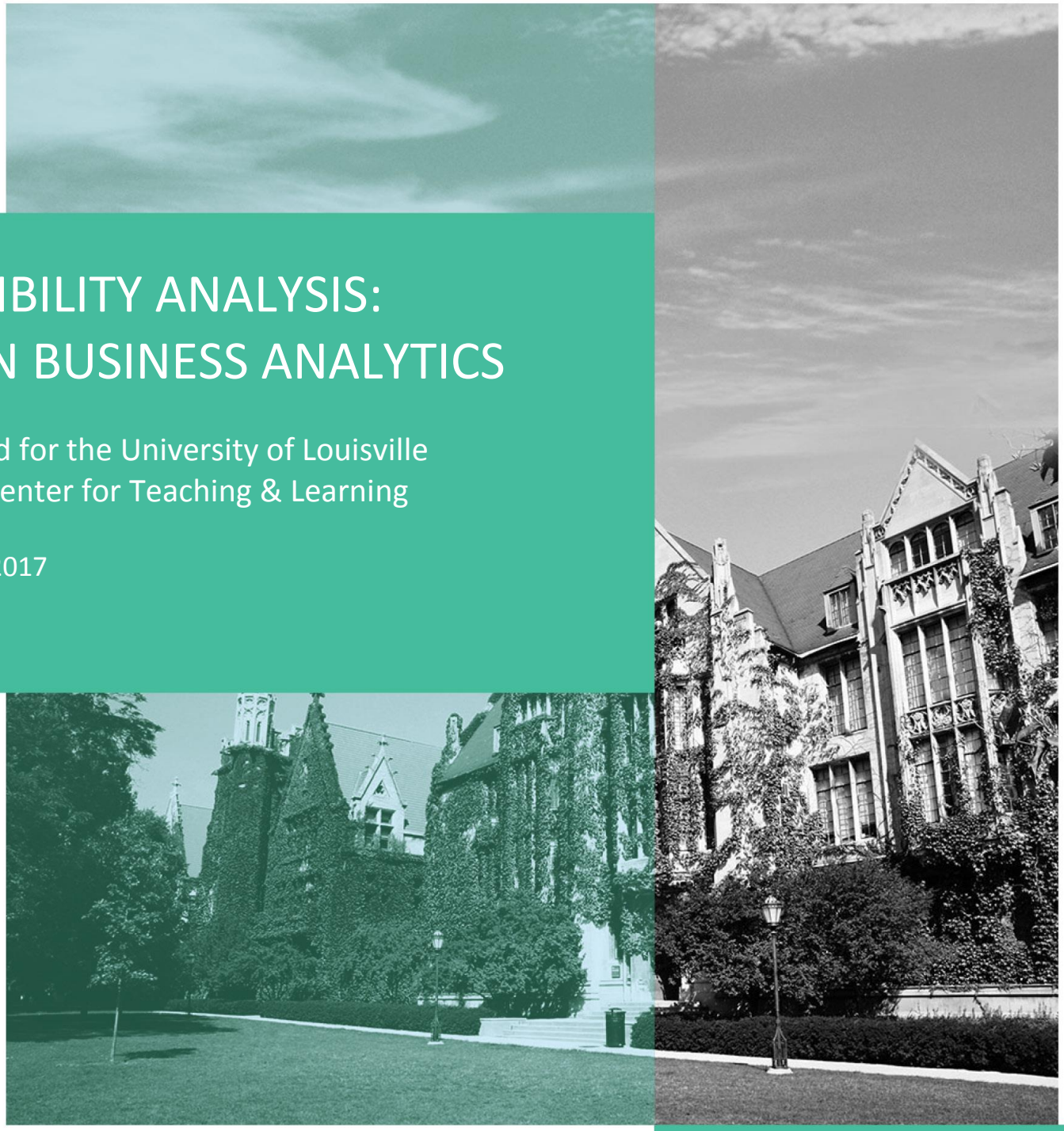

FEASIBILITY ANALYSIS: MS IN BUSINESS ANALYTICS

Prepared for the University of Louisville
Delphi Center for Teaching & Learning

January 2017

In the following report, Hanover Research provides a high-level feasibility assessment for an online Master of Science in Business Analytics for the University of Louisville Delphi Center for Teaching & Learning.

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EXECUTIVE SUMMARY AND KEY FINDINGS

INTRODUCTION

As the use of big data – also known as business analytics – across industries grows, businesses seek graduates who can transform large data sets into readable and usable deliverables to inform business decisions. In a 2015 *Computerworld* survey of the top 10 tech skills for 2016, business analytics ranked fifth. According to the survey, hiring managers look for employees with advanced technical expertise and business education, obtained through graduate programs.[1]

In this report, Hanover Research (Hanover) assesses overall demand for an online Master's in Business Analytics program at the University of Louisville by examining student demand for related degrees and evaluating future labor market demand using occupational projections and current job postings. The report is divided into two sections:

- **Section I – Degree Completions Trends and Competitive Saturation** uses degree completions data to assess trends for business analytics master's degrees at the national, regional, and state levels.
- **Section II – Labor Market Outlook** provides an overview of occupational trends to determine potential labor market demand for professions related to business analytics. This section also discusses educational attainment trends, salaries in occupations related to business analytics, and current job postings in the field.

KEY FINDINGS

- **Trends indicate sufficient demand to make the inclusion of a master's degree program in business analytics at the University of Louisville viable.** Rising student demand, favorable occupational projections, and low competitive saturation for online programs point to a promising environment for such a degree program.
- **Students trained in business analytics should face promising employment prospects over the next decade, both in Kentucky and the surrounding region.** Collectively, employment in related occupations such as statisticians, survey researchers, database administrators, and business analysts, is expected to grow at above average rates.
- **Regional competitive saturation for online master's programs in business analytics is low.** Preliminary research suggests that there are four regional programs offering an online degree option while no institutions in Kentucky offer an online program.

[1] Pratt, Mary K. "10 hottest tech skills for 2016." Computerworld. http://www.computerworld.com/article/3012033/it-skills-training/10-hottest-tech-skills-for-2016.html

SECTION I: DEGREE COMPLETIONS TRENDS AND COMPETITIVE SATURATION

This section presents information on recent degree completions trends and competitive saturation. The National Center for Education Statistics (NCES) uses a taxonomic system of numeric codes called the Classification of Instructional Programs (CIP) to classify postsecondary academic programs. Institutions of higher education nationwide submit degree completions data, organized by CIP code, to the NCES' Integrated Postsecondary Education Data System (IPEDS) for aggregation into the database. Unless otherwise noted, all degree completions data used in this report derive from IPEDS.[2]

There are no specific CIP codes that are directly tied to degree programs titled "business analytics." To assess student demand for business analytics-related programs, Hanover scanned CIP codes and determined four codes that are closely related to business analytics. Figure 1.1 presents the titles and descriptions of CIP codes included in the analysis.

Figure 1.1: CIP Code Descriptions for Business Analytics Fields

CIP Code	Title	Description
11.0802	**Data Modeling/Warehousing and Database Administration**	A program that prepares individuals to design and manage the construction of databases and related software programs and applications, including the linking of individual data sets to create complex searchable databases (warehousing) and the use of analytical search tools (mining).
52.1301	**Management Science**	A general program that focuses on the application of statistical modeling, data warehousing, data mining, programming, forecasting and operations research techniques to the analysis of problems of business organization and performance.
52.1302	**Business Statistics**	A program that focuses on the application of mathematical statistics to the description, analysis, and forecasting of business data.
52.1399	**Management Sciences and Quantitative Methods, Other**	Any instructional program in business quantitative methods and management science not listed above.

Source: IPEDS[3]

It is important to note that degree conferrals are self-reported and institutions may report similar programs under different CIP classifications or under general CIP classifications where appropriate specialized CIP classifications also exist. Moreover, programs classified as having a distance learning option may also offer a campus option, and completions for both format types are reported together. IPEDS completions data do not distinguish between degree completions in either format option. Instead, they simply indicate that the specified

[2] "IPEDS Data Center." National Center for Education Statistics. http://nces.ed.gov/ipeds/datacenter

[3] CIP code descriptions taken verbatim from: "Classification of Instructional Programs (CIP)." National Center for Education Statistics. https://nces.ed.gov/ipeds/cipcode/browse.aspx?y=55

program is available in a distance learning format. Additionally, institutions have only been required to report the presence of a distance learning format since 2012, precluding any longitudinal analysis of programming trends.

Hanover employs two metrics to contextualize year-to-year degree completion trends:

- **Compound Annual Growth Rate (CAGR)** reflects the percentage growth that would occur each year if the same rate of change occurred yearly between 2011 and 2015.
- **Annual Average Change (AAC)** calculates the average year-to-year difference in the number of degrees conferred. It allows for an analysis of both directional trends and volume.

Note that these metrics are only calculated when a full five years of data are available. Finally, note that IPEDS data for 2015 are currently in the preliminary release stage. This means data "have been edited but are not subject to further NCES quality control procedures." Though the data are assumed to be reasonably accurate, there is some potential that they will be adjusted slightly by the NCES in the coming months.

DEGREE COMPLETIONS TRENDS

National and regional[4] completions trends indicate growing student demand for programs related to business analytics. The majority of institutions report business analytics-related degrees in management science, though the number of reported completions in data modeling and business statistics has grown over the past five years. These smaller, but growing, completions show the recent growth in program offerings due to industry and student demand. Business statistics exhibits particularly high growth of almost 57 percent nationally and over 24 percent regionally between 2011 and 2015 (Figure 1.2 on the following page). These growth rates are much higher than the national and regional growth in completions of all master's level degree programs (0.9 percent and 0.5 percent, respectively).

Notably, **there are no programs in Kentucky that have reported master's-level degree completions under the CIP codes analyzed.** A separate scan of relevant programs in the state revealed that Northern Kentucky University offers an MS in Business Informatics degree with a specialization option in business data analytics. The program webpage emphasizes that the program is recorded under a STEM-designated CIP code to assist international students with their visa status.[5] While a specialization in business data analytics is available, the program seems to be more technically-oriented than other business analytics programs. According to the program webpage, the degree prepares

[4] Kentucky and its seven neighboring states are included in the regional analysis. These states are Illinois, Indiana, Missouri, Ohio, Tennessee, Virginia, and West Virginia.
[5] "Business Informatics Master Program." Northern Kentucky University. https://informatics.nku.edu/departments/business-informatics/business-informatics-master-program.html

students for careers as "I.T. Manager, Business Intelligence Analyst, Information Security Manager, and Applications Development Manager."[6]

Figure 1.2: National and Regional Master's Completions Trends, Business Analytics, 2011-2015

Program of Study	2011	2012	2013	2014	2015	CAGR	AAC
National							
Data Modeling/ Warehousing and Database Administration	62	51	104	110	196	33.3%	34
Management Science	1,140	1,252	1,611	1,666	2,523	22.0%	346
Business Statistics	39	66	41	119	236	56.8%	49
Management Sciences and Quantitative Methods, Other	437	226	218	613	704	12.7%	67
Total, Selected Programs	**1,678**	**1,595**	**1,974**	**2,508**	**3,659**	**21.5%**	**495**
Total, All Master's-Level Programs	**745,949**	**770,558**	**767,666**	**769,588**	**773,556**	**0.9%**	**6,902**
Regional*							
Data Modeling/ Warehousing and Database Administration	--	2	15	11	71	--	--
Management Science	547	544	565	675	867	12.2%	80
Business Statistics	18	33	18	35	43	24.3%	6
Management Sciences and Quantitative Methods, Other	106	65	63	63	76	-8.0%	-8
Total, Selected Programs	**671**	**644**	**661**	**784**	**1,057**	**12.0%**	**97**
Total, All Master's-Level Programs	**151,585**	**156,158**	**157,203**	**156,275**	**154,526**	**0.5%**	**735**

*The regional numbers reflect degree completions in Kentucky and its seven neighboring states (Illinois, Indiana, Missouri, Ohio, Tennessee, Virginia, and West Virginia).
Source: IPEDS

[6] Ibid.

COMPETITIVE SATURATION

Figure 1.3 shows a count of institutions across the nation and in the region that offer a master's degree in business analytics. About a third of these institutions offer distance programs in business analytics-related fields. Figure 1.4 on the following page provides a selection of competitor programs in the region that are offered on-campus or online.

Figure 1.3: Number of National and Regional Institutions with Business Analytics-Related Master's Programs

Program of Study	Total Number of Institutions	Number of Institutions with Distance Programs
National		
Data Modeling/Warehousing and Database Administration	7	3
Management Science	54	24
Business Statistics	14	1
Management Sciences and Quantitative Methods, Other	23	6
Total	**98**	**34**
Regional*		
Data Modeling/ Warehousing and Database Administration	3	1
Management Science	11	5
Business Statistics	3	0
Management Sciences and Quantitative Methods, Other	3	1
Total	**20**	**7**

*The regional numbers reflect the number of institutions in Kentucky and its seven neighboring states (Illinois, Indiana, Missouri, Ohio, Tennessee, Virginia, and West Virginia).
Source: IPEDS

Figure 1.4: Selection of Regional Competitors (Online in Green)

INSTITUTION	STATE	PROGRAM
Bowling Green State University	Ohio	**MS in Analytics**[7]
DePaul University	Illinois	**MS in Predictive Analytics** with concentrations in Marketing, Health Care, Hospitality, and Computational Methods[8]
Indiana University	Indiana	**MS in Business Analytics**[9]
Lewis University	Illinois	**MS in Business Analytics**[10]
Northern Kentucky University	Kentucky	**MS in Business Informatics**[11]
Northwestern University	Illinois	**MS in Analytics**[12]
University of Cincinnati	Ohio	**MS in Business Analytics**[13]
University of St. Francis	Illinois	**MBA** with a Business Analytics concentration[14]
The University of Tennessee - Knoxville	Tennessee	**MS in Business Analytics**[15]
University of Virginia	Virginia	**MS in Commerce** with a Business Analytics track[16]
Washington University in St. Louis	Missouri	**MS in Customer Analytics**[17]
West Virginia University	West Virginia	**MS in Business Data Analytics**[18]

[7] "MS in Analytics." Bowling Green State University. http://www.bgsu.edu/graduate/analytics.html
[8] "MS in Predictive Analytics." DePaul University. http://www.cdm.depaul.edu/academics/Pages/MS-in-Predictive-Analytics.aspx
[9] "Master of Science in Business Analytics." Indiana University. https://kelley.iu.edu/onlineMBA/Online/MSBA/page43444.cfm
[10] "Master's in Business Analytics." Lewis University. http://lewisu.edu/academics/business-analytics/
[11] "Business Informatics Master Program," Op. cit.
[12] "Master of Science in Analytics." Northwestern University McCormick School of Engineering. https://www.mccormick.northwestern.edu/analytics/
[13] "MS Business Analytics." University of Cincinnati College of Business. http://business.uc.edu/graduate/msbana.html
[14] "MBA Concentration: Business Analytics." University of St. Francis. http://www.stfrancis.edu/academics/mba-business-analytics/
[15] "Master of Science in Business Analytics." The University of Tennessee, Knoxville. http://bas.utk.edu/academic-programs/masters/business-analytics/default.asp
[16] "M.S. Commerce - Business Analytics Track." University of Virginia. https://www.commerce.virginia.edu/ms-commerce/business-analytics
[17] "Master of Science Customer Analytics." University of Washington in St Louis Olin Business School. https://olin.wustl.edu/EN-US/academic-programs/specialized-masters-programs/ms-in-customer-analytics/Pages/default.aspx
[18] "Online MS Business Data Analytics." West Virginia University. http://business.wvu.edu/graduate-degrees/online-ms-business-data-analytics

SECTION II: LABOR MARKET OUTLOOK

This section analyzes national, regional, and state labor market trends using occupational outlook projections data provided by the Bureau of Labor Statistics[19] (BLS) and Projections Central, a repository maintained by the Projections Managing Partnership that offers state-level occupational projections data for a standard 10-year period (2014 through 2024).[20] Hanover also examines educational attainment, salary data, and job postings for the business analytics field.

OCCUPATIONAL PROJECTIONS

State and national labor market projections are made for occupations as defined by the Standard Occupational Classification (SOC) system of the BLS.[21] The SOC system is analogous to the CIP system, and the two are connected by the CIP-SOC crosswalk, which maps individual (six-digit) degree programs to (six-digit) occupations.[22] Figure 2.1 displays the occupations relevant to business analytics that are included in the analysis.

Figure 2.1: SOC Codes and Titles for Business Analytics Fields

SOC Code	SOC Title
13-1111	Management Analysts
13-1141	Compensation, Benefits, and Job Analysis Specialists
13-1161	Market Research Analysts and Marketing Specialists
13-2051	Financial Analysts
15-1141	Database Administrators
15-2031	Operations Research Analysts
15-2041	Statisticians
19-3022	Survey Researchers

Nationally, occupational projections exhibit above average growth at 15.2 percent for all business analytics-related occupations combined. Statisticians are projected to have the highest demand, with an increase of over 33 percent across the 10-year period, followed closely by operations research analysts with expected growth at 30 percent (Figure 2.2).

Regional and state labor projections forecast positive occupational outlooks for all business analytics occupations, with higher than average growth for most occupations. Management analysts and market research analysts are projected to create the highest numbers of job openings per year at both the regional and state level (Figure 2.2).

[19] "Employment Projections." U.S. Bureau of Labor Statistics. http://data.bls.gov/projections/occupationProj
[20] "About the Long-Term Numbers." Projections Central. http://www.projectionscentral.com/Projections/AboutLT
[21] "Standard Occupational Classification." Bureau of Labor Statistics. United States Department of Labor. www.bls.gov/SOC
[22] "CIP 2010 to SOC 2010 Crosswalk." Retrieved from NCES. http://nces.ed.gov/ipeds/cipcode/resources.aspx?y=55

Figure 2.2: National, Regional, and State Occupational Projections, 2014-2024

SOC Code	Title	Number		Change 2014-24		Average Openings Per Year*
		2014	2024	Number	Percent	
National (In Thousands)						
13-1111	Management Analysts	758	861.4	103.4	13.6%	208.5
13-1141	Compensation, Benefits, and Job Analysis Specialists	84.7	88.1	3.4	4.0%	24
13-1161	Market Research Analysts and Marketing Specialists	495.5	587.8	92.3	18.6%	151.4
13-2051	Financial Analysts	277.6	310	32.3	11.7%	89.4
15-1141	Database Administrators	120	133.4	13.4	11.1%	39.2
15-2031	Operations Research Analysts	91.3	118.9	27.6	30.2%	43.9
15-2041	Statisticians	30	40.1	10.1	33.8%	15.4
19-3022	Survey Researchers	16.7	18.7	1.9	11.6%	3.9
Total, Selected Occupations		**1,873.8**	**2,158.4**	**284.6**	**15.2%**	**575.7**
Total, All Occupations		**150,539.9**	**160,328.8**	**9,788.9**	**6.5%**	**46,506.9**
Regional						
13-1111	Management Analysts	146,170	170,370	24,200	16.6%	4,460
13-1141	Compensation, Benefits, and Job Analysis Specialists	14,110	15,230	1,120	7.9%	430
13-1161	Market Research Analysts and Marketing Specialists	80,590	97,750	17,160	21.3%	2,690
13-2051	Financial Analysts	41,760	46,450	4,690	11.2%	1,340
15-1141	Database Administrators	23,790	27,010	3,220	13.5%	830
15-2031	Operations Research Analysts	17,150	23,160	6,010	35.0%	920
15-2041	Statisticians	5,210	6,840	1,630	31.3%	260
19-3022	Survey Researchers	2,570	2,930	360	14.0%	80
Total, Selected Occupations		**331,350**	**389,740**	**58,390**	**17.6%**	**11,010**
Total, All Occupations		**27,861,920**	**30,124,500**	**2,262,580**	**8.1%**	**905,310**
Kentucky						
13-1111	Management Analysts	4,280	5,110	830	19.4%	140
13-1141	Compensation, Benefits, and Job Analysis Specialists	1,580	1,810	230	14.6%	60
13-1161	Market Research Analysts and Marketing Specialists	3,590	4,450	860	24.0%	130
13-2051	Financial Analysts	1,370	1,540	170	12.4%	50
15-1141	Database Administrators	1,850	2,210	360	19.5%	80
15-2031	Operations Research Analysts	1,600	2,390	790	49.4%	110
15-2041	Statisticians	990	1,310	320	32.3%	50
19-3022	Survey Researchers	150	180	30	20.0%	10
Total, Selected Occupations		**15,410**	**19,000**	**3,590**	**23.3%**	**630**
Total, All Occupations		**2,150,860**	**2,476,960**	**326,100**	**15.2%**	**84,060**

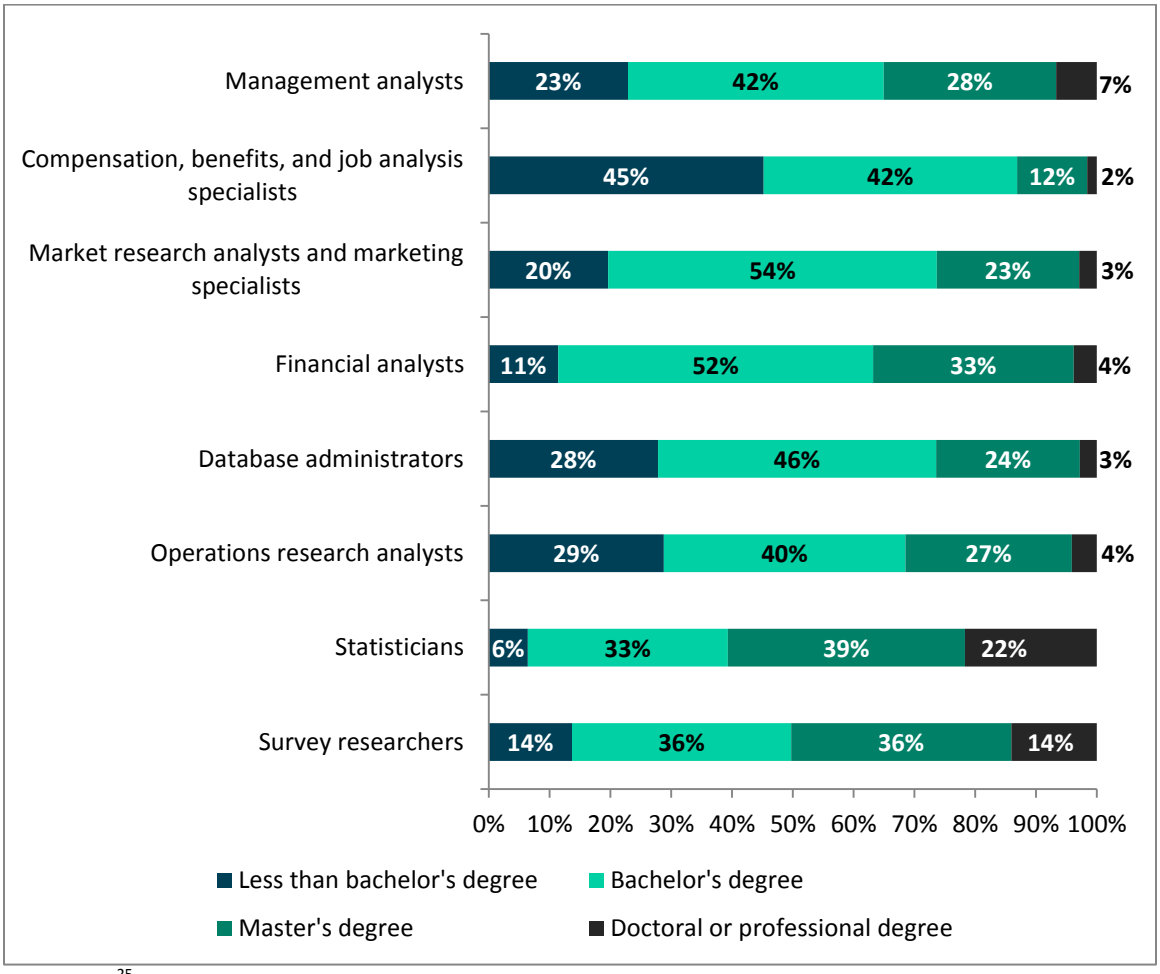
*Due to replacements and growth.
Sources: BLS[23] and Projections Central[24]

[23] "Employment Projections," Op. cit.
[24] "Long-Term Projections." Projections Central. http://www.projectionscentral.com/Projections/LongTerm

EDUCATIONAL ATTAINMENT

As Figure 2.3 shows, most workers in the field of business analytics hold at least a bachelor's degree. Statisticians are more likely to have attained a master's degree, and about equal percentages of survey researchers have bachelor's and master's degrees. Among the occupations considered, compensation, benefits, and job analysis specialists are the least likely to attain master's-level education.

Figure 2.3: Educational Attainment for Business Analytics Occupations, 2014-2015
(For Workers Age 25 and Above)



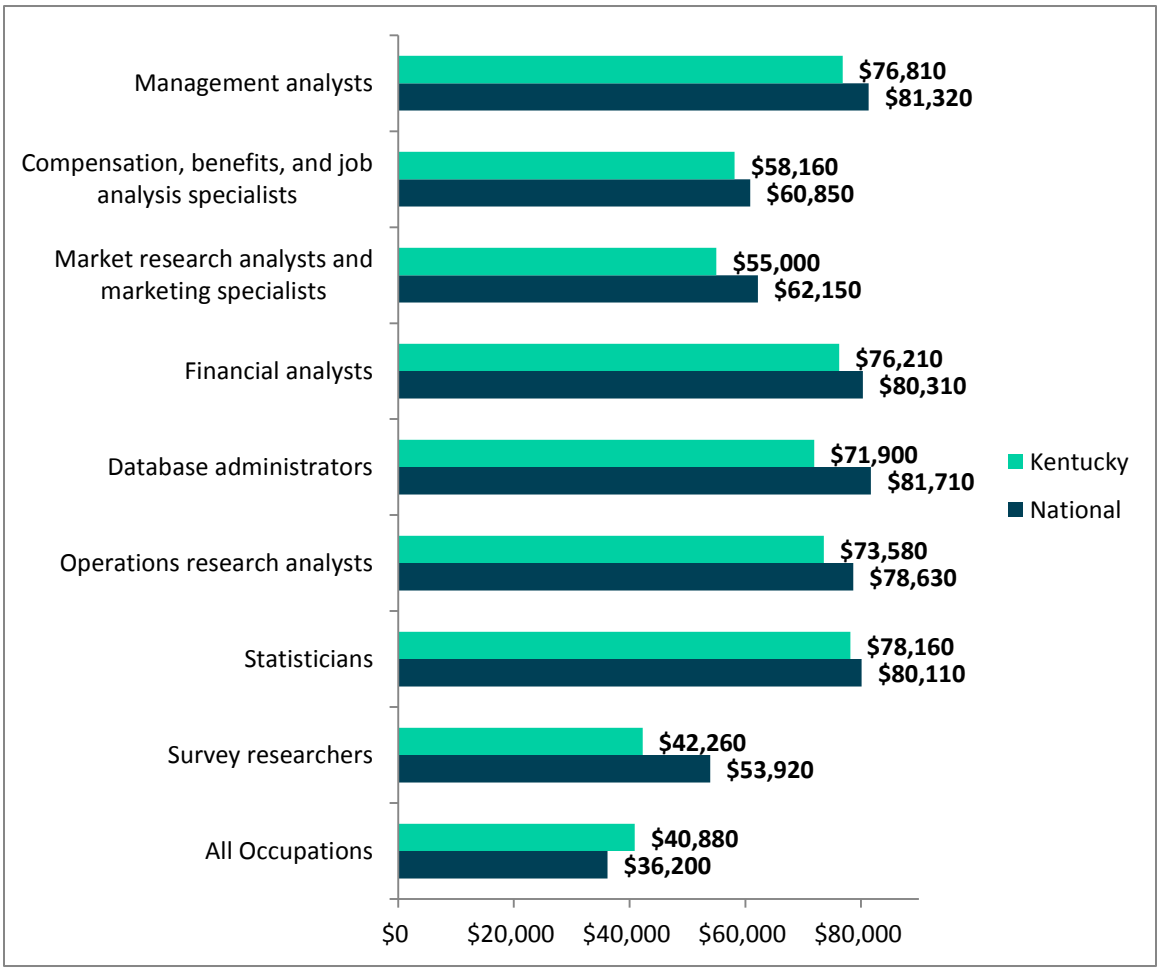
Source: BLS[25]

[25] Educational Attainment for Workers 25 and Over by Detailed Occupation." Bureau of Labor Statistics. http://www.bls.gov/emp/ep_table_111.htm

SALARY DATA

Figure 2.4 presents annual wages at the national and state level for occupations related to business analytics. The figures include salaries of professionals with and without master's level education. The salaries for business analytics-related occupations are substantially higher than the salaries for all occupations reported by the BLS. Most notably, management analysts in Kentucky make about $36,000 more than the average for all occupations ($40,880). Similarly, management analysts make about $45,000 more than the average at the national level ($36,200).

Figure 2.4: Annual Wages for Business Analytics Occupations, 2015



Note: National data is reported as the annual median wages for each occupation, while state data is reported as the annual average wages.
Source: BLS[26]

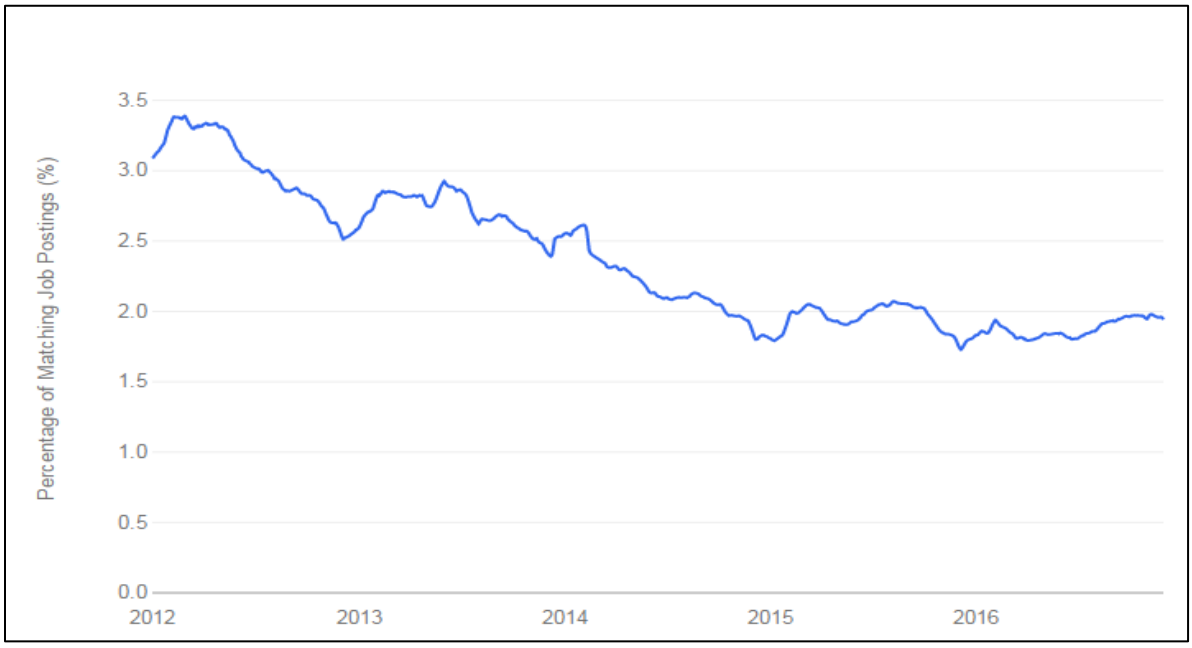
[26] "May 2015 State Occupational Employment and Wage Estimates." Bureau of Labor Statistics. p. 2. https://www.bls.gov/oes/2015/may/oessrcst.htm

JOB POSTING TRENDS

To analyze trends in job posting data, Hanover uses Indeed.com, an aggregator which compiles online job postings from hundreds of smaller job boards. Indeed's Job Trends tool allows users to examine trends in the relative volume of total job postings over time (e.g., the percentage of job postings at any given time that contain the search term).

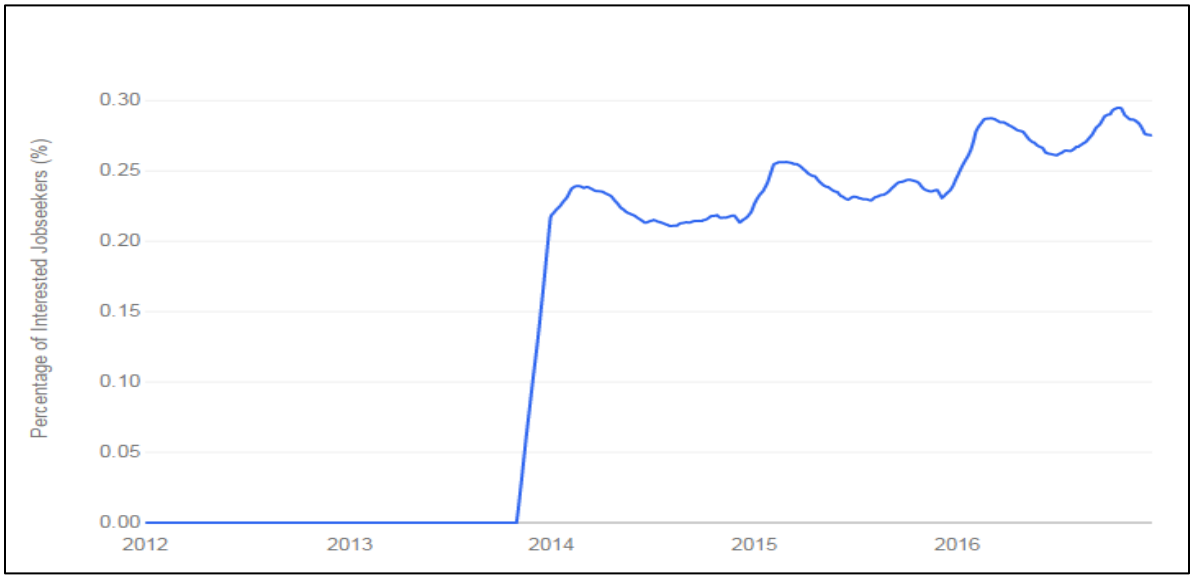
According to national trends, the relative volume of job postings containing the term "business analyst" have declined by a third since 2012 (Figure 2.5). However, there has been an increase in the volume of job seekers searching for jobs containing the same term (Figure 2.6). The decrease in the relative volume of jobs containing the term "business analyst" may reflect increasing specialization and use of specialized job titles in the field.

Figure 2.5: National Trends in Volume of Job Postings Containing the Term "Business Analyst"



Source: Indeed.com

Figure 2.6: National Trends in Volume of Job Seekers Searching for Job Titles Containing the Term "Business Analyst"



Source: Indeed.com

To gain more insight into the job market prospects of business analysts, Hanover conducted a job search on Indeed.com in late January 2017. The job search using the term "business analyst" yielded over 98,000 jobs at the national level. The highest numbers of jobs were posted by companies located in New York City (5,670), Chicago (2,526), and Washington, DC (2,271). Companies with the highest numbers of business analyst job postings at the national level included Lockheed Martin (851), Leidos (820), and JP Morgan Chase (714).

At the state level, the same job search resulted in 520 postings, most (261) of which were located in Louisville, followed by Lexington (54) and Bowling Green (23). Among the companies looking for business analysts in Kentucky were Martin & Bayley, Inc. (50), Humana (32), Hire Investment (15), ResCare (11), and Brooksource (9). Figure 2.7 provides examples of business analyst jobs located in Louisville that were posted on Indeed.com.

Figure 2.7: Selection of Active Indeed.com Job Listings for Business Analysts in Louisville, Kentucky (January 2017)

EMPLOYER	JOB TITLE
Humana	Data/Business Analyst – HPS Finance
	Compensation & Strategy Analyst
	Marketing Analyst
Hire Investment	Business Analyst
	Digital Marketing Analyst
ResCare	Business Development Analyst
	Benefits Systems Analyst
Kindred Healthcare	Payroll Project Analyst
	Programmer Analyst
Republic Bank	Statistical Analyst
	Commercial Credit Analyst

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