

Bryant University

HONORS THESIS



The Impact of Emerging Big Data and Analytical Approaches on Beginning Accounting Associates

BY Kennedy Akpeneye

ADVISOR • Dr. Kwadwo Asare

EDITORIAL REVIEWER • Dr. Xiaochuan Zheng

Submitted in partial fulfillment of the requirements for graduation
with honors in the Bryant University Honors Program
April 2022

Table of Contents

Abstract	1
Introduction	2
Literature Review	3
Data and the Accountant's Work	3
Information Technology and the Accountant's Work	4
Improving Data Management	5
Methodology	7
Participants	8
Procedure	8
Results	10
Key Findings	17
Conclusion	19
Appendices	20
Appendix A - Survey	20
Appendix B - Interviews	24
Appendix C - Sample Interview Response	25
Appendix D - IRB Approval	27
Appendix E - Line of Service Demographics	28
Appendix F - Job Position Demographics	28
References	29

The Impact of Emerging Big Data and Analytical Approaches on Beginning Accounting Associates

Honors Thesis for Kennedy Akpeneye

ABSTRACT

Although accounting has gone through many significant changes over the years due to big data and data analytics, the profession remains at the core of business. Big data has not only impacted the accounting profession but has also completely transformed the business world. As accounting associates are continuously introduced to new technology software, their ability to analyze and interpret data is enhanced. The research in this paper seeks to understand how big data and analytics are currently impacting the work of beginning accounting associates. More specifically, this thesis analyzes certain trends in big data within the accounting industry. This involves understanding which software beginning accounting associates have the most knowledge using, as well as the software they believe is the most important to their job. To conduct this research, a survey was sent to participants who are currently working at Big Four accounting firms and corporations. The results of this survey were analyzed based on certain controls. Also, interviews with beginning accounting associates were conducted to help analyze if big data is improving accountants work productivity.

The results of this study show that Microsoft Excel, Tableau, and SAS are perceived as the software which beginning accounting associates have the most skill in using. The identification of this software as being important helps to indicate how the jobs of beginning accountants are changing. Big data allows accountants to spend more time analyzing the data they are working with, which in turn helps them to make more informed decisions.

The Impact of Emerging Big Data and Analytical Approaches on Beginning Accounting Associates

Honors Thesis for Kennedy Akpeneye

INTRODUCTION

There are many noticeable trends big data brings to the accounting industry. Some trends in big data include AI (Artificial Intelligence), AIS (Accounting Information Systems), and Machine Learning. Artificial Intelligence is helping accountants be more productive and efficient on the job. Tasks can be completed at a much faster rate with the new technological improvements of AI in accounting firms (Faggella, 2020). Accounting Information Systems are helping accountants ensure efficiency, provide assurance, and improve the pace of their work on the job (Tysiac, 2020). Accountants provide more value to accounting firms when they use AIS on the job consistently. Machine learning can be used to fix accountants' data entry errors (Sood, 2020). An example of a data entry error is when information is entered in the wrong way or order. For example, this could happen to an accountant who types numbers rather than words. This is a frequent error for accountants who type too quickly to notice mistakes. Software such as Xero and TensorFlow can be used to reduce data entry and related errors. Today, many undergraduate programs are also implementing big data-related majors and concentrations to help equip students who are pursuing a career in accounting.

Due to the trends in the accounting industry, a career in private or public accounting has many advantages. Many undergraduate programs are offering majors and minors in data analytics for accounting students. Undergraduate programs considered this because they wanted to prepare accounting students for their careers, which have the possibility of using big data extensively. This is a great advantage for accounting students because it gives them the ability to learn big data before working. Graduates who are gaining big data skills in college will be adept at handling large amounts of data and applying them to accounting. Ultimately, big data being implemented in undergraduate programs is creating a foundation for young accounting students to succeed in the future.

Big Data has a significant potential in the business world. For example, management accountants are embracing data science and analytics to improve performance at their companies, leveraging the technology to improve their organizations' data governance and analysis capabilities. Accountants will need to continue to develop necessary skills to keep pace with technology and act as strategic business partners at their organizations (Cohn,

The Impact of Emerging Big Data and Analytical Approaches on Beginning Accounting Associates

Honors Thesis for Kennedy Akpeneye

2020). This in turn presents new opportunities for individuals pursuing the accounting profession. The purpose of this thesis is to analyze how big data is changing the work of everyday accountants in Big Four or private accounting. This is conducted through studies showing that accountants are utilizing big data and analytics to improve their work performance (Cohn, 2020).

LITERATURE REVIEW

Data and the Accountant's Work

In the business world today, many firms are implementing big data to increase accountants' competency. As defined within the scope of big data, the accounting profession is positioned to use big data for risk and fraud management, data visualization, auditing, and performance measurement (Cockcraft and Russell, 2018). Cockcraft and Russell (2018) suggest that using big data to expand accounting tasks and analyze information at a faster rate is beneficial for accounting firms. Big Four accounting firms and corporations are using big data to improve firm performance and complete routine tasks. Cockcraft and Russell (2018) used predictive modeling to analyze accountant's big data skills in firms such as Deloitte, PwC, EY, and KPMG. They found that 83% of accountants who had big data skills before working full-time were more productive than accountants with no big data skills.

The implementation of big data in accounting firms has increased accountants' productivity significantly. In the accounting profession, productivity is measured by an accountants' ability to efficiently turn into outputs (Kludt, 2020). Accountants often use big data as an input. Also, they will use that big data to create accounting information which is an output. Productivity is measured by process execution within accounting firms. Process execution is related to the speed at which tasks can be completed and the quality of the work. For example, accountants with strong process execution can complete tasks efficiently on the job and present their best work to clients. Big data increases accountants' productivity by helping them manage and complete projects on time. Accountants can utilize big data to manage their project by using bots. Big Four accounting firms and corporations use bots to replace repetitive tasks that a human would otherwise have to perform. For example, accountants can use bots to help them

The Impact of Emerging Big Data and Analytical Approaches on Beginning Accounting Associates

Honors Thesis for Kennedy Akpeneye

design work schedules for projects. The bot will automatically design a schedule that helps accountants complete their work before the project deadline. This allows them to stay on task, while staying technically competent on the job.

Accountants are benefiting from big data in accounting firms by being able to make faster decisions. A study from 2020, offers insights on how the implications of big data is providing opportunities for accountants to make quicker decisions within accounting firms (Archarya, 2020). This study shows how long it took accountants to make financial decisions while using big data. Accountants were evaluated on how big data helps them make informed decisions about other businesses' finances through relevant data sets. Also, the accountants indicated that big data helped them make financial decisions more quickly in the evaluation. It is suggested that accountants who use big data are usually more analytic minded in their decision making, giving them the tools to help the firm succeed faster (Archarya, 2020). For example, accountants can use big data to make financial decisions faster through descriptive analytics. Archarya (2020) surveyed various accountants within public and private accounting to analyze big data's impact on decision making. The results indicated that more than 75% of accountants use big data as an incentive to make strategic and operational decisions for the accounting firm.

Information Technology and the Accountant's Work

Another benefit of big data for accountants is information technology improving accountants' work. IT is a variety of applications that provide support or management through computer-based systems (Chen, 2013). IT involves computer-based systems or software such as Statistical Analysis System (SAS), Alteryx, and Tableau. Many accountants utilize these computer-based systems to design analysis reports within accounting firms. Chen (2013) suggests that big data and information technology work together. Essentially, both big data and IT serve as digital tools in accounting firms today. The study indicates that information technology creates improved accessibility of accounting data, which helps accountants perform on the job (Chen, 2013). This study was executed by surveying accountants at public accounting firms who utilize information technology on the job each day. Chen (2013) conducted research and found that accountants who used information technology on a daily

The Impact of Emerging Big Data and Analytical Approaches on Beginning Accounting Associates

Honors Thesis for Kennedy Akpeneye

basis were 65% more prepared for the challenges they could face on the job compared to those who did not use IT.

Accountants who used information technology to access accounting data, benefited significantly because it allows them to work remotely at any location. Information technology allows accountants to make journal entries, scan documents, and check financial reports from their computer at any time (Leonard, 2019). This prevents accountants from losing time on the job and gives them the opportunity to work efficiently from other places. Leonard, (2019), surveyed beginning accountants at Big Four accounting firms to examine the use of information technology. Leonard's results indicated that 63% of public accountants are using information technology to have instant access to accounting information. This exemplifies that information technology is helping accountants work faster on the job. Information technology within accounting firms is an innovative tool that accountants continue to use. Accounting professionals are consistently using information technology to improve their work on the job.

Improving Data Management

One of the benefits of big data is that it helps accountants reduce poor data management. In accounting firms today, big data is used to give accountants the most reliable information while working (Kludt, 2020). Poor data management occurs when a company's data is not organized, and this can affect a firm's financial reports. For example, a firm could have duplicate data in a financial report for the quarter. Duplicate data serves as an example of poor data management because it is data that is found multiple times in the database. The problem with duplicate data is it causes unnecessary data storage for accounting firms and corporations. Essentially, too much duplicate data can be expensive for accounting firms to keep in the database. An accountant would use data cleansing software such as SAS and Alteryx to avoid presenting duplicate data in the financial reports. Another example of poor data management is outdated data. Accountants are responsible for making sure the data is up to date on a yearly basis in the financial reports. Alteryx is a software that accountants use to make sure the dates being presented are accurate. Many Big Four accounting firms and corporations enhance data management with the new technological advancement of big data.

The Impact of Emerging Big Data and Analytical Approaches on Beginning Accounting Associates

Honors Thesis for Kennedy Akpeneye

Data mining is a process used by accounting firms to turn raw data into useful information. This prevents accountants from using the data incorrectly because it notices patterns and trends in the data to gain more information. Then, machine learning helps accountants identify omission errors in data sets. Omission errors are when a transaction is not recorded correctly in the database. Machine learning is used to fix accountants omission errors, which prevents them from presenting inaccurate data to clients (Sood, 2020). For example, machine learning identifies omission errors by notifying accountants when a recorded transaction omits critical information. Accountants will fix those omission errors by recording journal entries and making sure all the debits equal the credits in the database. Sood interviewed beginning accountants at corporations such as CVS Health and Blum Shapiro. Sood found in his study that beginning accountants are required to become familiar with machine learning when starting at the firm. Accountants are required to learn machine learning because it helps them improve accuracy and avoid errors in the data. Both data mining and machine learning serve as big data tools, which could reduce managing data poorly within accounting firms. These big data technological advancements help accountants reduce poor data, while staying technically competent on the job. Big data is certainly building a foundation for accountants to reduce presenting data poorly in Big Four accounting firms and corporations today.

The Impact of Emerging Big Data and Analytical Approaches on Beginning Accounting Associates

Honors Thesis for Kennedy Akpeneye

METHODOLOGY

This project was designed to find out more about big data and analytical approaches for beginning accountants within Big Four and private accounting. To accomplish this, I conducted surveys, analyzing adaptability, projection, and growth of both Associates and Senior Associates of Big Four accounting firms and corporations. In this study, I focused on how these accounting professionals used big data in the beginning stages of their career. I created survey questions to collect more data about the accountant's analytical work on the job. The survey questions were sent to Associates at the following accounting firms - PwC, EY, KPMG, and Deloitte. Also, to receive more diversity in my sample of accounting firms, I used the Amica Center for Career Education. The Amica Center for Career Education helped me to achieve diversity because they can email former Bryant University Alumni from a variety of accounting firms. I used LinkedIn to post the survey questions to receive more responses from accountants as well. I have created a series of five interview questions that helped me to analyze the accountant's knowledge of big data and how it has impacted his/her career. The interviews were one on one to help provide more context. After completing the semi-structured interviews, I developed surveys based on what I learned from the accountants. I conducted these interviews with a selected group of accounting professionals to gather better results. I interviewed five beginning accounting associates who are currently working. I interviewed three public accountants and two private accountants for my semi-structured interviews. My goal was to find out how effective and adaptable big data has made beginning accountants at Big Four accounting firms and corporations. These six interview questions helped me to determine if big data is helping accountants grow within their profession. I wrote down each interviewer's responses throughout the interview process and recorded them on Zoom. This allowed me to identify patterns, trends, and gather more information for the project. Zoom gave me the ability to re-watch the recordings for information I may have missed during the interview. The results of the interviews benefited my project, as I was able to indicate if big data is improving accountants work productivity and growth in Big Four accounting firms and corporations. These six interview questions certainly helped me develop a foundation to know more about analytical approaches for beginning accountants.

The Impact of Emerging Big Data and Analytical Approaches on Beginning Accounting Associates

Honors Thesis for Kennedy Akpeneye

PARTICIPANTS

An online survey was created by using the Qualtrics Online Survey software and distributed through email. The survey was titled *Big Data and Analytical Approaches* and I sent it out to 54 beginning associates who are currently working at an accounting firm. The contact information of the participants was found using LinkedIn and the Bryant University Amica Center for Career Education. The email containing the Qualtrics survey was sent to the participants twice. I sent the survey once as an original email, and a second time as a follow-up email. A total of 50 participants responded to the survey, which resulted in a 92.5 percent response rate. Out of the 50 participants, 68.4 percent of them currently work in public accounting. Of those 68.4 percent that currently work for public accounting firms, 78 percent do work that relates to audit or assurance, 17 percent do work that relates to tax, and 6 percent do work that relates to consulting or advisory services.

One-on-one interviews were conducted using Zoom to gain more research beyond the Qualtrics survey. I was able to interview five beginning accounting associates currently working in the industry. The Bryant Alumni Association is the primary resource I used to find all five beginning accounting associates to interview. Three of the beginning accounting associates worked for public accounting firms and two worked in private accounting. I was able to write down the participants' responses using Google Docs. Also, each of the interviews were recorded on Zoom which allowed me to re-watch them for more context. The interviews gave more knowledge about how Big Four accounting firms and corporations are implementing big data into accounting associate's workday. Each of the participants interview responses helped me to analyze if big data is actually improving beginning accounting associates work productivity.

PROCEDURE

Participants were first asked to respond to a set of questions related to their current and previous work experiences regarding big data. The first question asked participants about what the most accurate definition of big data is to them. This question helped me identify how beginning accounting associates define big data within their accounting firms. The next

The Impact of Emerging Big Data and Analytical Approaches on Beginning Accounting Associates

Honors Thesis for Kennedy Akpeneye

question asked participants what percentage of their current and previous accounting position uses Big Data. This question was used to gain a better understanding of how frequently big data is actually used within accounting firms. Lastly, participants were asked to indicate if their firm trained them on big data before working for the accounting firm. Participants were also asked to identify what type of big data they were trained on such as data visualization, data mining, data modeling, and analysis processing. These basic questions related to big data work experience concluded the first section of the survey.

The next section of the survey focused on the type of technology software that the participants use. The first question is focused on the degree to which the participants know how to use certain software. The software the participants were asked about include SAS, Python, Tableau, Alteryx, Java, Jira, and Microsoft Excel. Participants were asked to rank how well they know how to use certain software on a scale from one to five. The survey also provided a space titled “Other” for them to indicate any software they use in their job that was not provided to them on the list. Participants were instructed that ranking their knowledge as one would signify that they have minimal or no knowledge about the software. Ranking their knowledge a five, would signify that the participant is an expert and knows a lot about the software. Similar to the questions focused on perceived knowledge, the next two questions focused on if big data and data analytics have increased the participants’ work performance at the accounting firm. Participants were instructed to indicate if they feel that learning extensively about big data has impacted their work at the job and if it should be required for accounting firms to train associates on big data before working. The purpose of these questions in the survey was to evaluate the participants competence in certain technology software.

The last section of the survey asked participants a series of demographic questions. The first questions asked about what company they currently work for and how long they worked at the accounting firm. Participants were asked about their age and accounting line of service as well. Lastly, participants were asked to indicate what position they previously held at the accounting firm and what position they currently hold in the survey.

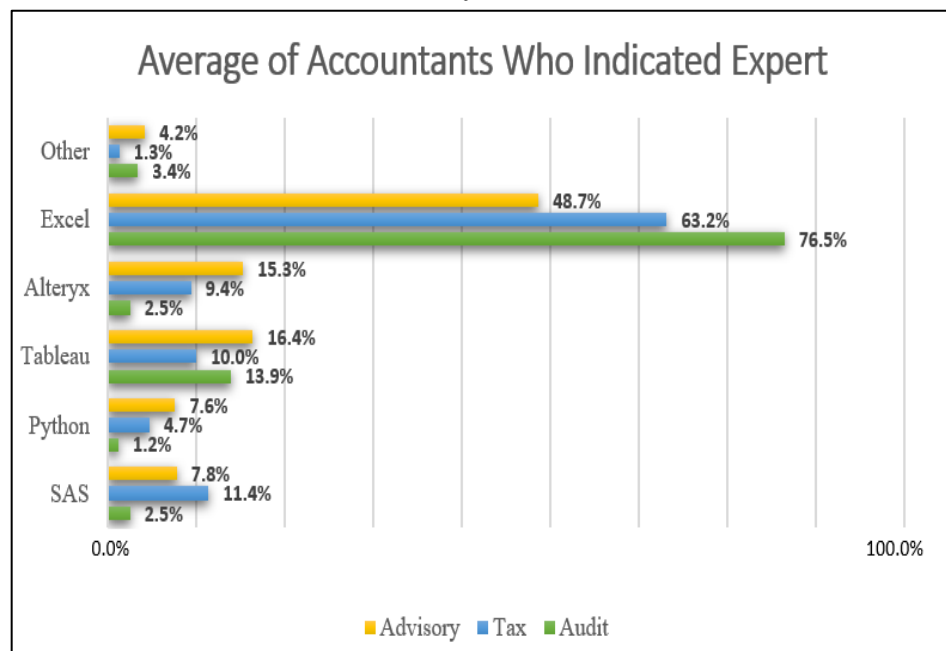
The Impact of Emerging Big Data and Analytical Approaches on Beginning Accounting Associates

Honors Thesis for Kennedy Akpeneye

RESULTS

The participants of the survey were asked a series of questions to help me gain a better understanding of how big data and data analytics is impacting the work of beginning accounting associates. The survey contained questions about how knowledgeable accountants are using different technology platforms. The software that was listed in the survey includes SAS, Python, Tableau, Alteryx, Java, Jira, and Microsoft Excel. Participants were asked to rank their knowledge of certain software on a scale of one to five. By ranking their knowledge as a five, this would mean that the participants believe that they are very skilled in using the software. Rather than analyzing how each participant ranked their knowledge on a certain software as a whole, the results were broken down into groups to gain a better understanding of the data. Essentially, this means that results on perceived knowledge were analyzed based on the accountants line of service, company, and current position held at the accounting firm. This helped me to gain a better understanding of any similarities or differences in knowledge.

Figure 1: Average of Accounting Associates Who Indicated Expert on Different Technology Software



The first set of questions in the survey related to beginning accounting associates perceived knowledge on different technology software by line of service. *Figure 1* above shows the average of accounting associates that ranked their knowledge of SAS, Python, Tableau,

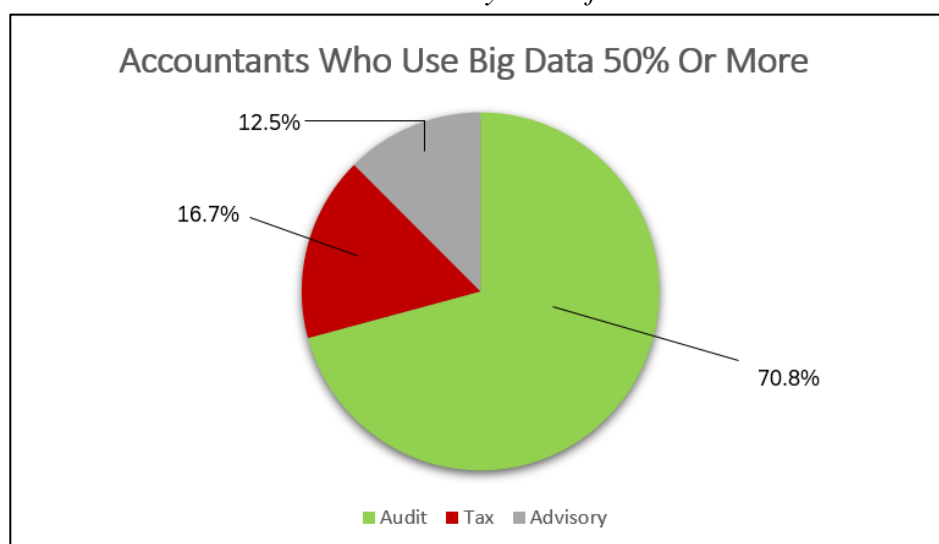
The Impact of Emerging Big Data and Analytical Approaches on Beginning Accounting Associates

Honors Thesis for Kennedy Akpeneye

Alteryx, Java, Jira, and Microsoft Excel as expert (on a 5-point scale). Accounting associates who ranked a particular software at a five are indicating that they have a good understanding of using it. This, in turn, helps to illustrate which technology software accountants feel they are the most proficient in using. The results displayed in *Figure 1* show that beginning accountants feel they know how to use Microsoft Excel the most at 76.5% for audit, 63.2% for tax, and 48.7% for advisory. Beginning accountants also were expert in using Tableau at 40.3% between all lines of service.

To gain a more accurate understanding of how perceived knowledge of big data software varied by line of service, the results were broken down in a different way. *Figure 2* shows the percentage of beginning accounting associates that actively use big data at their firm. The bar graph shows that regardless of line of service, big data has a strong usage within the accounting profession for beginning accounting associates.

Figure 2: Percentage of Beginning Accounting Associates that Use Big Data 50% or More – Broken Down by Line of Service



In *Figure 2* above, big data is used in all lines of service which includes audit, tax, and advisory 50% or more. The pie graph was broken down into line of service to analyze if some areas of the accounting profession do not use big data actively. Also, results were broken down by line of service to determine if there are any differences in perceived knowledge about beginning accounting associates using big data. 70.8% of the accounting associates within the auditing line of service indicated that their job uses big data 50% or more. 16.7% of

The Impact of Emerging Big Data and Analytical Approaches on Beginning Accounting Associates

Honors Thesis for Kennedy Akpeneye

Tax beginning accounting associates indicated that they use big data 50% or more. Around 12.5% of beginning accounting associates within the advisory line of service that were surveyed indicated that 50% or more of their job uses big data. Over ten percent of each line of service that was surveyed indicated that their job is using big data 50% or more. Through looking at the percentage of accounting associates who actively use big data, it can be seen that both Big Four accounting firms and corporations are implementing big data in the workplace. This also demonstrates that beginning accounting associates are using a variety of technology software to implement big data on the job.

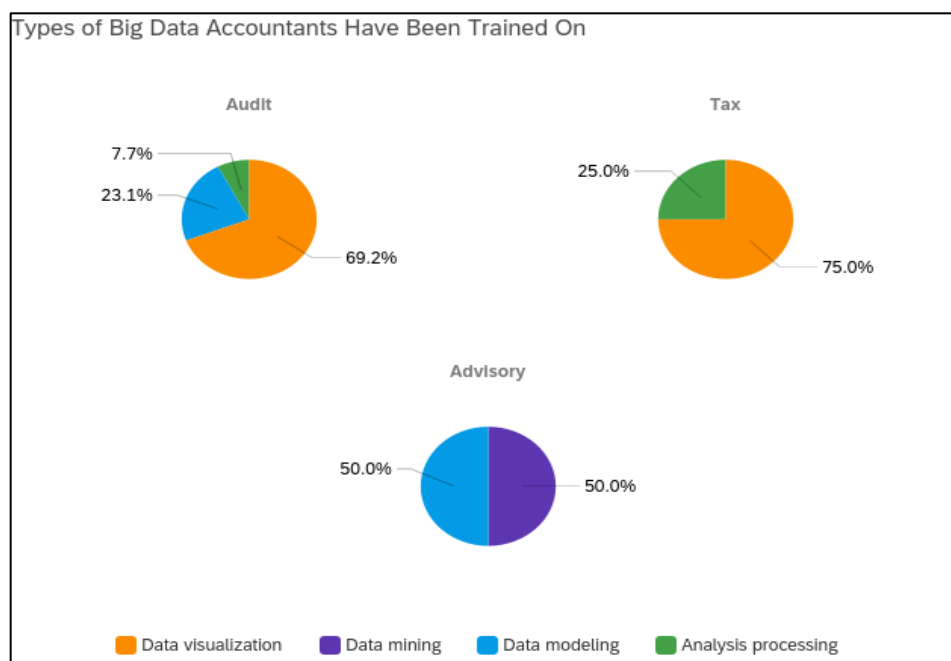
Overall, the results show that in all lines of service, big data is actively being used on the job for beginning accounting associates. *Figure 2* demonstrates that beginning accounting associates in audit, tax, and the advisory line use big data actively on the job. The audit line of service had the greatest amount of beginning accounting associates who actively use big data while working. Beginning accounting associates actively using big data on the job indicates that both big data and analytics are making an impact on the accounting profession.

Accounting associates are consistently using big data to make better decisions on the job. Big data being actively used in all lines of service ties into how more accountants are being trained to use different styles of big data before working which is displayed in *Figure 3*.

The Impact of Emerging Big Data and Analytical Approaches on Beginning Accounting Associates

Honors Thesis for Kennedy Akpeneye

Figure 3: Types of Big Data Accountants Have Been Trained to Use – Broken Down by Line of Service



The survey questions also focused on beginning accounting associates previous knowledge on different types of big data. Accountants indicated that they were previously trained on data visualization, data modeling, and analysis processing the most. In *Figure 3*, beginning accounting associates were asked to identify what type of big data they were previously trained in before working at their job. In order to get a better understanding of how the types of big data vary between services, the results are broken down by line of service above.

Through looking at the percentage of beginning accounting associates who indicated the different types of big data they were previously trained on, it can be seen that across all lines of service three main big data tools are used. These tools of big data include data visualization, data modeling, and analysis. For both audit and tax services, data visualization is ranked the highest as a type of big data associates previously learned before working. This also indicates that most beginning accounting associates are skilled in representing data through different charts, plots, and infographics. Audit and tax beginning accounting associates being skilled in big data before working gives them an advantage to be able to communicate data-driven insights in a way that is easy to understand. For the advisory line of

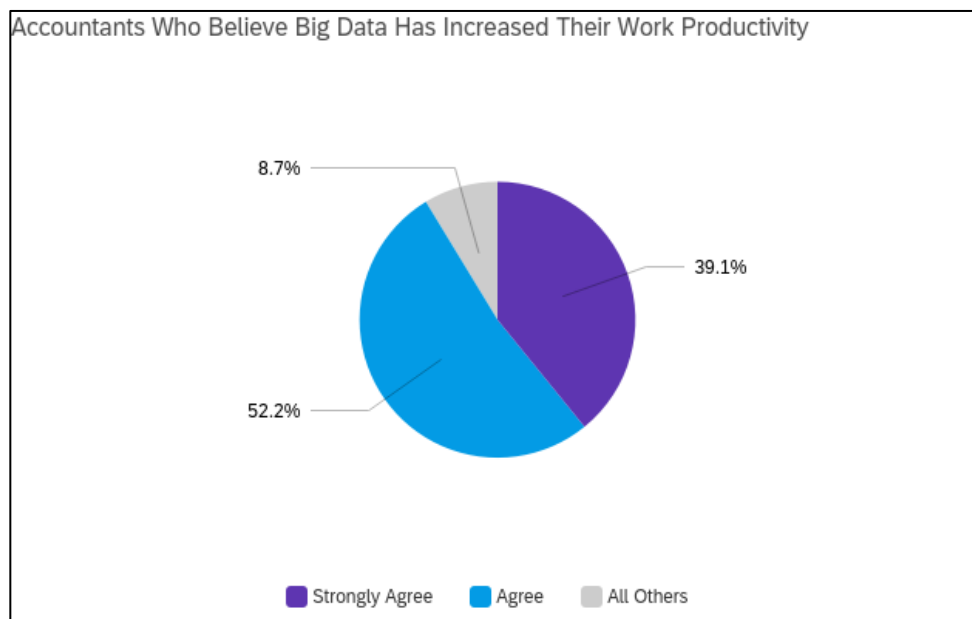
The Impact of Emerging Big Data and Analytical Approaches on Beginning Accounting Associates

Honors Thesis for Kennedy Akpeneye

service, analysis processing is ranked the highest as a type of software accountants are being trained to use before entering the workplace.

Another way to view the results can be seen in *Figure 4* below. This pie graph analyzes the percentage of beginning accounting associates who believe their work productivity increased from big data and data analytics. These results are based on all fifty beginning accounting associates at Big Four accounting firms and corporations who were surveyed. To understand if big data is making a difference within their profession, work productivity was examined.

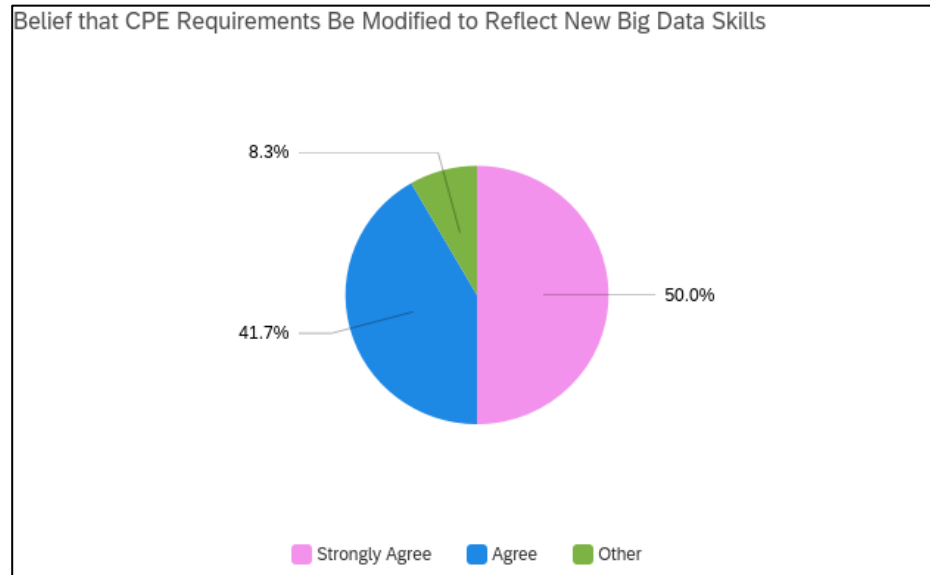
Figure 4: Percentage of Accountants that Indicated Big Data/Data Analytics has Increased their Work Productivity



Work productivity means the amount of work that beginning accounting associates can produce over a certain period. The results show that 52.2% of beginning accounting associates working at Big Four accounting firms and corporations strongly agree that big data and data analytics is improving their work productivity. Also, 39.1% of beginning accounting associates agree that big data and data analytics is improving their work productivity. Only 8.7% of the beginning accounting associates did not know if their work productivity was being increased by big data and data analytics. This pie graph suggests that 91.3% of the beginning accounting associates who were surveyed have a strong belief that big data and analytics is improving their work productivity within the workplace.

The Impact of Emerging Big Data and Analytical Approaches on Beginning Accounting Associates
Honors Thesis for Kennedy Akpeneye

Figure 5: Percentage of Accountants that Indicated the CPE Requirements be Modified to New Big Data Learning Skills



Continuing Professional Education requirements are designed to help accountants maintain their competency and skill sets as providers of professional services. Accounting associates are able to receive Continuing Professional Education credit based on hours of study that count toward certification programs which allows them to maintain their credentials as a CPA (Certified Public Accountant). Beginning accounting associates were surveyed to find out if they believe the Continuing Professional Education requirements be modified to reflect big data skills accountants are actively learning.

The results indicated that 91.7% of beginning accounting associates working at Big Four accounting firms and corporations generally agreed that big data skills be implemented in the Continuing Professional Education requirement. Also, 8.3% of beginning accounting associates did not know if the Continuing Professional Education Requirement be modified with big data skills. This shows that the majority of beginning accounting associates believe big data is an important skill to have while working on the job because of the value it provides in the accounting profession. Ultimately, Big data being a Continuing Professional Education requirement would cause more beginning accounting associates to actively use big data on the job.

The Impact of Emerging Big Data and Analytical Approaches on Beginning Accounting Associates

Honors Thesis for Kennedy Akpeneye

Interview Analysis

In addition to gathering results through collecting survey data from beginning accounting associates, interviews were conducted to help analyze the data even more. A total of six questions were asked to beginning accounting associates about big data and data analytics. The first three questions were asked to see how each beginning accounting associate uses big data in the accounting profession. The last three questions were asked to evaluate how big data and data analytics is being implemented in accounting firms for beginning accounting associates. Five beginning accounting associates were interviewed from both Big Four accounting firms and corporations. Three of the accounting associates who were interviewed indicated that big data is taking over the profession for accountants in all different lines of service. This means that big data is being used at a high level in audit, tax, and advisory within Big Four accounting firms and corporations. Many of the accounting associates indicated that big data is impacting the way that they do work and how fast they can collect large data sets. For example, an accounting associate indicated that acceleration centers are one way beginning accounting associates are incorporating big data at a higher level. Acceleration Centers are used at PwC to give accounting associates access to different types of big data software during any time. The beginning accounting associate also indicated that the acceleration center helps to train the accountant on big data software that is being commonly used within the firm. This means that big data and data analytics is being taught to various accounting associates while working. Big Data analytics is certainly changing the way beginning accounting associates perform work and is becoming more streamlined in Big Four accounting firms and corporations.

The Impact of Emerging Big Data and Analytical Approaches on Beginning Accounting Associates

Honors Thesis for Kennedy Akpeneye

KEY FINDINGS

Overall, the results of this study demonstrate that big data and data analytics is improving beginning accounting associates work productivity at Big Four accounting firms and corporations. The results also indicated which big data software had the biggest impact on beginning accounting associates. From the results of fifty surveys, it can be inferred that big data is being actively used in all lines of service on the job. The majority of beginning accounting associates working in audit, tax, and advisory services are using big data more than fifty percent of the time on the job. Accountants today are spending more time analyzing the data to help them get more work done faster, which is supported by the results of the surveys.

Tableau, an interactive data visualization software, is frequently used for beginning accounting associates in all lines of service. 40.3% of beginning accounting associates felt advanced in using Tableau. This means that beginning accounting associates are using Tableau to organize their data in a more visual way. Tableau also uses cloud support, which allows for real-time updates in data. Accounting associates indicating that they are experts in using Tableau shows that data visualization is giving accountants the ability to present their work more effectively.

Over ninety percent of beginning accounting associates believe that big data is improving their work productivity. Essentially, beginning accounting associates are able to complete tasks faster during the day by using big data. Accountants can spend less time working on a project during a workday because big data allows them to multi-task. Big data gives beginning accounting associates the ability to perform more than one task at a time, which improves their overall work productivity. The results of this study indicate that a large number of beginning accounting associates have learned to use a variety of big data software at once. The results of this study indicated that 78% of beginning accounting associates were previously trained in big data. This demonstrates big data is being taught to accounting associates before entering the workplace. Most accounting associates learned big data as a part of their college studies or through training provided by Big Four accounting firms and corporations. Big Four accounting firms and corporations providing training on big data for beginning accounting associates demonstrates that it is a useful skill to have in the accounting

The Impact of Emerging Big Data and Analytical Approaches on Beginning Accounting Associates

Honors Thesis for Kennedy Akpeneye

profession. Most accounting firms are offering training on big data software such as Microsoft Excel, Tableau, Alteryx, SAS, and Python to help beginning accounting associates be able to analyze large sets of data faster. Receiving education and training on these tools is important for accounting associates to adapt to technological changes happening within the profession. Accountants believe training on big data will be required in the future. 91.7% of beginning accounting associates agreed that big data should be a Continuing Professional Education requirement. This indicates that beginning accounting associates believe big data is an important skill to have while working on the job. Two of the participants that were interviewed from corporations believe that big data is a necessary tool to help an accountant perform work faster. Essentially, big data should be a Continuing Professional Education requirement because beginning accounting associates are working with large sets of data every day on the job. Over ninety percent of the beginning accounting associates who were surveyed believe that making big data a Continuing Professional Education requirement will increase an accountant's overall work productivity in Big Four accounting firms and corporations.

Big Four accounting firms are actively using Acceleration Centers. Three participants that were interviewed from public accounting firms indicated that Acceleration Centers are a useful tool for accounting associates to learn more about big data software. Acceleration Centers are a global resource that help accountants to learn and expand on big data software. Sixty percent of the beginning accounting associates that were interviewed indicated that Acceleration Centers have allowed them to find out more information about big data faster and create new connections globally. In essence, Acceleration Centers can increase an accounting associate's work productivity because they are able to learn how to use big data from other accountants not working in the United States. Ultimately, Big Four accounting firms providing accountants with Acceleration Centers for beginning accounting associates show that big data is making an impact on the accounting profession.

The Impact of Emerging Big Data and Analytical Approaches on Beginning Accounting Associates

Honors Thesis for Kennedy Akpeneye

CONCLUSION

The software that is perceived as most impactful by beginning accounting associates today contain valuable features that allow them to work with and analyze large sets of data. The study discussed in this thesis provides a lot of insight on how the accounting profession is impacted by big data, and how beginning accounting associates are using it to improve their work productivity. Big data and data analytics will continue to be a useful tool for beginning accounting associates currently working for Big Four accounting firms and corporations. It is essential for accounting associates to learn and understand how to adapt to technological changes to remain relevant in their profession. A majority of beginning accounting associates today have already started to receive education and training on big data software before entering the workplace, which gives them the opportunity to accelerate their career.

Although the results of this study provide insight on how big data is modifying the nature of beginning accounting associates work, one limitation of this study is the number of accounting associates interviewed. The accounting associates interviewed were mainly from Big Four accounting firms instead of corporations. For future research, it would be beneficial to interview more accounting associates from corporations to see if they have a different perspective from the Big Four associates on big data. It would also be interesting to conduct all of the interviews with accounting associates before sending out the surveys. This would allow me to incorporate the interviewee's results into the final survey before sending it out to more accounting associates. Another opportunity would be to collect the demographic data for gender when evaluating if big data is improving beginning accounting associates' work productivity. It would be interesting to see if a male accounting associate has a different perspective on big data compared to a female accounting associate. Exploring more about these three limitations would help give this study a better idea of how big data is changing the way beginning accounting associates perform their job. Deciding to complete the same study again after a few years will help to determine if big data remains to have an impact on beginning accounting associates' work productivity.

The Impact of Emerging Big Data and Analytical Approaches on Beginning Accounting Associates
Honors Thesis for Kennedy Akpeneye

APPENDICES

Appendix A - Survey

Listed below are ten survey questions for Associates and Senior Associates currently working at Big Four accounting firms or corporations. Please answer these questions to the best of your ability. Thank you!

Survey

1. Which definition of Big Data is the most accurate to you?
 - A. Extremely large sets that may be analyzed computationally to reveal patterns, trends, associations, especially relating to human behavior and interactions.
 - B. Larger, more complex data sets, especially from new data sources.
 - C. The exponential increase and availability of data in our world.
 - D. Data sets whose size or type is beyond the ability of traditional relational databases to capture, manage, and process the data with low latency.

2. What percentage of your previous Accounting position uses Big Data?

- ☐ 30%
- ☐ 45%
- ☐ 50%
- ☐ 75%
- ☐ 90%
- ☐ Other

3. What percentage of your current Accounting position uses Big Data?

- ☐ 30%
- ☐ 45%
- ☐ 50%
- ☐ 75%
- ☐ 90%
- ☐ Other

The Impact of Emerging Big Data and Analytical Approaches on Beginning Accounting Associates

Honors Thesis for Kennedy Akpeneye

4. How long were you in your previous position before getting promoted?

- ☐ 2 Years
- ☐ 3 Years
- ☐ 4 Years
- ☐ 4 Years +
- ☐ Other

5. Did you attend a training course on Big Data/Data Analytics before working at the Accounting firm?

- ☐ Yes
- ☐ No

6. Did your Accounting firm train you to learn Big Data while working on the job?

- ☐ Yes
- ☐ No

7. In which of these have you been previously trained on?

- ☐ Data visualization
- ☐ Data mining
- ☐ Data modeling
- ☐ Analysis processing
- ☐ None of these

8. Indicate your level of competence for each of the following from 1(minimal) to 5(expert):

- ☐ SAS
1 2 3 4 5
- ☐ Python
1 2 3 4 5

The Impact of Emerging Big Data and Analytical Approaches on Beginning Accounting Associates

Honors Thesis for Kennedy Akpeneye

☐ Tableau

1 2 3 4 5

☐ Alteryx

1 2 3 4 5

☐ Java

1 2 3 4 5

☐ Jira

1 2 3 4 5

☐ Excel

1 2 3 4 5

9. Do you feel that training yourself in big data/data analytics has increased your work performance?

5 Strongly Agree

4 Agree

3 I do not know

2 Disagree

1 Strongly Disagree

10. Should the Continuing Professional Education (CPE) requirements of the profession be modified to reflect new big data learning skills/requirements?

5 Strongly Agree

4 Agree

3 I do not know

2 Disagree

1 Strongly Disagree

Demographic Data

11. What company do you currently work for?

The Impact of Emerging Big Data and Analytical Approaches on Beginning Accounting Associates

Honors Thesis for Kennedy Akpeneye

12. How long have you worked in the Accounting firm?

- ☐ 1-2 Years
- ☐ 2-4 Years
- ☐ 4-6 Years
- ☐ 6+ Years

13. What is your current age?

14. What line of service?

- ☐ Audit
- ☐ Tax
- ☐ Advisory

15. What position did you previously hold in the Accounting firm?

- ☐ Associate
- ☐ Senior Associate
- ☐ Manager
- ☐ Director
- ☐ Partner

16. What position do you currently hold in the Accounting firm?

- ☐ Associate
- ☐ Senior Associate
- ☐ Manager
- ☐ Director
- ☐ Partner

The Impact of Emerging Big Data and Analytical Approaches on Beginning Accounting Associates

Honors Thesis for Kennedy Akpeneye

Appendix B - Interviews

Interview Questions

1. As an associate of your accounting firm, are you able to effectively research and gather reliable data using IT resources in a relatively short time period?
2. Has big data improved your ability to find and detect patterns in a volume of data? Please provide some examples.
3. Do you feel that big data analytics is taking over the accounting profession?
4. Does your accounting firm value learning data analytics to increase associates work productivity? Please provide some examples.
5. How much did you know about big data/data analytics before working at the accounting firm?
6. Do you think that prioritizing Big Data at the Accounting firm helped your overall career path improve? Please provide some examples.

The Impact of Emerging Big Data and Analytical Approaches on Beginning Accounting Associates
Honors Thesis for Kennedy Akpeneye

Appendix C - Sample Interview Response

Interviewee: Angelica Provost, Assurance Associate at PwC

1. As an associate of your accounting firm, are you able to effectively research and gather reliable data using IT resources in a relatively short time period?

There has been no situation where I needed to collect external data on the job, but the firm provides really good resources if I needed to collect more reliable data. PwC has resources out there to help me acquire data more quickly than other firms. For example, Acceleration Centers give me the ability to find out how to receive the proper training on types of big data software in less than three days. I can also connect with different accountants globally through using Acceleration Centers.

2. Has big data improved your ability to find and detect patterns in a volume of data? Please provide some examples.

The more big data you have access to, the more you are likely to come to a better conclusion. Big data gives me the ability to evaluate large data sets more reasonably which is a benefit for me as an auditor. An example of this is journal entry testing and the firm has tools that I can use to help me sort through journal entries faster. This can help the overall audit when I have to go through each process, and it helps the audit quality. Another example is EGA (Evidence Gathering Activities) testing which helps me to collect the results on substantive analytics faster.

3. Do you feel that big data analytics is taking over the accounting profession?

Not sure if it is taking over the profession, but it is definitely impacting the way that we do work and how fast we can collect data as auditors. Big data and analytics gives auditors the ability to spend less time collecting the data, and focus more on the audit of the client. Acceleration centers can help me work with big data analytics when I need it at any time. I have the ability to connect with anyone internationally through Acceleration centers. Big data analytics is changing the way how beginning accounting associates work and making it more streamlined.

4. Does your accounting firm value learning data analytics to increase associates work productivity? Please provide some examples.

The accounting firm has a huge digital library of CPE data trainings that you can use to improve your skills in Alteryx, Tableau, Power BI. The interesting part about these CPE trainings is we have access to them at any time and I can refer to them if I need to improve my skills in a big data software. PwC values me learning data analytics by giving me digital badges that indicate my proficiency in using different software. I have received digital badges in Excel, Alteryx, and Tableau during my time working at the firm. These resources allow you

The Impact of Emerging Big Data and Analytical Approaches on Beginning Accounting Associates

Honors Thesis for Kennedy Akpeneye

to expand your knowledge beyond the basic uses of Excel which is typically used in college and universities.

5. How much did you know about big data/data analytics before working at the accounting firm?

I knew a great amount of big data/data analytics before working for PwC. I concentrated in Applied Analytics during college and completed a capstone project using different big data software such as Alteryx and Tableau. Most of the big data software taught to me during the associate training I already knew how to use. As I started working as a beginning accounting associate, I was able to learn how big data/data analytics applies to the audit profession.

6. Do you think that prioritizing Big Data at the Accounting firm helped your overall career path improve? Please provide some examples.

The profession is using Big Data a lot more now and I think it can help you get to a faster promotion. If accountants know how to use Big Data, it can help them manage sets of data more efficiently than others. Big Data can help you be more accelerated and a higher performer at your accounting firm because you are able to multi-task various projects at once. As an auditor, it is important that you are proficient in using big data, and the manager on my engagement team values using big data to get specific tasks done.

The Impact of Emerging Big Data and Analytical Approaches on Beginning Accounting Associates
Honors Thesis for Kennedy Akpeneye

Appendix D - IRB Approval



February 2022

Kennedy Akpeneye:

RE: IRB Proposal #2022-0208b

TITLE: The Impact of Emerging Big Data and Analytical Approaches on
Beginning Accounting Associates

Dear Kennedy:

Your proposal, entitled “The Impact of Emerging Big Data and Analytical Approaches on Beginning Accounting Associates” was considered under IRB Guidelines for expedited review. The IRB Committee of Bryant University approved the proposal on February 8, 2022.

Bryant University is strongly committed to adhering to the basic ethical principles related to the conduct of research involving human subjects as set forth in The Belmont Report: Ethical Principles and Guidelines for the Protection of Human Subjects of Research. The submission of your proposal to the IRB Committee supports the goals of Bryant University and the IRB Committee and ensures that research involving any members of the Bryant community is in strict accordance with these ethical principles and guidelines. Thank you for your submission, and good luck with your research.

Very truly yours,

A handwritten signature in black ink that reads 'Yoon sukki' followed by a period.

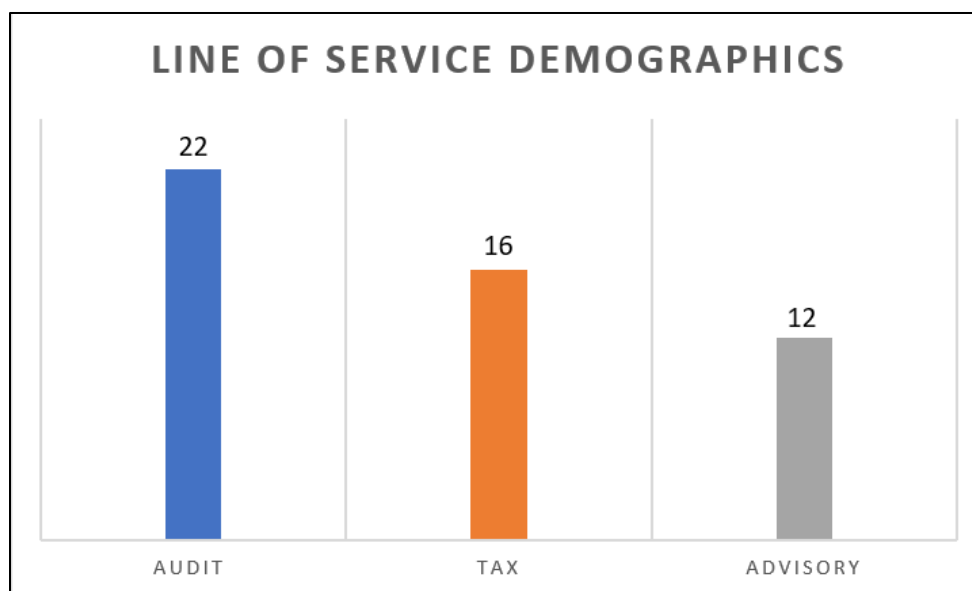
Sukki Yoon

Chair, IRB Committee

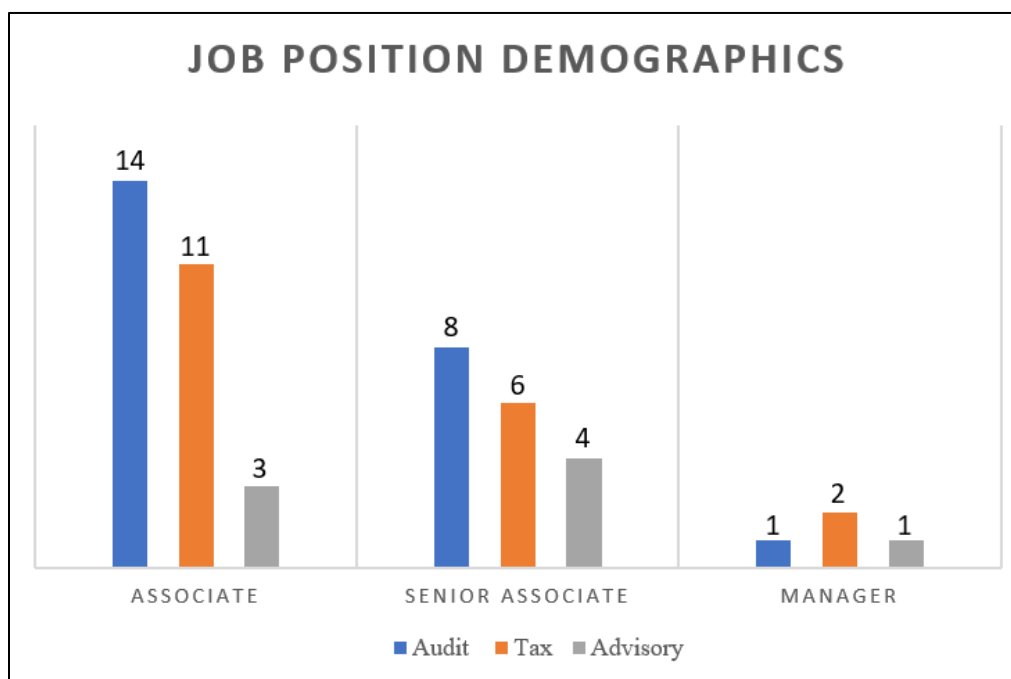
The Impact of Emerging Big Data and Analytical Approaches on Beginning Accounting Associates

Honors Thesis for Kennedy Akpeneye

Appendix E - Line of Service Demographics



Appendix F - Job Position Demographics



The Impact of Emerging Big Data and Analytical Approaches on Beginning Accounting Associates
Honors Thesis for Kennedy Akpeneye

REFERENCES

- Acharya, Sharad. "How Big Data Will Impact the Accounting Industry." Hacker Noon, 14 Jan. 2020, hackernoon.com/how-big-data-will-impact-the-accounting-industry-9f2636pn.
- Chen, Wilbur, and Suraj Srinivasan. "Going Digital: Implications for Firm Value and Performance." *Www.hbs.edu*, 2013, aaapubs.org/doi/pdf/10.2308/isy-10372.
- Cockcraft, Sophie, and Mark Russell. "Big Data Opportunities for Accounting and Finance Practice and Research: Big Data in Accounting and Finance." *Australian Accounting Review*, 2018.
- Cohn, Michael. "Accountants to Rely More on Big Data in 2020." Accounting Today, Accounting Today, 15 Jan. 2020, www.accountingtoday.com/news/accountants-to-rely-more-on-big-data-in-2020.
- Faggella, Daniel. "AI in the Accounting Big Four - Comparing Deloitte, PwC, KPMG, and EY." Emerj, Emerj, 3 Apr. 2020, emerj.com/ai-sector-overviews/ai-in-the-accounting-big-four-comparing-deloitte-pwc-kpmg-and-ey/.
- Kludt, Mitchell. "The Impact of Big Data and Information Technology on the Accounting Field and Business Environment." Trace.tennessee.edu, 2020, Preliminary Honors Thesis.
- Leonard, Kimberlee. "How Is Information Technology Used in Accounting?" *Small Business - Chron.com*, Chron.com, 12 Feb. 2019, smallbusiness.chron.com/information-technology-used-accounting-2101.html.
- Sood, Sureesh. "Skills for The Professionals of 2020 - Big Data Accounting Course." ACUITY, 2 August 2018, www.acuitymag.com/technology/skills-for-the-professionals-of-2020---big-data-accounting-course.

The Impact of Emerging Big Data and Analytical Approaches on Beginning Accounting Associates

Honors Thesis for Kennedy Akpeneye

Tysiac, Ken and Jeff Drew. "2020s Vision: Tech Transformation on Tap." *Journal of Accountancy*, *Journal of Accountancy*, 1 Jan. 2020, www.journalofaccountancy.com/issues/2020/jan/accounting-technology-transformation.html.

Yu, Jea. "How Big Data in Accounting Is Reshaping and Revitalizing Roles From the Bottom Up." *Spark*, 7 Jan. 2019, www.adp.com/spark/articles/2019/01/how-big-data-in-accounting-is-reshaping-and-revitalizing-roles-from-the-bottom-up.aspx.