

THE PENNSYLVANIA STATE UNIVERSITY  
SCHREYER HONORS COLLEGE

DEPARTMENT OF ACCOUNTING

ARTIFICIAL INTELLIGENCE AND ITS IMPACT ON RECRUITMENT  
AND HIRE FOR PUBLIC ACCOUNTING FIRMS

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SPRING 2020

A thesis  
submitted in partial fulfillment  
of the requirements  
for a baccalaureate and masters  
degree in Accounting  
with honors in Accounting

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## ABSTRACT

Artificial intelligence has and continues to take the world of technology by storm. The technological revolution, that has been in constant motion for the last 30 years, has only been accelerated by improvement in accuracy and efficiency. Many worry that artificial intelligence is a threat to their well-being, more specifically, their careers. An industry that had been forever deemed as a professional field run by the people was Accounting. There was an understanding that man-power would always be needed to accomplish the functions of the trade. However, artificial intelligence has completely altered that outlook. Artificial intelligence has flooded the accounting industry, as more public accounting firms begin to adopt this technology and integrate it into policies and procedures for conducting business activities. This movement has sparked fear that “robots” will be replacing the workforce, which brings much apprehension to potential future accountants. This study goes on to reveal the attitudes and expectations of public accounting firms as progression into an artificially intelligent world continues to impact companies entirely, and how it is expected to impact hiring and recruitment of employees. Interviews were conducted to gain this insight. The interviews uncover not only, a positive outlook on artificial intelligence and machine learning, but also, an idea of it being a necessity to compete in this market in the long-term. If firms are not willing to improve their business structure to include advanced technology, then they will fail to retain clients and fall behind. In addition, if universities and institutions are unable to improve the skills that students are exposed to prior to hire, there are consequences reflected on recruitment efforts that are put into that particular school. Further research should be done to define the financial impacts of adoption of artificial intelligence and its profitability over time.

## TABLE OF CONTENTS

LIST OF FIGURES .....	iii
LIST OF TABLES .....	iv
ACKNOWLEDGEMENTS .....	v
Chapter 1 Introduction .....	1
Terminology.....	3
Chapter 2 Literature Review .....	5
Evolution of Technology .....	5
Artificial Intelligence.....	8
Hire and Recruiting.....	13
Chapter 3 This Study’s Purpose.....	16
Interview Set Up and Design .....	17
Chapter 4 .....	20
Deloitte.....	20
KPMG.....	23
PricewaterhouseCooper .....	26
Ernst and Young .....	32
Summary.....	34
Chapter 5 Conclusion.....	35
BIBLIOGRAPHY .....	40

**LIST OF FIGURES**

Figure 1. The Make-up of IoT .....	7
Figure 2. Essential to Organizational Efficiency .....	12
Figure 3. Sustainable Productivity Equation .....	13
Figure 4. Automation Impact Survey .....	22
Figure 5. BIO IT Operating Model.....	25
Figure 6. Employee Numbers Before and After AI.....	37

**LIST OF TABLES**

Table 1. Interview Contact Information ..... 19

## ACKNOWLEDGEMENTS

I would like to take a moment to sincerely thank everyone who has taken time out of their busy schedules to guide and assist me through this thesis process. The Schreyer Honors College has provided me with the opportunity to work with incredible resources and mentors that made this thesis possible.

Also, thank you to my advisors and readers who have always given me the best advice and ideas to help me make this thesis the best representation of my idea possible. Professor Bonsall has been an amazing role model and really helped me see the importance of good authentic research.

Thank you to all of my interviewees who saw the importance of my research and agreed to participate in this study. They allowed me to not only gain insight but also helped me connect with many other people that were able to shed new light on the topic.

Finally, I want to thank my family, especially my dad who was the inspiration for this topic. His constant curiosity sparked my desire to write about how the world is changing around us so rapidly. My family has been a positive support system throughout all of college but during this thesis process is when I needed them the most. They are the ones that allowed me the opportunity to study at this amazing institution and have always encouraged me to work hard and follow my dreams.

## **Chapter 1**

### **Introduction**

Technology is something that has changed the way humans communicate, grow, learn and work. The basis of it is centered on advancement and efficiency integrated into any and all channels of life. The most pressing topic in technology right now is artificial intelligence. Ideas of robots and automated functions are flowing through businesses constantly to keep up with competitors and improve internal functions with hopes of reaping the benefits.

Public accounting firms are taking this notion of integration seriously. Typically, the accounting industry has been a cornerstone for producing available jobs that require human skill and accuracy to carry out the requirements of an audit. As technology has grown over time, more and more advancements have been adopted by firms to allow work to be done by the systems. Artificial Intelligence stands at the center of this change. Attitudes of the firms have changed to let the computers do the work. But where does this leave the jobs that were always expected to be available in the market? How does this impact the job profile of a future accountant?

With these changes comes great concern from young adults who are looking to enter the industry, Gen Z in particular. The ability to get hired and stay employed was once generally guaranteed by the need for human judgement and capabilities. Artificial Intelligence has emerged to assume those same desired skills and do it at speeds unprecedented. The entire profile for an incoming hire for a public accounting firm has changed even in just the last five years. The changes have sparked uncertainty, and in turn, concern for future accountants who are the audience for this particular study.

This study seeks to provide answers to the uncertain future of public accounting recruitment and hiring. There are factors influencing firms internally and externally that are necessary to understand in order to explain decisions to move towards an artificially intelligent practice. By using interview-based methods, members of public accounting recruitment teams can speak on behalf of their firms to explain the level of technological adoption and what it means for the future. Analysis of responses will allow for clarity and predictions to be made regarding how these changes will apply to incoming associates. This study will draw upon the change in the culture surrounding technology and the new desirable traits firms are looking for in employees.

Competition and efficiency are two of the most consistent influences on the change to an automated practice in public accounting firms. There is a time sensitive paradigm shift in business culture today. If a firm is not willing to accept the technology and utilize it properly, consequences follow those choices and they will fall behind in the market. Interview results also signaled to incoming hires the need to conform to these changes in order to be successful in the new public accounting environment. Universities play a large role in the preparation of the future workforce and hold responsibility to expose students to innovation.

Lastly, this study exploits the differences between information on the internet and in the news regarding artificial intelligence with the facts from the firms themselves. Differences exist in opinions and facts concerning artificial intelligence which are detailed in the literature review. The study itself helps to bridge the gap and also specify areas that need further investigation. More statistical research is needed on this topic in order to quantify the true impacts of more technology, financially and structurally.



## Terminology

Throughout this study there will be a significant number of abbreviations and terms that relate to artificial intelligence and are necessary to define in order to understand them in context.

The term artificial intelligence, often abbreviated as AI will be used most frequently and is considered to be interpreted as the study of systems that act in a way that is able to deal with dealing with situations, solving problems, answer questions and devise plans. There can be weak and strong AI systems which differ in how the knowledge is presented in the system and what it is trained to do with that knowledge (Coppin, 2004).

In addition, a subset of artificial intelligence is the concept of machine learning. It uses supervised learning techniques on historical data to make cognitive decisions (Murphy, 2012). Its goal is to develop methods to automatically detect patterns in data and then use those patterns to predict future data or perform other decision-making actions under circumstances of uncertainty (Murphy, 2012).

Both AI and machine learning are dependent on algorithms. An algorithm is a detailed set of instructions for carrying out the operation or solving the problem that the AI system intends to accomplish (Miller, 2018).

A topic that will be discussed in further detail in the literature review is The Internet of Things, also referred to as IoT. This is the broad spectrum of physical and virtual objects that have specific identities and are connected to the internet in order to facilitate intelligent applications. This is the will-house under which AI and its relatives are categorized in the technological revolution (Miller, 2018).

The terms big data and big data analytics, will be used interchangeably throughout this piece. Historically, big data refers to a wide range of large data sets that are seemingly

impossible to manage and process through traditional data management systems due to size and complexity (Toshniwal, 2015). All of these traditional processes and practices are being challenged through the adoption of AI.

The term metadata is essential to define with respect to big data. Essentially it is data about data. This can be further explained by the fact that in any business process, data is stored. Therefore, metadata is the stored data defined (Sarda, 2001).

For the purpose of this study, the target audience and demographic that these changes are members of Generation Z, or Gen Z. These are individuals born from 1995 through 2010 (Francis & Hoefel, 2018). They will be entering the workforce now and moving forward in the next 10 years where AI will be making its impact.

## **Chapter 2**

### **Literature Review**

#### **Evolution of Technology**

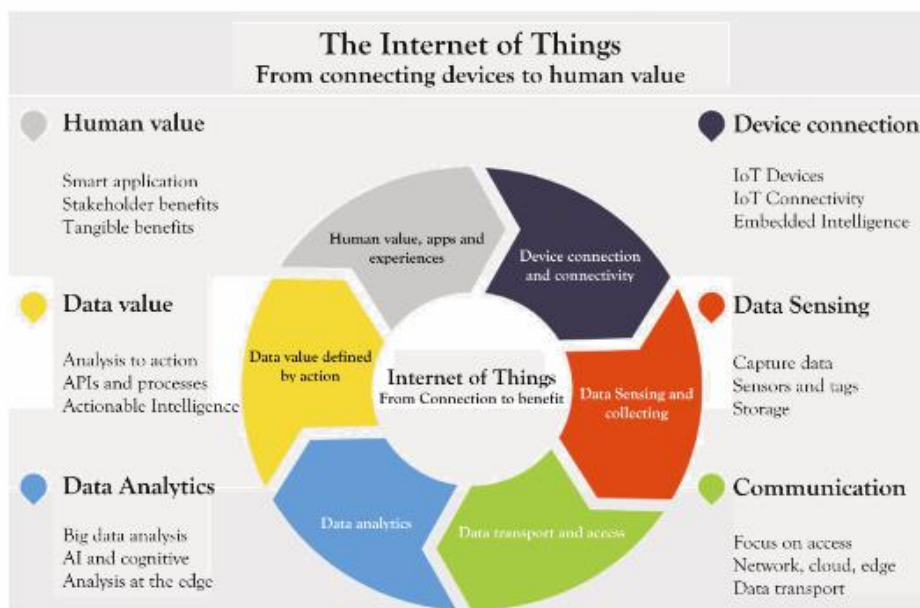
Technology has changed the face of the way that businesses function today and will continue to impact the world into the future. The digital age is important to understand in order to comprehend the effect that advancements are causing in the world of business and recruitment in particular.

Historically, the belief was that if humankind works hard enough, the universe will reveal itself so that it can be interpreted and understood (Weinberger, 2019). However over time it had to be accepted that the world is far too complex to be fully interpreted by the human brain; an infinite amount of information and unknown drivers forced the building of strategies that take into account the complexities (Weinberger, 2019). This is where technology comes into account. Once a technology is proven to work, continuous improvement is necessary to conform with the growth of information and problems to be solved (Weinberger, 2019). The world is constantly changing and revealing new chaos and with that comes new exploration into approaches and strategies in order to explain how things happen and to become more efficient (Weinberger, 2019).

Efficiency will be the center of this discussion. A desire to be the fastest and best in any market drives this desire for change. Business has become to be about advantage, focus, differentiation, superiority and excellence (Haque, 2011). The new generation of companies are thriving by rebelling against the traditional ways of industrial age capitalism and becoming radical innovators (Haque, 2011). The attitude has echoed throughout the entire business

environment and challenged the speed of change and conformance to a technologically dependent society.

The conversation continues with the introduction of the idea of the Internet of Things, also known as, IoT. These are physical and virtual objects that are all connected to the internet in order for intelligent applications to be facilitated within a business (Mulay, 2018). The entire technological revolution is centered on the growing dependencies on wireless communications and cloud technologies in every sector of the global economy (Mulay, 2018). Operational performance is the key improvement factor for all businesses today. IoT has signaled the change from traditional functions to entirely new business models that integrate technology to align with company performance and value (Mulay, 2018). However, the adoption of these qualities requires a strategic balance of economic, social, environmental and security priorities within a business (Mulay, 2018). Figure 1 illustrates the numerous factors that are essential to the success of integrating a true IoT system into the functionality of a business. It is especially important to highlight the cooperation from all aspects of a business in order for IoT to serve a purpose in the improvement with the rest of an industry. It is reliant on flexibility and scalability of platforms that lead to higher processing efficiency (Mulay, 2018).



Source: Mulay, 2018

**Figure 1. The Make-up of IoT**

The increased technology everywhere forces businesses to compete against one another for the most effective and efficient practices possible. Rapid pace and desire of change has only pushed firms to gain a competitive advantage in the market. Best explained through Michael Porter's Five Forces concept. It is a framework for defining an industry's structure and shapes the nature of competitive interaction that is being emphasized in the success of businesses today (Porter, 2008). The five forces are as follows:

1. Competition amongst existing firms
2. Threat of new entrants in the industry
3. Threat of substitutes in the industry
4. Bargaining power of customers
5. Bargaining power of suppliers

Any company in today's business economy must evaluate their stance with respect to the industry to evaluate the way in which they need to respond to remain competitive and,

essentially, profitable (Porter, 2008). Most the changes to be made are technological in nature and match the speed that the economy is transitioning to automation.

The rise in efficiency, IoT, and competition had led to the development of Artificial Intelligence that is fundamentally changing the way that data is processed, stored, and accessed (Mulay, 2018).

### **Artificial Intelligence**

AI is taking the business world by storm and improving functionality of technology like never before. It is driven by three significant factors: big data, affordable high-powered computing, and deep learning systems (Miller, 2018). Each of these factors working in unison allows for businesses to improve their business, no matter what the industry. The essential purpose of AI is to be able to combine cognitive abilities with technology to create programs that can self-think and adjust to achieve a certain operation or solve a problem (Miller, 2018). AI “robots” are being developed in order to communicate, cooperate and take on decision making responsibilities without human intervention (Mulay, 2018). Algorithms are the foundation of AI and it uses them to carry out an operation from start to finish (Miller, 2018). The simple language of the algorithm is straightforward and in plain English which prevents the AI engine from being confused by anything unclear or ambiguous (Miller, 2018). There are many different types of AI that are currently used in practice. The most common due to its affordability and accessibility is Process Automation. This is the act of automating digital and physical tasks; in a sense the basic level of AI (Miller, 2018). The other two types, Cognitive Insight and Cognitive Engagement, are more complex and emerging as the next level of competition. Both involve the assumption of human capabilities concerning interpreting data’s meaning as a human would and in turn coming to conclusions in decision making (Miller, 2018).

AI is making technology more adaptive and flexible which will continue to improve the ability for it to assume human capabilities (Mulay, 2018). With that being said, businesses are changing the most in order to conform to the new standard that is prevailing.

By 2027, every process will be managed by AI (Bauckhage, 2017). This is a staggering prediction and many others like it make the point to show that AI is not going anywhere, and businesses need to change in order to be able to survive the technological revolution that is underway. The prosperity of current businesses is reliant on the change in strategy and the structuring of an entirely new business model that includes technology as a main focus (Miller, 2018). The larger the organization the bigger the challenge to ensure firm-wide acceptance and comprehension of the vision and mission of implementing a greater degree of technology (Miller, 2018). The change starts with the tone at the top of the organization and allows for a smooth integration if clear communication and firm business objectives are existent (Miller, 2018)

The Miller Model, developed and published by Tony Miller in his book, *The New World of Human Resources and Employment: How Artificial intelligence and Process Redesign is Driving Dramatic Change*, outlines the intricate process of restructuring a business to comply with AI and integrate technology. This model looks at organizational maturity over time in order to find the strategic mix of factors that allows firms to integrate technology into their business structure and remain productive (Miller, 2018). It is comprised of nine factors that are critical to successful AI in any business.

1. Reengineering

Almost every existing system will have to be changed for AI to be integrated effectively. It will impact the people, the process, and the structure. The people will

be affected in quantity and quality to be able to gain value from the technology. The process needs to be changed to then be carried out in the new business practice.

Lastly, the structure of the organization needs to encompass technology as a critical theme so that it resonates throughout and is able to be supported.

## 2. Future Requirements

Introducing AI and innovative technologies into a business model will change many factors in the future. The biggest one to consider in an organization is the pay level. As AI is integrated, not only in individual businesses but also entire market segments, which will change the value of people in the industry and the rates that accompany that change.

## 3. Workforce Planning and Trends

A firm needs to think about trends that are to come in the future with the introduction of technologies. Examples include, inclusion, productivity, skills shortage, turnover, longevity in employment, competency, and the biggest factor that is expected to change is workforce reduction.

## 4. Planning

Succession plans need to be put in place for key personnel to ensure the continuation of the business. In addition, the organization has to consider the development of new training requirements and needs to conform with new competencies.

## 5. Trends

The trend that is the center of this change is AI. It is essential to get to the big picture or a more productive and efficient business. AI is best applied as a holistic



tool in a business instead of being pieced in where needed. The point of this key factor is to ensure awareness of current trends and how they will impact the organizational structure.

#### 6. Performance, Competence and Reliability

The tasks of an employee will be completely changed and forces the discussion to focus on the competencies required for these newly structured jobs. All of this impacts the performance of the firm in its overall productivity and reliability to be successful.

#### 7. Alignment

New models and structures directly impact the culture of the entire organization. For the most effective outcome, the corporate culture requirements should match the strategic objectives of implementing AI. In addition, a business needs to align the effects of this great change with job security and job retention for the benefit of employees

#### 8. Actions

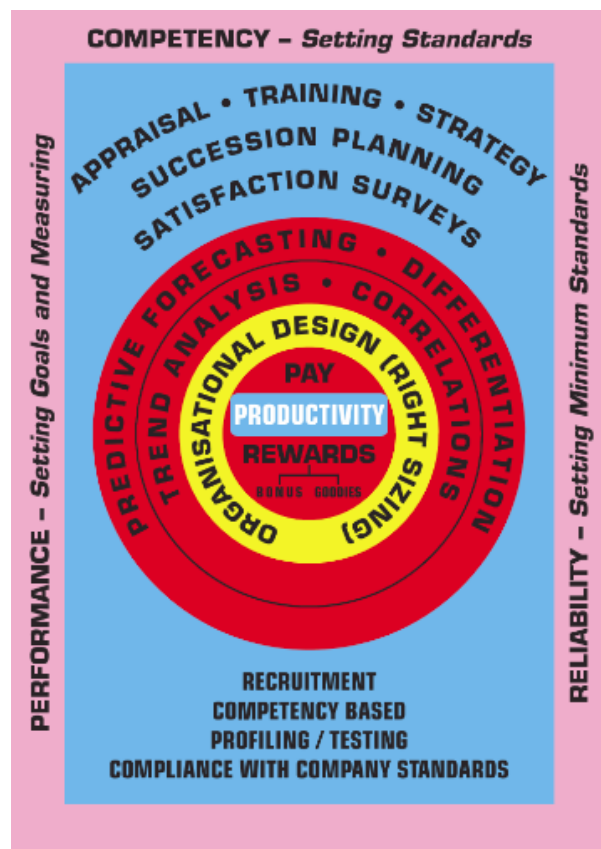
Training, education and development adjustments are required for the success of a new technology-focused business structure. Training needs to be intensified to make sure that employees are properly prepared to complete necessary tasks. Educational standards might become a requirement as the skill level necessary to fulfil tasks increases; there is a link between educational standards and performance in the workplace. Development internally and externally to create an effective continuity plan for the business.

#### 9. Survey

This factor allows internal and external parties to interact and react with the change in structure and process in order for improvements to be made. Alignment and satisfaction are feasible through effective surveying.

The following figure (Figure 2) illustrates the importance of each of these factors outlined in the Miller Model. From the inside, out, the model focuses on the overall productivity of a firm. This productivity is driven by AI in today's business world.

By taking into account the general changes coming to businesses when faced with AI and innovative technologies, deeper analysis of the changes specifically faced by hiring and recruiting departments can be explored.



Source: Miller, 2018

**Figure 2. Essential to Organizational Efficiency**

## Hire and Recruiting

Although the switch being made to is focused on technology, it all comes back to the people. Hiring and recruiting employees embraces an entire new outlook for businesses while maintaining productivity.

Being sustainably productive is the goal of almost any business, and in order to accomplish this, the organization must develop a workforce that encompasses that mission. Sustainable productivity is exemplified through Figure 3. This “equation” highlights the essential factors that, in unison, foster a successful business structure with the integration of AI and technology (Miller, 2018). This all starts with the people. In any organization, AI changes the profile of an employees that is capable of working effectively in the business.

**Sustainable Productivity = Competence + Performance + Reliability**

Source: Miller, 2018

### Figure 3. Sustainable Productivity

Competence provides quality assurance for the company and permits completion of tasks in a reasonably safe and legal manner (Miller, 2018). To ensure competence, the introduction of new trainings for incoming hires on AI that are in alignment with business objectives and standards (Miller, 2018). Recruitment teams have to make sure that people they are bringing in can handle the training and adapt to the technology focused business.

Performance is the point of AI and respective innovative technologies. Companies was to deliver quality data and results in the most efficient way. In order to do this, they have to hire employees that can handle a flexible approach to work and handle problems efficiently (Miller, 2018). The desired targets are measured and reevaluated throughout the year in conjunction with

employee performance standards. Hiring and recruiting departments in business have the responsibility to maintain these employee performance standards, even more heavily with AI in place (Miller, 2018). There is a performance gap that will present itself if AI is not to be integrated; old processes will become obviously redundant and performance measures previously determined by the organization will not be sufficient to maintain productivity in the market (Miller, 2018).

Reliability refers to the constant improvement in processes for systems to them to remain effective in practice. As acceptance and integration of technology continues, adaptation of the hiring process will have to be made. Awareness of the evolving culture of technology will help to assure that business processes are reliable (Miller, 2018). For competence and performance to prosper, the systems and procedures for recruiting employees need to be reliable. That is why each part of the equation is dependent on the other for sustainable productivity in a business.

AI not only impacts the people that make up the workforce but also the way that recruiting can be facilitated as a whole. A company with an AI system in place can speed up and improve the hiring process. Automated AI developed interview techniques are becoming customary for recruiters to use for a more efficient review of an applicant (Miller, 2018). In addition, AI has the ability to cross reference candidate data with their respective digital footprint that exists for just about anyone (Miller, 2018).

Each generation has had a different relationship with technology as its influence grew over the years. Older generations had to learn it and integrate it into their everyday life. Whereas groups like Gen Z, have grown up with it from the beginning. This is the generation that is being heavily recruited right now and entering the workforce. It is essential to take this into consideration when compiling an ideal employee profile to recruit. This is the first generation to

grow up in a fully technological world (Miller, 2018). They are a group that is comfortable with multitasking and using available technologies to the fullest; if a recruiting team is not taking a new skill set profile into account they will not be recruiting the best workforce to allow for sustainable productivity to prosper (Miller, 2018).

The biggest challenge that needs to be confronted by firms and their respective recruitment efforts is finding the balance of the right employees to be competent, performance-driven, and reliable while also fulfilling the business' overall goals and strategies (Miller, 2018).

## Chapter 3

### This Study's Purpose

There is existing literature on the integration of AI that confuses, scares and often drives people away from technologically heavy industries. There is a miscommunication and disconnect between the daunting technological revolution and the true benefits that it brings to a business. What businesses use AI and Machine Learning for varies from company to company and can be misconstrued as a threat to their ability to stay with a company in the long run as technology advances. With all this being said, it is important to bridge this information gap with facts from the companies themselves.

Public accounting is a field that is experiencing this self-generated fear from potential hires. An increased amount of technology integration combined with constant news about robots replacing the human worker, bring the ability to retain a job in public accounting into question. This study goes on to interview some of the largest public accounting firms in order to understand and explain their attitude towards AI and how their company is integrating it into their business structure and operation. By speaking specifically to personnel on the firms' recruiting teams, a greater comprehension of the firms' growth and goals can be conveyed to adults taking public accounting into consideration. Motive and intent for using AI, Machine Learning, Big Data and any other type of technology integration is essential for employees and future employees to understand.

This study will report and analyze the responses from each different firm in order to gauge what the evolution of technology has been internally and where it is going with respect to the entire company and specifically recruiting. It will serve to prove or disprove the negative consensus of AI which was discovered in the literature review.

### **Interview Set Up and Design**

Four public accounting firms, also known as the Big 4, were inquired with regards to participating in an interview. Each recruiting officer was contacted through their company email, provided by Ed Babcock, head advisor of the Masters of Accounting Program at Penn State University. All interviews were either conducted in person or over the phone. Only with permission were interviews recorded and later transcribed into typed responses. The interview consisted of 10 questions that allowed the interviewee to explain the firm's general perspective on Artificial Intelligence and technology. The interview then went into more specifics on recruitment for each firm.

Two of the four firms agreed to participate in the interview. The two that agreed were PricewaterhouseCoopers (PwC) and Ernst and Young (EY). Two firms, Deloitte and Klynveld Peat Marwick Goerdeler (KPMG), declined participation in the interview due to the legal and disclosure policies in place. Both firms redirected the interview to information provided by the firm on their public websites which will be included in this review.

A sample of the questions asked during the interviews is outlined below:

1. What is [firm]'s stance on Artificial Intelligence in the workplace?
2. Does [firm] have any firmwide initiatives concerning AI? If so, what are they and how are they being implemented?
3. How has the idea and implementation of AI changed in the last 5 years?
4. Have you noticed a general consensus/reaction from employees as AI has become more integrated into workday activities?
5. How has AI changed your everyday role as a recruiter for [firm]? Has it made it easier?
6. Have these AI initiatives put new pressures on the recruiting process?

7. How has AI changed the candidate profile that recruiters aim to find?
  - a. What skills are becoming non-negotiable?
  - b. What universities are preparing students best?
8. How do you feel about AI? Do you think this is the right direction for the industry?
9. How might someone prepare for these extreme changes in practice in order to remain an asset to the firm?
10. Should someone entering the industry be worried about the longevity of their career?

It should also be noted that interviews strived to be conversational and free flowing. That being said, the structure of the interviews varied and did not always follow the exact order and language of questions that are outlined above.

The next chapter will go on to go through the responses from each of the firms. Analysis of the results will foster a comparison to be made between the reality of the firm and the information gathered in the Literature Review.



The following table lists the contact information for all persons interviewed and contacted in this study:

**Table 1. Interview Contact Information**

<b>Name</b>	<b>Firm</b>	<b>Position</b>	<b>Contact Info</b>
<b>Kaitlin Hopkins</b>	PwC	Mid-Atlantic Campus Recruiting Talent ID Lead; Senior Manager	484-459-8249
<b>Brieanne Urian</b>	PwC	Talent Identification Manager	215-510-8183
<b>Scott Metro</b>	PwC	Digital Risk Solutions Partner	978-884-8336
<b>Jacqueline Jaszczak</b>	EY	Campus Recruiter	412-378-9654
<b>Tony Giannetta</b>	Deloitte	Senior Campus Recruiting Specialist	tgiannetta@deloitte.com
<b>Allison Monkman</b>	KPMG	Campus Recruiting; Senior Associate	amonkman@kpmg.com
<b>Thompson Harner</b>	Penn State		

## **Chapter 4**

### **Results and Responses**

Each firm that was interviewed will be profiled and compared to its peers in the market to best emphasize the true competition that will continue to affect the public accounting industry, moving into the future. Firms that declined an interview have been researched and details regarding their public AI and innovative technology stances are outlined in this section.

#### **Deloitte**

As a major public accounting firm, members of the Deloitte recruitment team were contacted with respect to an interview; specifically, Tony Giannetta. However, legal restrictions provided by the Deloitte Risk team, prevented the associate to participate in the study. Although direct information was not collected, research was done on the firm's public stance and integration of technology into practice.

Deloitte has published many platforms for research and insights written by associates of the firm to explain their views of innovation being the future of accounting. They are focused on leveraging cutting-edge technology, data analytics and transformative service deliver models internally and externally to their client (Horton, 2019). The organization is continuing to use robotic process automation, RPA, in order to transform business processes that achieve higher speeds and accuracy through automating decisions (Horton, 2019). Deloitte emphasizes some key success factors that are determined necessary in the process of integrating technology. It is grounded in an enterprise wide strategy that combines RPA and AI, with a sound infrastructure and clear understanding of how to continuously capture value as a firm (Horton, 2019). AI increases the capacity of the workforce and forces work to be redefined. This process is

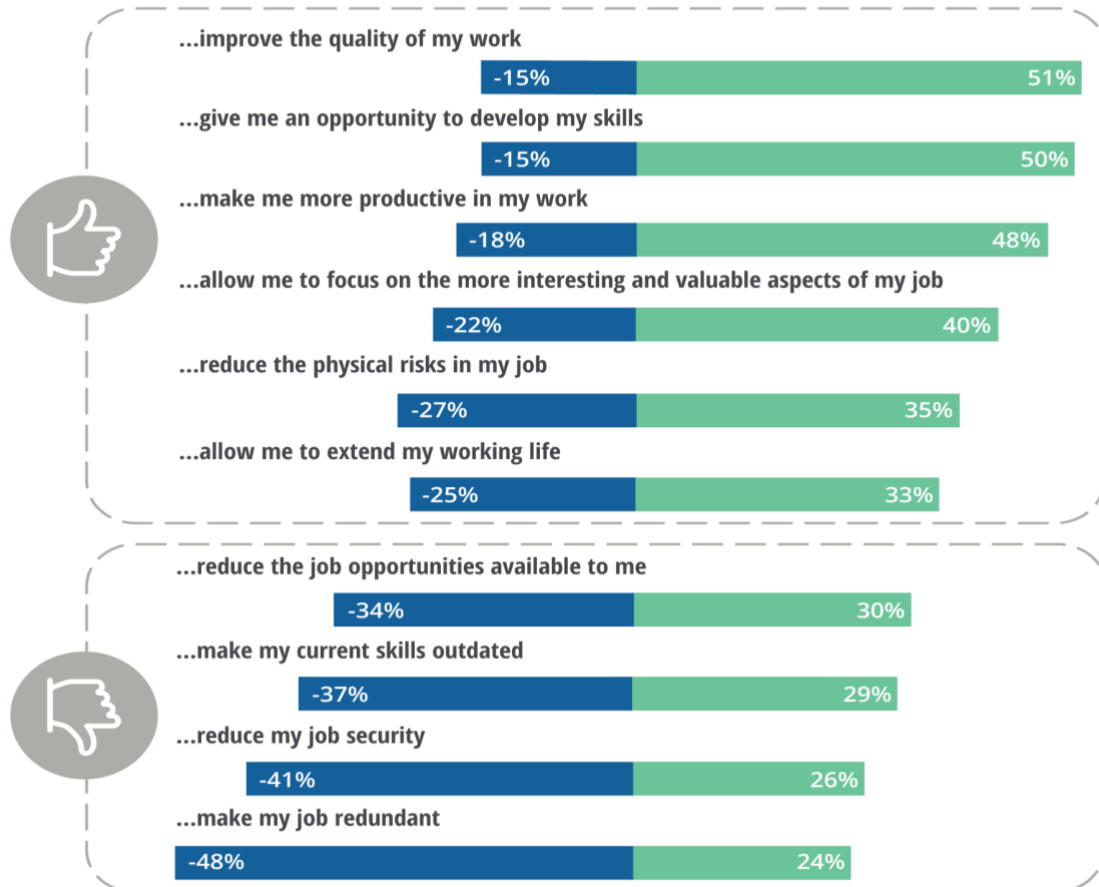
dependent on a supportive and talented workforce that is able to solve problems and maintain productivity (Horton, 2019). Deloitte is aware of the impacts and changes in the evolution of AI and cognitive technologies in their own business and others around them.

In addition to the structure of the business with technology, Deloitte explains the significant employability skills gap that is inevitable with this paradigm shift. The need to reevaluate talent profiles so that the skill sets required in the future will continue to foster success is essential (Radin, 2020). Employers that overemphasize the digital fluency of employees with skills such as coding are contributing to the massive deficit of social and emotional capabilities that Deloitte recognizes as the value adding factor when machines fall short (Radin, 2020). They stand on the fact that success and productivity depend on both cognitive, social and emotional skills in combination with the right levels of technical skills (Radin, 2020). Leaders in the market, like themselves, are taking this fact into consideration in their hiring strategy by additionally screening for nontechnical capabilities like critical thinking, empathy, and emotional intelligence (Radin, 2020). For Deloitte, this is an investment in the future of the firm's environment, community and shareholder network (Radin, 2020).

The following figure represents data from a survey conducted by Deloitte, regarding the perception of automation on employee's jobs in the next ten years (Moueddene et al., 2019).

% of "Agree" and "Disagree" to the statement: "in 10 years, automation will..."

■ Disagree ■ Agree



Source: Moueddene et al., 2019

**Figure 4. Automation Impact Survey**

## KPMG

Similar to Deloitte, KPMG was unable to disclose information regarding the current recruitment process nor the firm's current AI strategies. Allison Monkman was contacted and respectfully declined the interview but directed the research to be done through the company website, [www.kpmg-campus.com](http://www.kpmg-campus.com).

The entire KPMG story encompasses the firm's purpose, values, vision, strategy and promise to its employees, its clients and its community. The firm is driven to make informed decisions while responding to challenges and continuing to pursue new opportunities. KPMG is grounded in acting with integrity through maintaining high standards of principles of personal and professional conduct. They want to lead by example, work together, respect the individual, seek fact and provide insights, and maintain open and honest communication. Overall, the accounting firm follows a strategy for success focused on sustainable long-term success by providing quality service to clients. The culture of innovation is what is changing in the firm recently across all areas of the business and sharing ideas that inspire employees to excel and be better tomorrow than today.

In late 2014, KPMG introduced the Next Generation IT Operating Model that outlines and defined three new roles for IT. The framework refers to the rolls as the BIO; standing for Broker, Integrate, Orchestrate (Snyder & Heneghan, 2017).

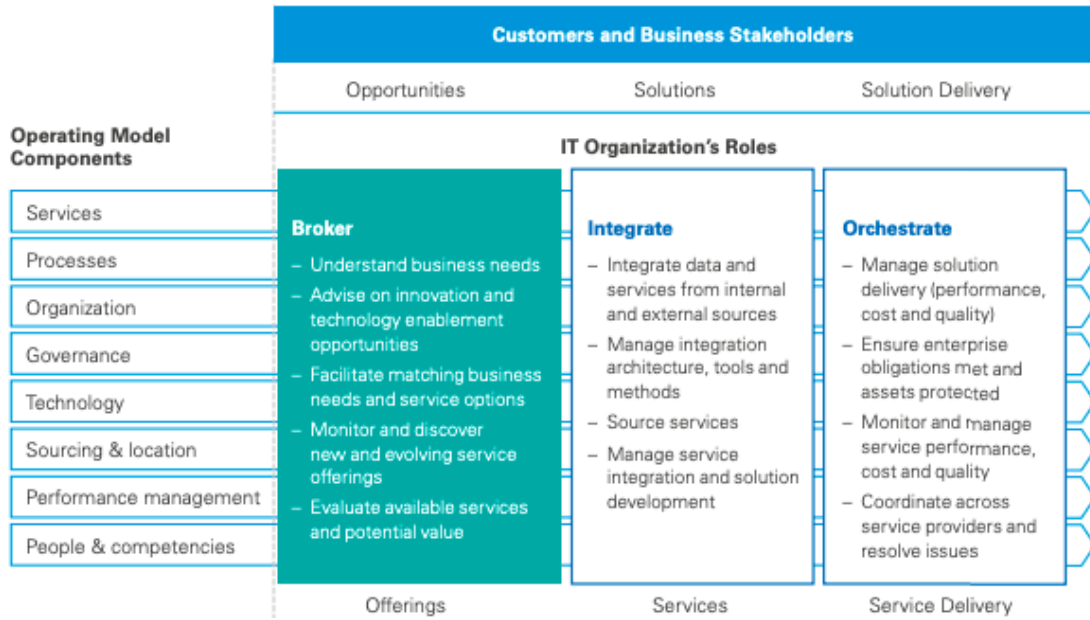
The Broker role is in place to change the operating model in order to expose the business to all available opportunities that can deliver technology quickly and effectively (Snyder & Heneghan, 2017). Technology enabled innovation and digital solutions want to be made visible and realistic to business partners for the future (Snyder & Heneghan, 2017). Overall, the Broker

role is in place to proactively engage the business in a technological partnership and shape demand for such change (Snyder & Heneghan, 2017).

The Integrate role takes the opportunities made clear by the Broker and turns them into decisions to be integrated into the business. This role focuses in optimizing value from investments in IT that involve the integration of office systems to provide a seamless experience and holistic view of data in the firm (Snyder & Heneghan, 2017). They want to preserve data integrity, security, and legal compliance (Snyder & Heneghan, 2017). This role is actively attempting to modernize existing application to reduce barriers and complexity while also implementing new developments for continuous delivery practices (Snyder & Heneghan, 2017) With this integration comes the need to educate and advise development teams across the firm in best practice (Snyder & Heneghan, 2017).

Lastly, the Orchestrate role addresses the end goal of hiding complexity and providing ease of using technology in the firm. IT models are wanted when they deliver services and ensure performance, costs and quality (Snyder & Heneghan, 2017). This final piece is essential for genuine return on investment to be realized by KPMG (Snyder & Heneghan, 2017). In Orchestrating the changes outlined in this model, KPMG wants to build and manage user services for employees, protect the enterprise as a whole and monitor service performance (Snyder & Heneghan, 2017). This role also recognizes the need for these changes to spark the need for new positions and skills amidst the technological disruption (Snyder & Heneghan, 2017). Current positions will either evolve or ultimately be eliminated as levels of automation and cloud migration increase (Snyder & Heneghan, 2017).

The figure below illustrates the model that KPMG has implemented and is currently following in their journey with AI and innovative technology.



Source: KPMG International

**Figure 5. BIO IT Operating Model**

## **PricewaterhouseCooper**

With regards to PwC, three separate interviews were conducted. Each interview was with an employee that has connection to the recruitment of new hires, while also providing variety of perspectives with respect to experience in the firm and connection to technology.

Consistent throughout each interview was the mention and emphasis on the firm-wide initiative, Your Tomorrow. This initiative is grounded in the digital transformation that the firm embarked on 5 years ago. It coincides with the motto of working smarter not harder in the public accounting practice that PwC is committed to exhibiting moving forward. It all began with the election of Tim Ryan as the Territory Senior Partner of the United States. One of Ryan's leading platforms was to digitally upskill all 50,000 US employees. This didn't start out to mean AI, but it has since evolved and moved with the market and the firm's desire to stay ahead of the competition.

PwC stance on technology is twofold; Business Led and Citizen Led. The business led piece encompasses the resources and different technologies made available to employees. Not only are these tools specific software systems, like Altryx and Tableau, but also the opportunities for increased training and digital academies to improve their individual skills. On the other hand, the citizen led piece is all about the people. Encouraging employees to learn new things and be eager to improve their individual skills to then benefit the entire firm. It starts with the people taking action and accepting the change and then the firm continues to increase and introduce more technology in order to elevate the entire business. Without the citizen piece the firm's implementation of technology would be unable to prosper; if internally people are not willing to upskill themselves then the technology is useless to the firm. The people are what drive this motion towards technology and PwC has found that balance between executing and emboldening



technological initiatives. They stand united on the fact that the technology is only as good as the human user behind it, so working to find a way to leverage new technologies and do it in the right way is the goal.

The biggest change that has come from PwC in the last 2-3 years has been the most impactful, as agreed on by all three interviewees. The introduction of the Digital Accelerators program has changed the way the entire firm conducts business activities. When initially implemented, the firm did not want to bring in outside computer and software engineers to build out new programs in order to implement AI. Instead 2,000 PwC employees left their day jobs, teams, and client engagements from all lines of service to become a PwC Digital Accelerator. This program included a formalized intensive training, called Lift Off lead by the Chief Digital Officer, Joe Atkinson. By allowing the current employees to focus on learning the technology, the firm is encouraging the digital upskilling to occur and be reintegrated back into the daily business practice organically. Following the training, employees return to their daily jobs and begin the process of teaching and improving the practice so that the entire firm has access to these improvements. The adoptions of “bots” and “workflows” and the two biggest accomplishments that have come from the program. A Digital Accelerator can create either of these items to run in practice to complete some of the mundane tasks faced in the conduction of an audit or tax filing. If it is found effective, the bot is published and accessible to the entire firm and teams across the country can utilize it to improve their efficiency in practice. The creator of a bot or workflow even has the opportunity to gain additional compensation for their creation the more that employees use their specific innovation. The entire program embraces the entrepreneurial spirit that PwC employees exhibit.

The firm as a whole is conscious of the fact that everyone responds to change and learning in different ways. Any change in a large organization is going to be challenging but by being aware of the different learning styles and levels of technological skill, the process can be eased. PwC knowing this, rolled out technology in an infinite number of different ways to accommodate the diversity of the firm. There are different ways that each employee can individualize their technological experience with the firm. They offer numerous podcasts to listen to, options to receive dialing learning verses that pop-up on their screens throughout the day, integrating a digital fitness app to learn with, while also offering traditional training outlets as well.

In terms of recruiting, each interviewee exhibited a different perspective that is detailed and explained below.

The first interview was with a current Talent Identification Manager and Head Recruiter for Penn State University, Brienne Urian. As a recent graduate, Urian has seen the changes in the technology happen before her eyes. She was able to start with the firm during the height of all this change. She has seen the most positive feedback from employees due to the fact that the average age of employees falls around 26 to 27 years old, all of which have grown up in the technology age. Even in the short time that Urian went from an intern to an associate with the firm, she noticed changes in the technology that improved the efficiency of everyday tasks. Once she moved into the recruiting aspect of PwC, she was able to apply some of those technologies into the process. Urian mentioned the biggest thing that AI has done for the recruiting team is help with interpreting data from year to year. Through the use of data visualization tools like Tableau, the team can input immense amounts of application and hire data to be able to see the areas that were impacted the most. Trends and growth can be pinpointed to a certain area of the

country, a specific PwC office, or even an individual university. Most importantly this helps when conveying the information to partners and directors; they can more easily understand and interpret the recruiting data in this format over being handed a long list of data in an excel file or document that then has to be examined further.

Moving up into the organization, the next interview was conducted with Kaitlin Hopkins, the former Head Recruiter of Penn State and the current Mid-Atlantic Campus Recruiting Talent Identification Lead; she is also a Senior Manager with the firm. Hopkins' biggest emphasis with the change in recruiting was the way in which AI has helped the efficiency of the application process and handling immense amounts of data to be evaluated. This past fall, Hopkins' explained that the firm received over 120,000 entry level applications. This amount of data is unprecedented for a team of recruiters to weed through manually. The way AI has improved this process is with data wrangling through Altryx. What is most important throughout the recruitment process is that PwC is hiring the best quality candidates while also being legally compliant and making unbiased decisions. With the Altryx software, the firm is able to pull information from reports to match the basic qualifications of the jobs that had be posted for candidates to apply. The software will then output recommendations of resumes that meet those criteria on a baseline level. Hopkins said this is huge for the recruitment team to then be able to have a more narrow pool of applications to review with a subjective eye without having to worry about the standard quality of the resume. There is more time to focus on the work experience and leadership qualities of the applicant than if the team had to manually go through each of the 120,000 applications received. Hopkins also emphasized that this process is only going to improve; with continuous use and time the team will figure out how to wrangle the data even better and become more accurate with the pool of resumes that are evaluated through AI.

Lastly, the third and final interview was with a Digital Risk Solutions Partner, Scott Metro. He has also played a major role in the recruitment of students from his alma mater, Penn State University. Metro has been with the firm the longest out of the three interviewees, going on 25 years. From the beginning he was more technologically savvy as he entered into the firm as a technologist. He was always seen the increase in technology as “putting another tool in the tool bag” that he didn’t necessarily have before. When recruiting, he finds that his focus goes immediately to the bottom of a resume to see what skills in technology a student has included. Exposure to any type of technology is fruitful information and will move a student to the top of the list. Whether they are gaining those skills through a class in university curriculum, independently taking courses, work experience or even self-teaching, all of it is valuable knowledge to the firm. Metro made the following anecdote to explain the differences between previous student profiles and the current standard. “You could be the best accounting student there ever was that would have had a great chance of getting through the door, but now you could still be that and have the same attributes but be devoid of technology and might not get on our radar.” This change is significant to the student and the firm. With the tasks of entry level hires changing from mundane copy and pasting to running reports and actually analyzing the results, the more exposure a potential hire has to these technologies, the better off they are in the recruiting process of a firm that embraces technological advancement.

One point that became a focus of each interview was the fact that this all comes back to the student. The student relies on the guidance of their university to assist in preparing them properly for their career. Recruitment for PwC is centered at universities around the country to get the best candidates possible. PwC is in constant communication with these programs in order to inform them of what skills they look for in incoming applicants and what the industry needs as

technology is increasing. If a university does not respond properly and take that communication into consideration when planning curriculum and opportunities for students then PwC has, in instances, pulled back on recruitment efforts with that institution. PwC wants the highest quality people to work at the firm and today that includes a new standard of technological skills.

When asked about the longevity of the career for someone entering the industry today, all interviewees consistently affirmed the same opinion. PwC is not looking to reduce the number of employees; artificial intelligence is not meant to replace the human, it is meant to put that human in a position to focus on their highest and best use for the firm. Efficiency is at the forefront of the goals of the firm in order to remain a leading firm in the market. Eliminating employees to be replaced by AI, puts that goal at risk because the ability for human communication and relationships to prosper is essential to PwC as well.

## **Ernst and Young**

EY provided an insightful interview with Campus Recruiter, Jacqueline Jaszczak. She has been in her current role at the firm for the past year and a half, but has over five years of experience in recruitment and hiring. Throughout the interview, Jaszczak was very consistent in her responses that EY has begun to use AI and other intelligent technologies but not to the fullest extent that they could. At the moment, the firm is using AI in order to allow its people to utilize their skills in a better way.

Over the years, EY has experienced some resistance when it comes to change in the way that things are done. Jaszczak explained that the people at the firm have given push back in the past and made the argument, “why change if it still works?”. The firm has integrated the platform Yello, a talent acquisition software that is used consistently across all departments of EY. Jaszczak speaks highly of Yello’s great functionality and the way it has made recruiting easier.

The majority of technology improvements that EY is committing to are rooted in interviewing. The biggest change that EY has made in recruiting efforts is with the integration of the virtual interview. These are conducted on through Yello and allows interviews to be conducted from anywhere and without an EY personnel present. Jaszczak makes the point that the decision to introduce this technology was not to eliminate people’s jobs and responsibilities to hire employees; EY has the employees and the resources available to conduct face to face interviews. This choice was to make the hiring process more efficient. By asking people to give up their work day and travel to a specific interview site, EY is losing time spent on critical business function; the virtual interview restore that time lost. Jaszczak also went on to say that it is technologies like the virtual interview that she foresees being implemented in the recruitment process in order to keep moving with trends. She references the competitive nature of the

industry that has sparked the need for improvements in recruitment. “There has always been a desired competitive edge, moving through application and being time efficient to get the best people and fast and it has only gotten more aggressive with time and technology.”

When asked about the future of the recruitment process for public accounting firms, Jaszczak brought it back to the universities. She spoke about Penn State in particular which has implemented a new platform in the Smeal College of Business, called Nittany Lion Careers. Prior to this technology each firm had its own technologies for interviews and this platform allowed for one integrated system that permitted companies that could not get on campus to recruit or students that could not travel for an opportunity the ability to gain access to one another. Jaszczak sees this as a perfect example of the way that recruitment is only improving with technology. In the market, she says that the way public accounting firms recruit has changed but at the same time remained the same; each firm has their own tracking system and their own platforms that differ across the board from firm to firm. It is not about what they have, it is about how they use it and, more importantly, how easily it can be integrated.

With the regards to EY, however, the future is somewhat unknown. She goes on to say that technology is the future and it will be integrated into the firm, but the process of getting there is what she is unsure about. She makes the point to say that recruiting cannot all be virtual because the relationship and connection that is made with a candidate is the most important part of the process and that cannot be fostered through technology, there has to be a balance.

The final question of the interview concerned the future of someone entering into the industry and should they be worried for their job. Jaszczak responded with this, “No I don’t think so, not at this point, I think that AI is being used to take away the tedious tasks to let employees do the more important things. We push it too hard, it’s cool but beyond that the robot taking over

jobs is a scary thing and I do not think we are there...we always will need the human eye and interpretation, for now you are fine.”

### **Summary**

Each firm clearly recognizes the movement towards technology. Although the level of change and acceptance internally varies, all are actively pursuing transformation for the future. By cumulatively looking at the plans and opinions shared by each firm, there is great deal of insight that incoming hires and potential accountants can use to their advantage.

The fear that has accompanied AI in this rapid technological growth can be subsided with this new insight that the firms have provided. Now it is known that there is a plan, there is an intention, and there is a way that AI and the human mind can continue to work together despite the increase in technology. There is a right way and a wrong way to integrate technology into businesses that have historically reliant on humans and their skills, as discovered in the literature review. It is important to make the connection between the theories and the realities of dealing with the technology revolution.



## **Chapter 5**

### **Conclusion**

This study delivers an in-depth analysis on the impact of innovative technologies, such as AI, on the future of the workforce and the how public accounting firms are adapting to this change. The literature review conducted in the beginning of the study, brought general theory and interpretation of the changes that businesses are facing in adjusting to AI in business models. The interview portion of this piece was then conducted to prove or disprove the findings to help future public accountants to be aware of the changes and prepare themselves for success in the field.

Overall, this study has confirmed that changes in technology require a firm's cooperation as well as understanding of a different employee skill set which allows for longevity in the market and the individual. Both the industry and the firms are understanding the sheer scale of changes that need to be made and are in the process of converting business models and strategies to align with the new normal.

The literature review focuses on the economy and business in general as technology becomes the leading factor. Firms like KPMG and PwC have demonstrated an understanding of the importance of properly integrating technology for it to be effective. Both of these firms have implemented and outlined company-wide initiatives that redesign the firm's structure and goals for the purpose of being a technological leader. The action of creating a new model to incorporate technology, is one thing but the reassurance of the human mind that the interviews provided balances the technology aspect that the literature review did not necessarily take into account.

All of the firms that were outlined and interviewed were able to disprove the fact that a robot is coming in to replace the job of a human employee. When asked, EY shot down the concept, PwC reassured the need for humans to foster relationships and also act with integrity alongside the technology. Deloitte wants to maintain a talented workforce that can manage the technology and fill in for where it can't perform. KPMG has high standards of personal and professional conduct that come first in the firm no matter what technology or innovation is being used. Any firm in this study, would stand strong on its purpose and values before letting technology take over which should alleviate the fears of incoming accountants.

The review also highlighted a change in profile for people to be hired that can work in conjunction with the new technology. They have to be skilled, flexible, willing to learn and accept the change. This idea brings into question the ability for a prospective accountant to be hired by a public accounting firm. When asked about the types of hires being looked for by the firm, PwC was the most vocal. Not only did they highlight the expectation of some technological exposure in a potential candidate but also recognized it as, in part, the responsibility of universities to properly prepare students for this future. EY accompanied this opinion with the work that certain universities like Penn State is doing to make firms more available to its students. With this being said, all the firms take pride in pristine training and giving their employees the opportunity to learn and grow with the technology for success. So the conclusion that anyone looking to get into this industry can come to is that you are expected to have some basic technological exposure, but it is the overall combination of skills, experience, and personality that will drive the ability to be hired in a public accounting firm.

Going off of that, this study also brought to light the ways in which firms are using technology that contrast to the ways in which the literature review portrayed them. The literature

review suggested that the AI and other innovative technologies would be replacing the workforce, almost entirely. Figure 6 provides an illustration of the outlined effect.



Source: Miller, 2018

**Figure 6. Employee Numbers Before and After AI**

The firms each refuted this view, in a few different ways. PwC, across all three interviews, stated that AI is not eliminating jobs within their firm. In fact, these technologies are just changing the tasks of what each employee is doing. Instead of spending time on mundane tasks, employees will be using the AI to complete those old tasks. The employees then can divert their saved time to analyzing and interpreting the data that contributes to the audit of a client. EY had a similar response. AI for them is just taking away the tedious tasks to allow for more time to be spent on more important tasks.

Research on the other firms, proves that the human skill cannot be eliminated in the way that the literature review suggests. Deloitte places far too much emphasis on the employability skills of employees to begin to eliminate people. These skills are essential since they need to pick up for the slack caused by the use of innovative technologies in the workplace. KMPG is the only firm that showed the possibility of jobs being eliminated over time. In their IT plan that has been implemented, they acknowledge that roles will be evolving to accommodate the increased

technology. However, they also mention that eventually this change could result in eliminating employees from the firm.

The responses from the firms help to answer the question of job security for now. But the future is inconclusive. With further research and statistical tracking of hiring and recruiting numbers over the next five years, concrete conclusions can be made to see the direct impact of AI and other innovative technologies on the number of people that can be effectively employed by a firm. This study helped to answer the question for now but has positively proven that research needs to be continued into the future.

Hiring and recruiting for public accounting firms is changing with the paradigm shift that businesses are facing with technology. Firms are relying on virtual interviews that starts the process in an efficient way; greatly decreasing the time spent by humans in traditional face-to-face interviews. Implementing AI to filter resumes and profiles to give the recruitment teams the best quality candidates much faster than if manual reviewing was to be conducted. It is most important that potential hires and future accountants understand these changes so that they are preparing themselves in the best way to meet the new standards of technology. All the firms are using AI to compete in the market and also expecting new hires to be able to know these technologies and work in conjunction to be most effective.

The two worlds of accounting and artificial intelligence, that once were considered separate, have converged overtime to become integrated. The world that has always been predominantly reliant on the human mind and skill set has completely evolved to become dependent on technology for successful business processes. Public accounting firms are now, more than ever, changing the basic foundation of their best practices. With this comes the change in people that perform these practices to be flexible and technologically comfortable with AI and

automation. At this point in the industry, technology is making accounting better; clients want the best services in the most efficient manner and employees need to be able to work with technology to deliver quality audits. For the best employees to complete these tasks recruiting and hiring teams are working with the technology to improve their processes and standards.

Artificial intelligence is not replacing accountants, only improving processes in order to help accountants deliver quality and perform best practices.

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**EDUCATION**

**The Pennsylvania State University,**

Masters of Accounting Program/ ISM Minor and IB Minor

Schreyer Honors College; Smeal College of Business (Academic Excellence Scholarship)

**IES Abroad Rome**

*Courses: Cultural Heritage: Business and Strategies, Cross-Cultural Psychology, Italian*

**WORK EXPERIENCE**

**PricewaterhouseCoopers**

*Intern (40 hours/week)*

- Developed knowledge of accounting in a Big Four public accounting firm
- Performed audit activities in the Asset and Wealth Management group
- Exemplified increased Excel skills and learning of firm technologies such as Aura
- Earned a Digital Acumen Badge and participated in CPE credit courses

**Greenspring Associates**

*Intern (40 hours/week)*

- Develop knowledge of accounting in a venture capital investment business
- Create entities and investors in company software and records through analyzing 10-K forms
- Exemplify increase excel skills through tracking and recording year to year fund statistics

**Maryland Association of CPAs**

*Intern (8 hours/week)*

- Register events and enter rosters for company events into new logging system
- Develop website organization for both company and customer benefit through account billing
- Prepare over 300 organization pages for members to view and gain further information

**Y Association of Central Maryland**

*Finance/Customer Service Intern (30-35 hours/week)*

- Analyze and post journal entries to the books during month and adjust at months' end
- Merge 24,000 duplicate accounts to simplify data base; providing more organized system
- File financial aid to YMCA members who qualify based on income, familiar status and employment

**Intero Advising**

*Intern (6-12 hours/week)*

- Assisted in the expansion of clients' networking groups of over 2000 people by using LinkedIn
- Work as a satellite intern from school 8 months out of the year
- Coordinated calls and scheduled interviews for lead account managers

**Lion Line,**

*Caller*

- Raised over \$6,000 for The Pennsylvania State University
- Contact thousands of Penn State alumni on behalf of their respective undergraduate college or major
- Trained and certified to communicate and facilitate financial gifts of up to \$1,000 over the phone

**LEADERSHIP AND ACTIVITIES**

**Delta Zeta Sorority, University Park, PA**

*Treasurer*

*November 2016-January 2018*

**PwC Challenge Case Competition, University Park, PA**

*Participant*

*October 2017*

**KPMG Leadership Edge, Philadelphia, PA**

*Attendee*

*November 2017*

**Accounting Society, University Park, PA**

*Member*

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*Mentor*

*February 2016-August 2017*

**SKILLS**

Knowledge in Microsoft Office and Excel, Tableau, SQL, Aura, Altryx