

Audit and AI: Can Artificial Intelligence Restore Public Trust?

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Abstract

Due to the fallout from a series of corporate fraud scandals in the late 2000s, the auditing world has lost much of the public trust that is very important to the profession. Much of the value of an audit opinion is determined by the trust the public places in the auditors behind the opinion. Without trust in the auditors, the audit opinion has very little value. The recent increase in the usage of artificial intelligence (AI) in many industries presents a solution to the problem of auditors. Increased usage of AI in the audit process has the potential to better meet public demand for an audit as well as restore public trust.

Audit and AI: Can Artificial Intelligence Restore Public Trust?

Public opinion of accountants has suffered in recent years. With the recent run of business scandals, starting around the turn of the century, accountants have often received a large portion of the blame for the events that have taken place. Even if they were not directly responsible for the fraud, it is often assumed that they allowed it to happen. A portion of this blame is due to a lack of public understanding of the proper role of an accountant, or more specifically, an auditor. The role of an auditor is heavily dependent on a continued trust in the auditor's professional judgement to give weight to their audit opinions. The decrease in public trust poses a threat to the importance of the auditing profession. However, a rise business process automation could provide a way for auditors to restore public trust. Automation has already been used in other professions, and even in various sectors of business, and has generated positive results for early adopters. Artificial Intelligence ("AI") has been instrumental in streamlining workflow and reducing wasted time. Application of recent developments in AI technology has the possibility to increase public trust in the auditing profession.

History of Accounting

Accounting is not a new profession. Evidence suggests the occupation may be many thousands of years old. The discovery of basic accounting records in Mesopotamian temples can date an early form of accounting to roughly 4000 B.C. (King, Case, & Senecker, 2017). While these undeveloped forms of keeping track of early business transactions may bear some resemblances to the modern system of accounting, the modern double-entry system is still remarkably old. The "Massari Ledgers," found in Genoa, originated in 1340. These records of financial transactions are the first known

example of the double-entry system (King et al., 2017). It would be nearly 100 more years before Luca Pacioli published “Summa” and laid out the guidelines for modern accounting (King et al., 2017).

The suffering reputation of the accounting profession is not new either. As accountants hold a large amount of power over the information revealed in the financial statements, history shows us that the scandals of the early 2000s were not the first time accountants have been unable to resist the urge to misrepresent financial information. In the 17th and 18th centuries, a series of accounting frauds in the Neapolitan public banks taught governments that laws must be backed up by internal controls (Avallone, 2017). Even before this, accountants were learning to exploit the fledgling science in order to disguise smuggling activities in Bristol (Jones, 2001). These historical wrongdoings may have been forgotten by the modern public if not for the recent return of accounting fraud to the public eye. The return has had a serious impact on the public trust in accounting.

Structure of Current Accounting Professions

In recent years, three main segments of the accounting profession have emerged in America as well as many other countries (Reigle, 2008). These three segments – tax, audit, and advisory accounting – all fall under the practice of a certified professional accountant, commonly abbreviated as CPA. A CPA is an accountant that has fulfilled certain educational requirements, passed a series of standardized exams, and participates in a continuing education requirement in order to keep up with current industry trends (Reigle, 2008). Of the jobs offered in public accounting, the “Big Four” accounting firms, Ernst & Young (EY), Deloitte, PricewaterhouseCoopers (PwC), and KPMG, all offer tax, audit, and advisory services. Accountants are not locked into a single career path, and it

is not uncommon for an individual to switch between the specializations during the course of his career. Each type of accounting profession fulfills a specific need in the world of business, and each has been impacted differently by the increase in business scandals.

Driven by the increasingly complex tax code, tax accounting seeks to aid clients, both personal and corporate, in completing their yearly tax returns as well as answering questions that would be above the knowledge of many non-CPA tax preparers. In the advisory branch of accounting, CPAs use their knowledge to give clients counsel on business decisions and strategies for the future. Finally, auditors determine if clients' financial reporting follows generally accepted accounting principles (GAAP) and is materially error free. GAAP is the term used in the U.S. to define the rules that define the reporting of business transactions, while internationally the comparable term is the international financial reporting standards (IFRS). While the two methods are similar in many ways IFRS is seen more as a set of guidelines, meant to lay out the spirit of the law and allow accountants to use their professional judgement to fill in the gaps, while GAAP is meant to provide more concrete rules for accountants (Bratton & Cunningham, 2009).

Tax Accounting

Tax accounting may be the most recognizable sector of the accounting industry. A tax accountant, "prepares tax returns, researches tax questions, and counsels clients on tax problems" (AICPA, 2018). Because of their separation from the auditing profession, tax accountants have suffered little harm to their reputation from the string of scandals in the mid 2000s. The practice of filing income taxes in the United States is just over 100 years old. When the federal government passed the sixteenth amendment in 1913, very

few Americans had the income to make it necessary to pay income taxes (Pickert, 2009). Since then the number of Americans who file taxes has increased exponentially, and while many individual taxes are filed through tax preparation software or companies such as H&R Block, the Bureau of Labor Statistics estimates that 35% of the nation's CPAs are tax specialists (2016). Tax accounting has been undergoing a large amount of public scrutiny after the reveal of widespread usage of unethical "Tax Havens" (Voinea, 2015). The recent series of tax haven scandals has seen accountants from all four of the major accounting firms exploiting tax loopholes, both legally and illegally, to greatly reduce the taxes paid by large clients (Jones, Temouri, & Cobham, 2018). It is yet to be seen how the tax specialization will recover from these scandals.

Advisory Accounting

Advisory accounting is the least known of the public accounting career paths, as it is often overshadowed by the tax and audit professions. In recent years, it has seen the most growth of the group though. Industry wide growth has averaged 5.7% yearly growth since 2012, beating out the general accounting industry's growth of 1.8% by a wide margin (NCACPA, 2017). KPMG alone has witnessed massive growth when last year, "advisory services leaped by 11.5%" (Wix, 2016). KGMP describes the advisory accounting services they offer by describing the challenges of keeping reporting practices current and saying, "Numerous companies are also seeking to improve their processes to achieve timely and accurate financial reporting" (2018). Advisory accountants leverage their education and experience as CPAs to provide clients with current market information and strategies to help them capitalize on opportunities and avoid risks (AICPA, 2018). The addition of these services as a separate practice in many firms helps

preserve the independence of the auditors and keep them separate from the advisory accountants. The addition of management advisory services to many CPA firms shows that the profession is still growing.

Auditing

Auditing is the specialization of accounting that is most applicable to the need for increased AI usage. This is due mostly to the fact that tax and advisory accounting have already begun to take large steps towards automating sections of their processes. The auditing practice is not a new one; in fact it has been used for thousands of years, but it was only formalized in the last century (Byrnes, Al-Awadhi, Gullvist, Brown-Libur, Teeter, Warren, & Vasarhelyi, 2012). Independent accountants conducted audits in the late 19th century. The growing railroad had created an environment that had bred a fair amount of fraud, and there was a general feeling that businesses should be held accountable for their actions: “Prior to the Civil War, the railroad industry employed more accountants and auditors than the federal government and all state governments combined” (Flesher, Previts, & Samson, 2005, p. 36). This large pool of accountants would later be instrumental to the formation of modern accounting in America after the Civil War (Flesher et al., 2005). The uniform CPA exam was decided on in 1917 and served as a test of an accountants’ knowledge before they were awarded the CPA designation (King, 2017).

The major driver in the adoption of auditing as a vital part of the modern business process was the stock market crash of 1929. By the time the Securities and Exchange Act of 1934 was passed, the frameworks for auditing were already in place: “The AICPA issued Statement on Auditing Procedure (SAP) No. 1 in October 1939 and it required that

auditors inspect inventories and confirm receivables” (Byrnes et al., 2012). Another result of SAP No. 1 was that auditors were now responsible for confirming that reports given from management were accurate (Byrnes et al. 2012). For years, accountants worked to build a reputation as a trustworthy and honest trade in order to solidify their position as dependable safeguards against fraud. It would not take long for the years of work to be undone, however, as the outbreak of corporate scandals in the 2000s quickly undermined the reputation of auditors. A statement for the AICPA issued shortly after the scandals first became public states, “Audits serve as the bedrock of the U.S. economy” while also admitting, “this is a difficult time for all of us involved with the financial reporting process” (Castellano, 2002). It is important that auditors do not lose sight of their previous reputation in striving to restore public trust in the profession.

Background on the Decrease in Public Trust

The modern decrease in public opinion of audits can be traced back to two events. In many respects, the first event is very much a part of why the second occurred. Ever since the corporate scandals of the early 2000s, there has been a general distrust in large businesses. American distrust of large businesses is not a new phenomenon, and evidence of their attitudes can be found well before the financial crisis of the early 2000s (Fulkerson, 1995). These feelings were further exacerbated by the willful deception of many corporations, making many feel justified in their assumptions (Kurlantzick, 2002). The failure of auditors to catch major flaws in large corporations’ financial statements, either because they had not maintained appropriate professional distance or simply did not do proper due diligence, resulted in a portion of the blame for the fraud being placed on them (Jost, 2002). The fallout took a heavy toll on many major accounting firms and

is still felt today. Even recently, allegations of fraud against Japanese companies have resulted in many auditors receiving a portion of the blame and had a significant impact on the public perception of auditors in Japan (Skinner & Srinivasan, 2012). This situation has done a lot to affect the public's trust of an auditor's opinion.

Public Opinion of Business

Public opinion of business has been affected heavily by scandals of the early 2000s and the subsequent realization of the depth of the corruption present in many of the larger corporations. According to Gallup polls, only 28% of Americans felt that there was too much big business in 2002. By 2011, that number had rocketed up to 50%. In the same year 67% of people said that both major corporations as well as banks and financial institutions held too much power (Gallup, 2018). Before the scandals began to break, America was witnessing the rise of business, and with it, a generation accustomed to prosperity with nothing but economic growth in the future. The culture was one of unchained optimism, as to many Americans, the 1990s were the best decade (Andersen, 2015). When everything began to fall apart in the early 2000s, many people blamed big business as the scandals of 2002 shattered some of the positive perceptions of business that had begun to take root throughout the increasing prosperity of the nineties.

Public Opinion of Accountants

In the late 1900s, public perception of the major accounting firms was at an all time high (Thompson & Jones, 1990). The firms were often considered to be unstoppable titans of industry, each well beyond the point of individually failing. Going into the 1980s and 1990s, the accounting profession was seeing its public opinion rise steadily. A survey conducted in 1986 polled a range of people on a variety of topics

about accountants, which included questions about their perception of accountants' integrity (Fowler, 1995). The results showed that in every area, people considered accountants to be one of the most trustworthy professions (Fowler, 1995). It would take less than two decades for the public opinion to be completely reversed. With the fall of Enron, and by extension Arthur Andersen, much of the blame quickly fell on auditors. The Sarbanes-Oxley Act, often abbreviated SOX, was a piece of legislation passed in Congress as an attempt to hold management responsible for their actions and ensure that the financial reporting continued to show the true nature of a company's financial standing. A portion of the legislation created the Public Company Accounting Oversight Board (PCAOB) which became the regulatory body for the profession (Willits & Nichols, 2014). While its long-term effects are still in debate, it did little to help opinions of auditors when it was first passed. Many accountants initially felt that the new regulations stifled their independence, and disliked increased government involvement (Jost, 2002).

While accounting has remained relatively free of scandals in the years following the fall of Enron and the passage of SOX, it has remained largely unnoticed, and the perception of the profession remains relatively unchanged. In 2012, the Association of Chartered Certified Accountants said that the, "Accounting profession must 'educate the public and its stakeholders of its value and take steps to rebuild trust in the industry' or risk losing credibility" (Fortune, 2012). The same article lists a survey, which found that only 55% of the population shows some level of trust in accountants and 62% said they believe that accountants work for the good of the company. The findings illustrate the disconnect between the role of the auditors from the perspective of accountants, and the

role of auditors from the perspective of the general public. The distrust of accountants has led too much of the blame for the recent scandals in business being blamed on them.

The increase in the negative perception of accountants has done a lot to result in the blame placed on accountants. In 2004, a declining number of accounting students caused concern to many in the industry (Hunt, Falgiani, & Intrieri, 2004). There is a general feeling that accountants should be doing more to prevent fraud, and this creates the negative attitude towards auditors when fraud is discovered after a company has been audited (Barber, 2014). After the optimistic 1990s, the sudden reality of the depth of the corruption present in much of corporate America had many looking for a scapegoat, and auditors were the target (Baurmash, 2002). As the modern profession of accounting has always struggled to be viewed positively and the apparent disregard present in much of the upper levels of accounting firms became clear, the public became quick to lay a deserved portion of the blame on the firms. However, the association between corporate scandals and accounting has been tough to shake and despite the efforts of accountants to redeem the profession in the eyes of the public they have continued to receive blame both warranted and unwarranted.

Background on Automation

Automation is a trend that has been moving through business for as long as it has been an option for businesses. It has not been contained by business though; practically no aspect of society is safe from the rise of technology. The concept of automation is one in which various parts of the business process are done by a machine or computer instead of an individual (Lee and Shi, 2006). This is a not a new idea, but the rise of the computer has rapidly increased the rate at which numerous jobs are being automated.

Many industries have experienced massive shifts due to the rise of automation and artificial intelligence. Marina Krakovsky voices the opinion of many by saying, “Autonomous vehicles are all but certain to replace truckers and taxi drivers in the coming decades, and robots have already taken over many jobs in factories and warehouses,” (2018, p. 21). Many of the labor-centric industries have embraced the rise of artificial intelligence as a way to move away from using people, who could become injured, fall ill, or miss work for any variety of reasons and miss work, thus impacting overall productivity. Even when employees are working, their pace often cannot keep up with machines that are able to complete their jobs at much faster paces. Like many other skill-based professions, accounting has long avoided the bulk of automation, but recent technological advances are finally catching up to the profession. Parts of the profession that rely on professional judgement have not seen encroachment from automation, but other parts are rapidly being replaced. The introduction of software that automatically transfers relevant financial data into tax forms has changed the responsibilities of many entry-level tax accountants (Girsch-Bock, 2017). While many welcome these changes there has always been a resistance to the ways in which technology can change the way we work.

Historical Resistance to Automation

An attitude of fear towards the impending automation of work is, like automation itself, not a new concept. Technology is only one of the ways that automation can take the role of a person, as machines have been reducing the number of people needed for a job since the creation of the wheel. Fear of technology can be traced back the Luddites, a 19th century group who held such an extreme fear that humans would be made

expendable by machinery that they took to assaulting factories and lighting the mechanisms on fire (Autor, 2015). The root of their concern was that the rise of machine fueled labor would lead to joblessness: “Machine-breakers were not, as is generally believed, necessarily against the introduction of new machinery; rather, they fought against the consequences of the implementation of that machinery” (Clancy, 2017, p. 395) Society today may not smash machines as an act of fear and defiance towards technological advances, but there is an overall doom and gloom attitude towards the rise towards new technologies: “Rarely does a day go by without more news predicting the end of work” (Krakovsky, 2018, p. 21). These concerns have not gone unanswered though. James Bessen noted that while specific examples often show jobs being replaced, “computers have not been replacing workers; instead, workers using computers are substituting for other workers” (2015). He finishes his study by stating, “Computers create about as many new jobs as are eliminated by this substitution” (Bessen, 2015). The general fear that automation may replace people working in jobs distracts workers from preparing for industry changes brought on by technology.

The shift towards automation does not only affect unskilled labor. As much as possible, many jobs that were previously considered skilled are now facing major changes in the face of rising technology: “Even professional services no longer seem safe from the encroachment of increasingly sophisticated artificial intelligence (AI)” (Krakovsky, 2018, p. 21). Numerous careers are now being automated. As early as 2002, researchers were noting the shift in legal research from a primarily paper-based practice to a computerized word search. Allan Hanson noted that, “legal research is

undergoing a shift from a print-based paradigm to a computer-based one” (2002, p. 564). He noted that the change in research methods has already changed law by placing, “more emphasis on facts and less on legal principles” (Hanson, 2002). The early AI in law document databases was able to find relevant sources much more quickly and provide lawyers with current and topical information in such a way that it had a marked impact on the industry.

Law is not the only industry to undergo such shifts. Finance has begun to lean more and more on software capable of eliminating menial tasks. As noted in Strategic Finance, “Manual processes have no place in the future of finance” (Parcells, 2016). Parcells argued that the mundane data entry processes of bookkeeping and accounting should be automated to allow accountants to focus on higher level tasks. Artificial intelligence is capable of doing more for business than simply eliminating tasks that professionals would rather not do: “Websites like Wealthfront and Betterment, which algorithmically optimize investment portfolios, are giving financial advisors a run for their money” (Krakovsky, 2018, p. 21). These financial tools are capable of monitoring the market movements and trends at a much more comprehensive level and much quicker than humanly possible.

Finance is not the only industry that has seen positive results by including AI into their workflow. Hospitals have been putting automation and artificial intelligence to the test as well. One hospital put it to use in an early detection system for *Clostridium difficile*, an infection commonly transmitted in hospitals. The automated testing allowed for a 970% increase in testing and earlier results, leading to earlier detection in infected patients (Goss-Bortoff, Garcia, and Steger, 2016). Once again the AI system was able to

search for, and discover certain indicators in a way that many people could not, while also freeing valuable hospital staff to focus on other tasks. The changes in how automation is used in many workplaces has had a profound impact on many industries.

Background on Artificial Intelligence

Artificial intelligence is a newer offshoot of automation that is focused on giving machines the ability to act like humans. It could be defined as the, “Activity devoted to making machines intelligent, and intelligence is that quality that enables an entity to function appropriately and with foresight in its environment” but, “there is no clear definition of AI (it is not any one thing)” (Etzioni & Etzioni, 2017, p. 32). Of all of the recent technologies to emerge from the great technology boom of the 2000s, very few have inspired the cycles of fear and anticipation as artificial intelligence.

Historically, dreams of artificial intelligence replacing human jobs goes back farther than many people imagine: “Ever since Homer wrote of mechanical ‘tripods’ waiting on the gods at dinner, imagined mechanical assistants have been a part of our culture” (Buchanan, 2005). Since then, everyone from philosophers to fiction writers have thought of ways in which computerized minds may reach levels of sentience to which they might appear indistinct from humans. The truth is much less flashy. Due to the rise of chess playing machines in the 18th and 19th centuries, the sport has often been used as a measuring stick of the computer’s ability to interact with humans, a barrier it passed in 1997 when a program known as Deep Blue beat chess master Gary Kasparov (Buchanan, 2005). Since then, innovations have allowed AI to reach into various aspects of culture and capture the imaginations of many people. Kenneth Forbus tracked the areas where AI was advancing and found that AI is heavily focused on making

advancements in natural interaction and knowledge management and data mining (2010). Both of these advancements have allowed for greater functionality in the business sector, and have the potential to increase the usefulness of AI in the future.

Modern Integration of Artificial Intelligence

As AI has become integrated with business process, public perception of AI become more important for businesses. In order for automation to become a normal part of today's working environment, a large part of society must become comfortable with it. Researchers have found that explanations and assurances made from authority figures play an important role in public acceptance of AI (Korber, Baseler, & Bengler, 2017). It is important for consumers to understand how the automated processes function if they are going to be willing to place a certain amount of trust in the processes. Researchers Hoff and Bashir say, "human-automation trust depends on the performance, process, or purpose of an automated system" and that the human-automation trust, "varies depending on how well an automated system executes a task" (2015, p. 411). It is of paramount importance that any automated processes that are introduced are well understood by those implementing them, as well as proven to be effective. While older generations are more skeptical of machines and technology that they do not understand, "newer generations of humans have co-evolved to be more comfortable trusting machines to make or support decisions" (Dhar and Stein, 2017, p. 32). This tendency towards increasing trust in automated processes and artificial intelligence shows a strong potential for automated growth. This growing trust is evident in many areas of society. A study reported on in *USA Today* reports growing numbers of Americans would feel safe letting a car drive for them (Woodyard, 2018). While the article reports that 63% of Americans are still fearful

of self driving vehicles, “a year ago, the figure was 78%” (Woodyard, 2018). In addition, a study conducted in 2017 showed that people were much more willing to trust in an AI run car if they were assured of its safety beforehand (Korber et al., 2017). This growing trust in automation has caused more and more businesses to move towards automation as a way to ease the amount of menial work done by people.

Background on Professional Judgement

The general concern with public trust may seem unwarranted. Accountants are not the only profession to experience a decline in public perception. The law practice experienced a sharp downturn in public opinion in the mid 1990s and continues to thrive despite the poor perception (Galanter, 1994). While the law profession has survived without public opinion, a portion of accountants’ jobs require a continued trust in the accounting profession. In order to grasp the importance that automation may have to restore public trust in accounting, it is vital to understand the concept of professional judgement in the accounting profession. According to the auditing and assurance board of Australia, Professional judgment refers to decisions that accountants make that are not otherwise clearly spelled out in the current accounting standards (AUASB, 2009). Professional judgment is when accountants objectively apply their education and training to a situation to determine the best way to account for a particular problem. Even though GAAP attempts to provide definitive rules for the situations that accountants may deal with, there are still times when grey areas will be encountered. While professional judgment is applicable to all areas of accounting, it is most commonly used in the field of auditing, as there is more opportunity for the use of professional judgment there than in the tax field. The objectivity portion of the definition has been most compromised in the

past. Another key principle for accountants is to remain independent in appearance and practice, meaning that the accountant must be objective in their work and also must avoid appearing to show preference to a client (Lindberg & Beck, 2004). After the Enron scandal the breach of auditor independence caused many to be distrustful of the profession (Reiter & Williams, 2004). When the objectivity of the professional judgment of accountants was compromised, then it was easy for many companies to get away with fraudulent behavior that would otherwise have been a violation of major accounting principles. This is the reason that it is suspected that the public's main area of distrust in accountants is in their inability to remain impartial and exercise objective professional judgment.

Argument for the Benefit of Automation

In order to keep up with their ever-growing responsibilities, the audit profession must change (Doty, 2012). Automation may, in fact, be the best way to restore confidence in the profession. To determine this would require the determination of the source of the public's distrust in accounting. More specifically, a determination of whether or not automation would aid in the restoration of trust in the accounting profession would mean finding out if the mistrust of accountants comes their actions or the overruling standards. For instance, a decrease in public trust associated to a belief that accountants are misusing their professional judgment may be reversed by moving more accounting procedures to an automated process. On the other hand, if the general public consensus is that the standards that govern accounting are instead responsible for the lack of public trust, then automating the process may only serve to compound the problem.

The introduction of increased usage of artificial intelligence as a business process automation technique has the potential for to greatly increase public trust in accounting for three main reasons. The first is that AI can process large amounts of information with greater accuracy than humans, lessening the chance of error (Bernard, 2017). Humans have limits on the amount of information that they can sift through on a daily basis, and over the course of a modern audit, choices have to be made as to what information is studied for faults. Artificial intelligence implementation has had massive impacts in other industries by allowing for increases in workload. The second reason why artificial intelligence would be a welcome addition to the audit profession is that it would make the detection of fraud easier. Currently, due to the nature of auditor capabilities and the growing size of many companies, providing reasonable assurances against fraud is difficult (Love, 2012). Finally, audit would benefit from the increased usage of AI by allowing auditors to better fulfill the expectations currently placed on an audit opinion. The current business environment has increasingly placed the weight of fraud detection on the shoulders of the auditors and this expectation shows little chance of shifting, despite the original intentions of an audit. The recommendation for AI usage in an audit should come with a serious warning. It is that in spite of the increasing ability of AI to complement human work, it should not be used as an excuse for increased negligence or laziness on the part of the accountants. The role of the auditor may look different in a decade, but diligence and due care must continue to be exercised for the sake of the profession.

Ability to Increase the Amount of Data Dealt With

AI has shown itself to be a helpful aid to human labor, and one that removes large amounts of busy work so that professionals can focus on more detail-oriented tasks (Marshall, 2011). Eliminating these tasks can result in much greater productivity, as well as allowing accountants to spend more time on high level tasks: “Manual processes have no place in the future of finance. These tedious tasks take up too much time and lead to an uneven workload, long hours, and escalating frustration” (Parcells, 2016). As automation has arrived in other industries, new levels of efficiency are becoming expected in order to keep pace with other industries. Auditing is no exception to this mandate. As the pressures of increased efficiency have impacted other parts of the accounting industry, other parts of the accounting industry have worked to adopt AI into their business processes. Tax accounting has found that AI is very useful in eliminating extra processes from work. Software such as CCH ProSystem fx Tax by Wolters Kluwer has the capability to convert scanned documents into PDF programs, find the right information in the documents, and prefill a client’s tax returns (Girsch-Bock, 2017). This software, and others like it, are revolutionizing the tax industry by requiring less busy work in the preparation of tax returns, and instead allowing accountants to focus on higher level work, thus greatly increasing the productivity of accounting firms.

AI has not increased productivity only in the finance industry, but instead is making an impact in a wide variety of industries due to the broad number of applications. The law profession, another late adopter of new technologies, has seen vast improvements in data gathering through the usage of AI aided programs: “Technology-assisted review (TAR, or predictive coding) is faster, better and cheaper -- and much

more consistent than human-powered review” (Mills, 2016). These programs have once again reduced the need for junior employees to focus the entirety of their schedule on menial tasks and allows them to focus on other tasks (Mills, 2016). Artificial intelligence has the potential to greatly increase the amount of work auditors are able to accomplish by applying these same technological principals to the audit process. Auditors would be able to spend less time on document review, serving only as a supervisor to the preliminary review done by the computer. This would allow for a greater focus on the application of professional judgement to individual situations.

Ability to Increase Chances of Fraud Detection

The integration of AI would have the added benefit of allowing for an increased chance of fraud detection. Currently, auditors must allocate their time and resources to best avoid missing vital information. The chance that an auditor may miss vital information is known as detection risk (Florea & Florea, 2012). Auditors must balance the time that they have with the cost of the audit, while attempting to lower detection risk (Florea & Florea, 2012). More importantly, many current auditors do not have personal experience with intentionally perpetuated fraud, as fraud training is much more common in forensic accountants, who are often not contacted until the fraud has been detected (Mock, Srivastava, and Wright, 2017). An AI analysis program would have an advantage in this area as it could view all the information from a more comprehensive perspective. EY has already begun the process of integrating AI into their audit workflow, which has allowed auditors to begin the audit process by applying professional judgment and dramatically decreasing the up-front work, as well as increasing the chances of detecting misstatements or fraud (Persico & Sidhu, 2017).

Detecting evidence of fraud over the course of an audit could be compared to finding a needle in a haystack. Fortunately, AI has been used to complete remarkably similar tasks. The process of tracking small boats on radar is extremely important to port authorities for a variety of reasons, but it is extremely difficult in large ports due to large quantity of boats in a small space. By implementing AI into the detection system, it was found that AI was able to increase real-time detection (Del-Rey-Maestre, Mata-Moya, Jarabo-Amores, Gomes-Del-Hoyo, & Barcena-Humanes, 2018). In the test, the AI program was able to track the individual boats with much higher accuracy than a person could. Recommendation engines, like the kind used by online retailers to find similar products, are being applied to business to aid with decision making (Investor's Business, 2014). These recommendation engines will "enable choices, accelerate decision making, and ultimately provide filters that deliver situational awareness" (Wang, 2016).

A similar problem was encountered in the medical field. When x-rays were done to diagnose a condition, a single doctor did not often have all the knowledge to diagnose the full variety of conditions that may be present. A cardiologist may have the right knowledge to give a clean bill of health for heart conditions but might otherwise miss an abnormality in the lungs. Dr. Adam Zoga says, "AI might alert a urologist looking for a ureteral stone to the possibility of a lung nodule" (Chen, Zoga, & Vacarro, 2017, p. 87). This principal could apply to auditing to allow for greater detection and to avoid having accountants miss evidence of fraud that would otherwise slip by undetected. Just as all doctors do not have the knowledge to catch every possible symptom, every accountant may not have all of the knowledge necessary to identify all types of deception. Deloitte uses this technology to scan contracts, each with individual distinctions that make

individual analysis difficult, and generate a risk analysis based on the information it discovers (Ovaska-Few, 2017).

Ability to Allow Accountants to Meet Modern Expectations

Finally, the usage of AI may aid accountants in meeting the ever-growing expectations placed on them by society. The initial purpose of a financial audit was to ensure that businesses were being forthright in their financial information, mostly as a side effect of early railroad industry corruption (Flesher et al., 2005). However, as time has gone on, corporate fraud has become more and more complex, and its perpetrators have found more careful ways to conceal it, which has caused more of the public to become more concerned with it. Ever since the scandals of the late 2000s, the misconception has grown that accountants should be responsible for the prevention of fraud (Stirbu, 2010). While organizations such as the AICPA have tried to shake this belief, there is acceptance that the role of audit may be changing. An AICPA whitepaper from 2012 demonstrates this, saying, “the future audit that relies upon the leveraging of technologies and processes has the capability to expand analyses of a firm’s operating activities and thus provide improved audit quality” (Byrnes et al., 2012). The public definition of an audit opinion is changing and this accountants can get ahead of this demand by bringing on AI to aid with the increased workload necessary to provide a greater assurance against fraud. More and more, the public is reembracing the policeman theory of audit, which was popular in the early 20th century (Ittonen, 2010): “The policeman theory claims that the auditor is responsible for searching, discovering and preventing fraud” (Ittonen, 2010). Arguments have been made for some of the benefits of adding AI to the audit workflow, but public expectations may very well present the

reason that it is necessary for accountants to focus on incorporating more AI into their work. Accountants should focus on rising to meet the public demand in order to ensure that their services match what is required by the market.

Caution Against an Overreliance on Technology

In spite of all of the worthy reasons to incorporate more AI into the audit process, one important point of caution remains. Technology can be a vital part of industry growth but the accounting profession must avoid over-relying on technology to aid their workflow and reduce their workload and retain what separates an audit from a routine check of an accounting methodology that could be done entirely by a computer. Professional judgement distinguishes an audit from any other kind of observation. Business may be a science, but it is far from an exact one and eventually situations will arise that demand careful examination to determine whether the actions taken by business are ethical or subscribe to current accounting standards. This brings us to AI's major drawback. Any sort of AI is a program, and like any program AI cannot react to something that is outside of what it is programmed to account for (Marshall, 2011). Certain situations will undoubtedly fall outside of the realm of what a program can be reasonable programmed to expect and thus require an accountant to exercise his or her professional judgement. There are also concerns that eventually people might be able to recognize how the AI sorts through data and use that knowledge to hide fraud (Murphy, 2017). Because of this it is especially important that accountants are well prepared to work alongside the Artificial intelligence instead of allowing it to take over their jobs.

Conclusion

By applying modern AI technologies to the audit process, auditors should be able to deliver reliable work while maximizing their skillset. Accountants must be prepared for changes in the practice if they are to be ready for the integration of new technology into the audit profession. As James Bessen says, “the technological challenge facing today’s workforce is not unemployment but a difficulty learning the skills needed to use new technology” (2015). In this case, the issue for accountants is not that they will become irrelevant, but that they will be forced out of their jobs by technology. The paramount importance of professional judgement should prevent such an action from taking place, as it would cause much more damage to the financial system than the proper integration of new technology with sound accounting principles and well trained CPAs. There will always be areas where accountants are required to give a professional opinion and as such, there should always be qualified and honest accountants to make professional judgments.

The integration of AI into the audit process provides accountants with three main benefits. It will allow them to greatly increase their workload to ensure that more of a company’s processes and financial data can be examined to provide the best possible results. It will also allow for a more comprehensive overview of the increased information that they are now responsible for examining, resulting in greater accuracy and an increased chance of fraud detection. Finally, and perhaps most importantly, it will allow for accountants to begin to meet the new expectations placed on them by the general public. The responsibility was originally seen as a by product of the auditors job, when accounting principles were newer and fraud was easier to detect in the highly

corrupt railroad industry (Flesher, Previts, & Samson, 2017). Over time, this responsibility has lessened but increased corporate fraud and rapid advances in technology have made this a realistic goal for accountants. Automating parts of the process also removes the possibility for accountants to tamper with the results of an audit, lessening the chances for dishonest accountants to disrupt the audit process and reflect poorly on the practice. It will also require fewer accountants to complete the task allowing firms to be more selective in their hiring process and only bring on accountants that they feel will properly be able to act independently and honestly.

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