

5-2018

## Technology Advancement Influence in Accounting and Information System Fields

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### Citation

Gordon, S. (2018). Technology Advancement Influence in Accounting and Information System Fields. *Accounting Undergraduate Honors Theses* Retrieved from <https://scholarworks.uark.edu/acctuht/31>

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**Technology Advancement Influence in Accounting and Information System Fields**

**By**

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**An Honors Thesis in partial fulfillment of the requirements for the degree Bachelor of Science in Business Administration in Accounting, Finance and Information System.**

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**May 11, 2018**

## **Introduction**

This research serves to relate the accounting and information technology fields. The information in the research documents changes in the fields, future expectations in the fields, the relationship between the fields, ideal accounting candidates, expectation gap between graduates and employers, careers in accounting, careers in information systems, and similar and different basic skills of each field.

## **Changes in the Accounting Field**

Over the years the field of accounting has changed, specifically the way people keep track of assets. The changes in accounting are influenced by the improvements in technology as time progress. According to Top Accounting Degrees, there are twelve technology advancements that influenced the changes in accounting. These advancements include; money, abacus, slide rule, electricity, Cathode ray tube, adding machines, comptometer, hand-held calculator, computer, data storage, microchip and software (TopAccountingDegrees.com, 2013). [4]

One of the most familiar of the advancements is computer. Computers were originally created to solve complex mathematical equations using algorithms (Tom Komer, 2002). [7] The US government needed a faster way to calculate the US Census because at the time due to rapid growth of the population it took seven years to complete the total calculations (Kim Ann Zimmermann, 2017). [8] Even though computers were originally created to solve mathematical problems, today they are widely used in research, design, gaming and doing business just to mention a few uses (Tech-FAQ.com, n.d.). [9] Today computers are widely used in accounting to process information. Computers process information faster and more accurately than an accountant (TopAccountingDegrees.com, 2013).

Data storage is another technological advancement that influences the accounting fields. Before technology, information was stored on clay tablets, then paper, but now data and information is stored on memory devices such as flash drives and floppy discs. This makes transferring data easier and efficient (TopAccountingDegrees.com, 2013).

Once computers became the norm in the workplace, software programs were created to eliminate menial tasks. This made the work of accountants more efficient and also increased the accuracy of the calculations by using spreadsheets. Software creations are also helping individuals manage their own finances just as an accountant would do (TopAccountingDegrees.com, 2013). As technology continue to advance, it will continue to affect the accounting community (Walt Mahan, 2012). [10]

## **Future Expectations**

The Bureau of Labor Statistics expects employment in the accounting field to grow ten percent from 2016 to 2026 due to the continuous growth in the economy, and the complex tax and regulatory environment (Bureau of Labor Statistics, 2018). [5] They also suggest the employment growth of accountants is closely tied to the health of the economy. The Bureau of Labor Statistics supports its claim by saying, "As the economy grows, these workers will continue to be needed to prepare and examine financial records" (Bureau of Labor Statistics, 2018). There will be a greater need for public accountants to handle legal documentation as more companies go public. Globalization may lead to more demand for accounting services related to international trade, mergers and acquisition (Bureau of Labor Statistics, 2018).

Technology is one of the major influences in the changes in the accounting field. It is expected by the Bureau that technology change will continue to affect the role of accountants in the future. Changes such as some routine accounting tasks may become automated as cloud computing becomes more widespread. This allows for efficiency in the job, and is not expected to reduce the overall demand for accountants. The Bureau of Labor Statistics states, “Instead, with the automation of routine tasks, such as data entry, the advisory and analytical duties of accountants will become more prominent” (Bureau of Labor Statistics, 2018).

### Changes in the Information Systems Field

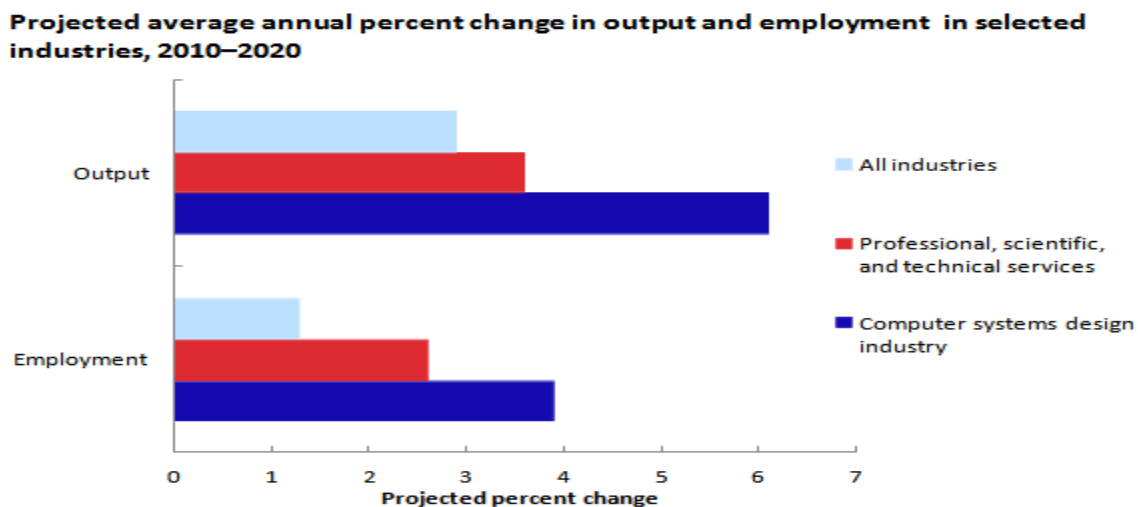
Information technology makes integration and communication possible anywhere in the world between businesses. Information technology systems have created a lot of job opportunities because a large workforce is needed to create new software, maintain networks, and secure information. Cell phone advancements have led to a new development; the mobile application industry. This creates jobs for programmers and other IT fields.

The Information Technology business sector, unlike other industries, was not significantly affected by the 2007 to 2009 recession. The Bureau of Labor Statistics documented that, “The industry lost about 1 percent of its employment in 2009 but regained momentum in 2010, when it surpassed the employment numbers from 2008. The high demand for the services provided by this industry has created a large number of fast-growing and high-paying IT jobs” (Lauren Csorny, 2013). [3]

### Future Expectations

The Bureau of Labor Statistics projects that the employment in the Information Systems sector will continue to grow rapidly over the next decade, outpacing similar industries. The output in the industry is expected to grow an average of 6.1 percent per year, from 2010 to 2020, while employment is projected to grow 3.9 percent per year as shown in the Chart 3 below.

**Chart 3**



Source: U.S. Bureau of Labor Statistics, Employment Projections Program.

The projected growth in the industry is influenced by the increase use in information technology among firms and individual consumers. Cloud computing is expected to contribute to industry growth as many organizations have already implemented its use and studies show growth

expectations in the coming years. The Bureau of Labor Statistics says, “Cloud computing is a way to replace computer products with services, such as storage space or software, delivered over the Internet” (Lauren Csorny, 2013). On the flip side, cloud computing may lead to a decline in jobs for onsite IT services due to it performing these jobs. There might be a decline in job opportunities in the other related industries, because fewer employees are needed for system maintenance and support.

With the increased use of technology, there is expected to be a continuous increase of cyberattacks. Because of cyberattacks, the demand for security services such as antivirus programs, improved firewalls, and other intrusion detection systems will increase. Businesses want to protect their data and intellectual property, this is a major factor in the employment growth in information systems design and related services (Lauren Csorny, 2013).

### **Relationship between Accounting and Information Systems**

Accounting and Information Systems are two different fields but combined they create a system of collecting, storing, managing, processing, retrieving and reporting financial data effectively. Some of the users of Accounting Information System (AIS) are accountants, managers and business analysts (AccountingEdu.org, n.d.). [11] There are six parts in a typical AIS; people, procedures and instructions, data, software, information technology infrastructure (ITF), and internal controls. People are the users of the system, procedures and instructions deal with how data is collected, stored, retrieved, and processed, while data includes all the information that goes into the system. The software consist of the computer programs used in processing data, ITF consist of the hardware used to operate the AIS and internal controls are the security measures used to protect the data (AccountingEdu.org, n.d.).

The AccountingEdu.org says, “Because an AIS stores and provides such valuable business information, reliability is vitally important” (AccountingEdu.org, n.d.). The American Institute of Certified Public Accountants (AICPA) and the Canadian Institute of Chartered Accountants (CICA) identified five important principles of the AIS’s reliability; 1) Security – access to system and data should be controlled and limited to authorized users, 2) Confidentiality – the protection of sensitive information and unauthorized disclosure of such information, 3) Privacy – ensuring the client’s personal information is collected, used and disclosed in an appropriate manner, 4) Processing Integrity – ensuring data is processed accurately, completely and timely with proper authorization, and 5) Availability – the system should be available to meet operational and contractual obligations (AccountingEdu.org, n.d.).

The automation of some accounting jobs could increase efficiency in the work place, which influences the productivity of the employees (Marlene Anderson, 2016). [12] Some of the jobs in the accounting field that can be automated are; document collaboration, social media presence, and data entry. Document collaboration can be automated through cloud. This allows the sharing of information between company and clients, and also among employees. Instead of always printing information out and sending paper files around, using Cloud gives the viewer access to the information anywhere they are and allows for digital signature signing. Not only can document collaboration be automated, the company’s social media presence can be automated as well. Instead of taking time daily to write posts, the PR Representative can write all the posts at the beginning of the week and assign days and times when they should be posted during the week (Marlene Anderson, 2016).

Entering data into the system can be time consuming. It also allows room for errors. Another job that can be automated is the data entry into the system. A capture system can be used by simply scanning the document using an optical character capturing device and the software will convert the document into the system. To verify the accuracy of the information captured, view the information entered into the system by comparing it with the copy of the document scanned on the side of the screen. With so many task being automated, the workplace will change. Anderson says, "Employees will have more time to focus on the small details and have room to innovate the inner workings of [the] firm" (Marlene Anderson, 2016).

Cloud Computing Technology is another way that the work environment is changing. According to NASDAQ, "Cloud computing has already become in everyday society. Yet, there is still so much more room to grow. The industry is changing faster than ever" (NASDAQ, 2018). [13] As technology companies continue to establish themselves the demand for cloud computing will continue to rise. Since January 2012 internet users have grown over 82 percent, about 1.7 billion people. If the volume of people including companies using the internet continue to rise, the demand for cloud computing will rise. Cloud computing makes sharing data and information easy and also allows the information to be accessible from other locations. Cloud computing impacts the productivity of teamwork. The data is accessible all day, every day and anywhere. The changes made to documents can be live, which makes the workflow become seamless (NASDAQ, 2018).

Even though cloud computing is currently in demand, it will soon have to compete with block chain. This is where data centers and companies allow users to rent computing power from hardware they are not currently using which can generate new revenue streams. They only use the power they need for the amount of time they need it. Akash, a block chain company and others are trying to leverage the business to turn the cloud business into an open market. This is because price is dependent upon supply and demand for the availability of computing power (NASDAQ, 2018).

As internet usage continue to increase so has the number cyberattacks (Rainie, Anderson, & Connolly, 2014). [14] According to FEI, "Recent events have made it apparent that the danger of a cyber-attack as well as the scope of potential damage has grown significantly as the role of technology has expanded in the business landscape" (FEI, n.d.). [16] Organizations globally are not adequately prepared for cyberattacks. Cyberattacks if not deflected can be pricey. If defenders of cyber security are not ready and ahead of the cyber attackers this could slow down digitization if attacks continue (Brian Taylor, 2014). [15] The industry has a lot of work to do to fight cyberattacks.

As technology continues to improve and the economy continues to grow, modification will be made to the systems to accommodate growth and expansion. Accounting Information Systems are customized to fit the needs of the firm using it, which increase the firm's competitive advantage with its competitors (Salehi, Rostami, & Mogadam, 2010). [6]

### **Ideal Candidates**

When recruiting new hires, hiring managers do not just look at qualifications such as education and certifications; they also look at the soft skills the candidates would bring to the team (Robert Half, 2017). [17] Candidates should have a vast business knowledge as the scope of accounting jobs are expanding, especially with the new technology advancements. By having a vast business

knowledge they will be able to work on cross-departmental collaboration, and successfully help develop strategies within the organization. In a research conducted by the Hart Research Associates in 2015, 60 percent of the employers believe that candidates should have both field specific knowledge and skills and a broad range of skills and knowledge that apply to a variety of fields (Hart Research Associates, 2015). Roberts Half states, “[Candidates] should be able to see the big picture and understand how their job impacts the company as a whole” (Robert Half, 2017).

Candidates need to display leadership skills to aid in the continuance of the job field; meaning having the characteristics to move into senior roles in the future. They must also adapt to change and different environments easily while embracing change, continuous learning, and personal development. The Hart Research Associates says, “Employers generally value graduates’ completion of various applied and project-based learning experiences, indicating that their company would be more likely to consider hiring a recent college graduate if the individual had engaged in these types of experiences” (Hart Research Associates, 2015). This would give students the opportunity to apply what they are learning to a real world situation which can help develop their thought process.

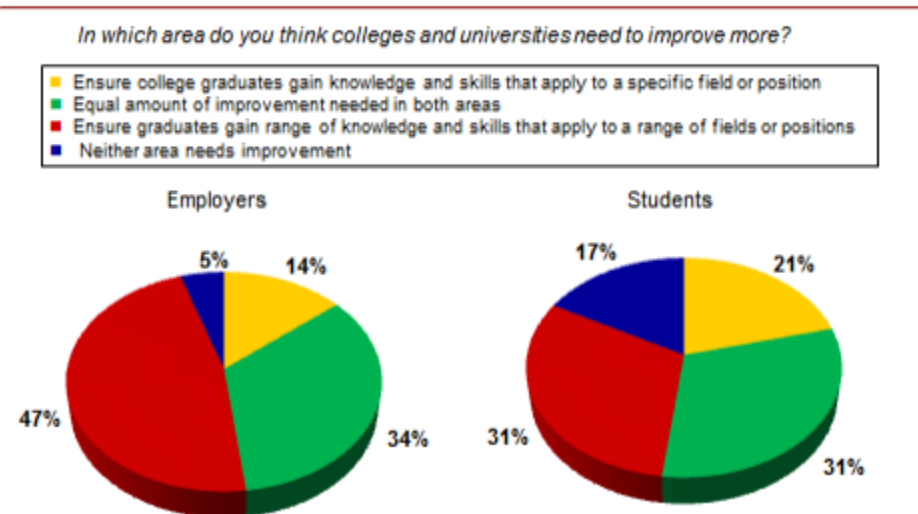
Previously, I mentioned how technology advancement is influencing change in the accounting field and in order to transition as smoothly as possible with this change, candidates need to display strong skills in accounting technology. They should advance skills in using software programs such as excel, database applications, SAP, and Microsoft Visio just to name a few. Along with these technical skills, they need to have great communication skills and people skills. Candidates need to understand that they will not only be working with coworkers, they will also be working with clients. Not all the clients will understand what the numbers mean, it will be the candidate’s job to explain the data to the client. The candidate will need to know how to communicate this to the client.

Most accounting jobs require the individual to have; planning and organizational skills, multitasking skills, analytical and problem-solving skills, self-starter and team player (Robert Half, 2017). While it may not be in the job description or mentioned aloud by hiring managers, they want to hire someone that is trustworthy and credible. Once that trust and/or credibility is lost, there may never be a solid bond created again; the doubt will always be there (Bright Network, n.d.). [18]

### **Expectation Gap**

The term ‘expectation gap’ describes the difference between the skills and attributes accounting graduates gain from university and the skills expected and/or required by employers (Low, Botes, Dela Rue, & Allen, 2016). [19] Graduates believe they are ready for the work environment, but employers say the opposite (Scott Jaschik, 2015). [20] In 2015, the Hart Research Associates carried out a research involving 400 employers and 613 college students. Of the 17 skills tested for valuation by the Associates, employers place the greatest priority on; demonstrated proficiency in knowledge and skills across all majors, ethical decision making, ability to apply knowledge in real world settings, teamwork, critical thinking, and written and oral communication skills when hiring candidates (Hart Research Associates, 2015). [21]

## Top Priorities for Improvement



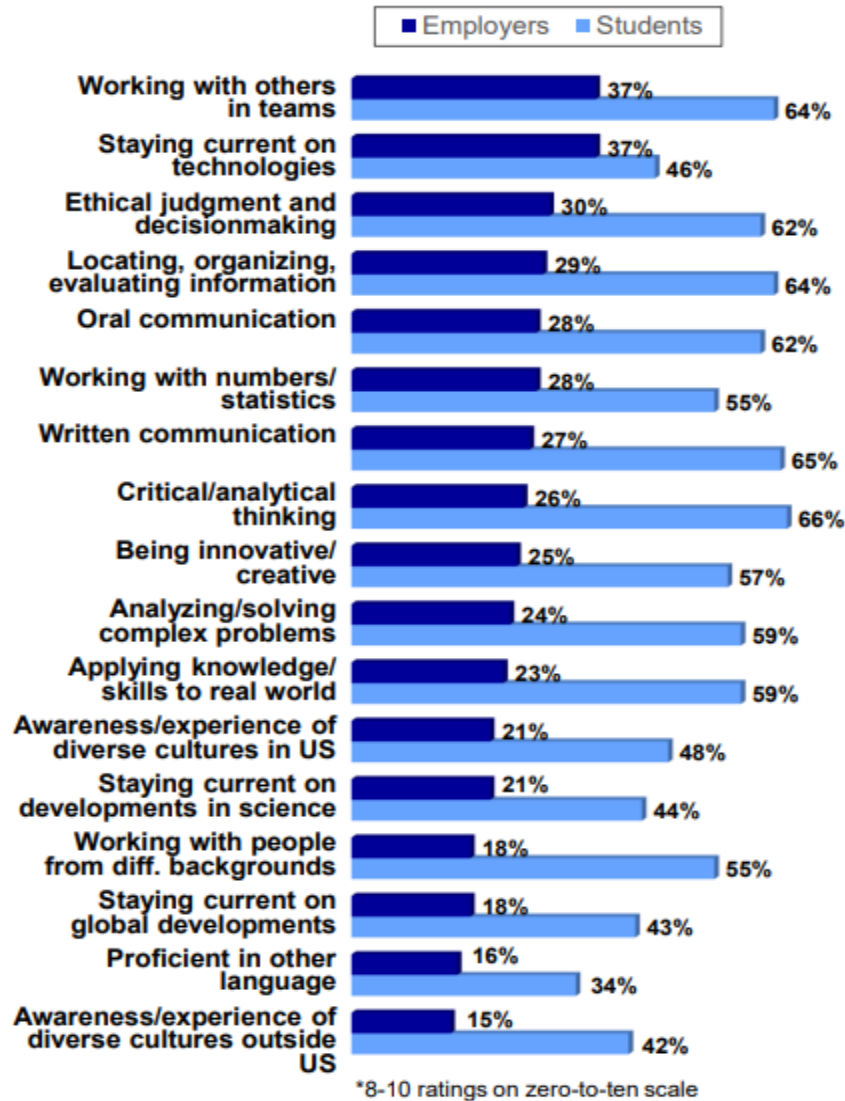
In the diagram above, the response of students versus employers are compared on the basis of where they believe students need to improve to meet the employer's expectations. Most employers believe that students need to improve in gaining knowledge and skills across all range of fields or positions, while only 31 percent of the students believe they need to. About 34 percent of the employers believe that there should be an equal amount of improvement in gaining knowledge and skills in a range of fields and a specific field. The percentage of students who selected this was 31 percent, ranging closely to the employers who believe this also. Only five percent of the employers believed there is no need for improvement, while 17 percent of students believed there is no room for improvement.

The graphs in my opinion, only proves to highlight that students and employers do not have the same thought process. The only way for students to complete school with the skills and knowledge employers want in their new hires is if the employers communicate this to the institutions and students. Employers can hold meetings and send out memos, among other things, with what they are wanting from their new hires. They could offer other events to educate students on what skills and knowledge they should be leaving school with, preferably earlier in their college careers rather than at the last stretch.



Graph by Hart Research Associates

*Proportions saying they/recent college graduates are well prepared in each area\**



The graph above shows the difference between employers and students responses on how prepared they are in different areas. The results reveal that students believe they are more prepared than employers believe they are. Four of the key topics that stood out in the results are; ethical judgement and decision making, oral communication, written communication, and working with others in teams.

62 percent of students believe they are ready for making ethical judgement and making decisions, when only 30 percent of employers believe they are. As accountants working with financial statements, money, taxes, among other things, there is a need for accountants to be ethical individuals who can make good judgement to be successful.

The other three points that stood out was because of the vast difference between what the employers believe to what students believe in their communication and team working skills. Students spend a lot of time communicating both on paper and orally with professors, potential

employers and peers that upon completion of their degree employers should believe they have mastered these skills. Students spend majority of their college career working on team projects that they should be able to work with other people as it is a major requirement of their careers.

62 percent of students believe they have good oral communication skills, and 65 percent believe they have good written communication skills while 28 and 27 percent of employer believe students have good oral communication and written communication skills respectively. Only 37 percent of employers believe that the students are prepared to work on teams while the student response was 64 percent believe they are prepared to work on teams.

It is clear that employers and higher education institutions (HEIs) need to work together to ensure that the students who are seeking careers in the accounting field will leave college with the level of skills employers want to hire (Marty Tillman, 2015). [31] Simon Kemp, Fay Martin, Pat Maier and Ian Williams concluded saying, “HEIs need to address the concerns of employers as much as possible but some of the more unrealistic demands of employers need to be managed; HEIs cannot fast forward maturity or provide business sense to young people who have spent the majority of their young lives in education” (Kemp, Martin, Maier, & Williams, 2009). [30]

### **Careers in Accounting**

It is believed that finding a job in the accounting field is a smart decision because the accounting field will always be in demand, which provides the opportunity for growth and advancement within the field (Riana Topan, 2014). [22] The accounting field will always be in demand because governments, businesses, non-profits organizations and individuals continually need accountants to manage their budgets, deal with taxes, do financial reporting, and complete audits, just to list a few, even when the economy is down (Riana Topan, 2014). There are a lot of career opportunities in the accounting field ranging from entry level to executive level positions.

Accounting career paths generally start in college with students taking accounting classes that will fulfil their eligibility to sit for Certified Public Accountant (CPA) exams and leaving college with a bachelor’s degree in accounting. After school, the student can decide to find a job right away to gain experience then take the CPA exams or take the exams then start their career. All Accounting Careers says, “Most firms offer incentives to employees if they get their CPA before starting the job or within a certain time limit upon starting the job. Certified Public Accountants make much more than accountants as the years go by” (All Accounting Careers, n.d.). [1] After becoming a CPA you can start taking on more responsibilities such as management positions and work your way up to partner or director. People may choose to branch off in another accounting department because with more experience comes more money and opportunities for advancement (All Accounting Careers, n.d.).

Gordon Hanson says,” Like nearly everything in life, a career in accounting has its positives and negatives. But the truth is that it’s not so much that the career itself is good or bad, but rather that it’s the right fit for certain people and not for others” (Gordon Hanson, 2017). [23] Some positives of working in the accounting field are; there is a clear career path, it is a stable and growing job field, there is potential for professional growth, earning potential is favorable, work where you want to, and entrepreneurial potential (Gordon Hanson, 2017).

In accounting you learn practical skills such as crunching number and analyzing cost that employers’ need, which gives a clearer path than an English or Philosophy major. The duties of accountants in the field are generally the same so you know what you are signing up for (Gordon

Hanson, 2017). The accounting field is projected to grow about 11 percent by 2024 (Gordon Hanson, 2017). Generally you start your career in an entry level position, but the potential for growth can be high. Hanson states, “After getting established and gaining experience, career advancement can be achieved through on-the-job performance and additional education or certifications like earning an MBA or CPA” (Gordon Hanson, 2017).

According to the Bureau of Labor Statistics the median annual salary of an accountant is \$68,150 and the top 10 percent makes over \$120,000. This is really great when compared to the national median salary of \$37,040 (Gordon Hanson, 2017). Along with the salary, some accountants receive benefits such as healthcare and vacation time. Accounting jobs are available worldwide, you can look for job opportunities in areas you would want to work. There is also the possibility of starting a small accounting firm on your own, or investing in another industry entirely (Gordon Hanson, 2017).

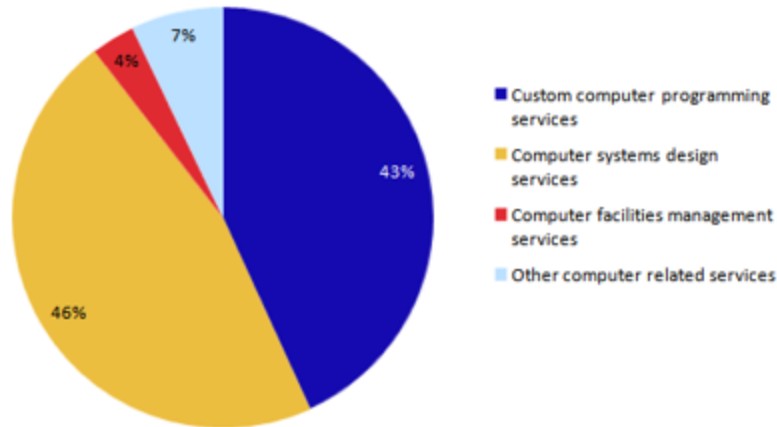
As mentioned, there are also negatives that come with working in the accounting field. Some of these negatives are; education is ongoing, work can seem dull, busy season, and work can be stressful. In order to advance in the accounting field you need to keep up with the changes in the job field and get credentials such as the Certified Management Accountant (CMA), Certified Professional Accountant (CPA) and Chartered Financial Accountant (CFA) certifications. Some accounting jobs are consistent, meaning you do the same thing repeatedly. This can make the job seem dull to some individuals along with being stressful during the tax season. The tax season is also called busy season because the work hours become longer and the work load increases, but after April 15<sup>th</sup> the work starts slowing down a bit (Gordon Hanson, 2017).

### **Careers in Information Systems**

The Bureau of Labor Statics says, “Computers and information technology (IT) touch nearly every aspect of modern life. [1] IT enables seamless integration and communication between businesses anywhere in the world” (Lauren Csorny, 2013). The 1950’s mark the beginning of the computer revolution which created numerous jobs that required skill, training and a logical thinking process (Alan Hughes, 2018). [2] The invention of computers did not only affect the IT industry but also the accounting industry. The accounting language has transitioned overtime, and throughout all the changes accounting technology has always made the job of an accountant easier (Agnes Ann Pee, 2011). [24] Agnes Ann Pee says, “As our knowledge of technology increased so has the accountant’s ability to analyze statistical values. Technology advancements have enhanced the accountant’s ability to interpret data efficiently and effectively” (Agnes Ann Pee, 2011).

The IT industry was not significantly affected by the recession of 2007-2009. The industry lost about one percent of its employment in 2009 but regained momentum and surpassed the employment numbers from 2008 (Lauren Csorny, 2013). The Bureau of Labor Statistics states, “The high demand for the services provided by this industry has created a large number of fast-growing and high-paying IT jobs” (Lauren Csorny, 2013). The four sub-industries that the IT industry can be divided into are; custom computer programming, computer systems design, computer facilities management, and other computer related services (Lauren Csorny, 2013). The graph below shows the percentage distribution of employment among the four sub-industries, with the first two sub-industries accounting for 90 percent of the IT services employment (Lauren Csorny, 2013).

Employment distribution of computer systems design and related services, 2011



Source: U.S. Bureau of Labor Statistics, Current Employment Statistics.

The custom computer programming services includes businesses that write, test, and modify software for a particular client, while the computer systems design services includes businesses that plan and design computer systems that integrate hardware, software, and communication technology. In addition, the computer systems design firms also install new computer systems and train the users. They both provide support to clients after the job is completed (Lauren Csorny, 2013). The computer facilities management services includes businesses that manage and operate computer systems and data processing facilities, and the computer related services includes businesses that provide a wide range of services not included in the other sub-industries, such as disaster recovery services or software installation services (Lauren Csorny, 2013).

Jobs in the Information technology field can be demanding, sometimes stressful, but most are financially rewarding. In the 1970's many people were hired into the field because of their technical skill and problem-solving abilities due to computer science degree programs being limited (Alan Hughes, 2018). As mentioned previously, this can be related to how employers of accountants are hiring new candidates based on skills that are applicable across all industries or job fields rather than for skills they actually need to do what they are hired for (Hart Research Associates, 2015). The vacancy of the Masters of Accounting programs at individual schools are limited, so getting accepted becomes a competition among candidates.

Overtime specialization has become the norm in the IT Industry, and several types of information technology degrees and jobs are now available in the early 21st century market (Alan Hughes, 2018). Callie Malvik says, "In a June 2017 report, RHT [Robert Half Technology] revealed that 63 percent of chief information officers (CIOs) find it somewhat or very challenging to find skilled IT professionals today" (Callie Malvik, 2017). [25] There is a demand for IT professionals, so job opportunities are available.

### **Similar and Different Skills between Accounting and Information Systems Jobs**

In this section, I found a few articles that listed basic skills Accountants and Information Technology workers should have and made a list of the skills listed under each industry separately. I then identified the similar skills listed under each industry and the list shown below is what I got after I completed this process.

- Time management
- Communication skills, both oral and written.
- Detail oriented
- Data analysis
- Self-motivator
- Numeracy skills
- Computer skills (IT more so than accounting)
- Teamwork
- Building relationships
- Leadership skills

The list above shows the basic skills that are necessary to be successful in the accounting and information technology fields that are similar. It makes sense that these are among the skills needed to be successful, because these two industry fields are critical jobs that need workers to pay attention to details. One simple mistake could result in big issues. [26], [27], [28], [29]

After following the process mentioned earlier about identifying the similar skills in accounting and information technology fields, the information that was not highlighted became the differences between skills in the two fields.

In the Information technology fields, the employee would need to have extensive knowledge of different computer systems, coding skills, advance computer skills and advance math skills. The list above included numeracy skills and computer skills, but even though both fields require this the IT fields requires a far more advance knowledge of the skills than accounting. The only basic difference on the accounting side is that accountants are required to know the accounting principles. [26], [27], [28], [29]

### **Conclusion**

Technology advancement is influencing change in both the accounting and information systems fields. Careers and opportunity growth for these fields are expected to be favorable. Information technology has made the jobs of accountants more efficient and easy through Accounting Information Systems, and this is expected to continue to influence the way accountants do their jobs.

The ‘ideal candidate’ to an employer is an individual who has a vast business knowledge, planning and organizational skills, and multitasking ability, analytical skills, and problem-solving skills. This individual must also be a self-starter and team player. The expectation gap between employers and graduates can be solved by increasing communication among HEIs and employers.

There are a lot of job opportunities in accounting and information technology. Pursuing a career in these fields require hard work and continuous learning; needs dedication. In both fields you will need to have time management skills, great communication skills, be detailed oriented and a team player. Technology advancement is changing the world.

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