GRASPING THE CYBER-WORLD: ARTIFICIAL INTELLIGENCE AND HUMAN CAPITAL MEET TO INFORM LEADERSHIP

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Abstract

The 21st century ushered in continuous change, artificial intelligence, which is driving immaterial assets of the human capital feature not recorded on organizations' balance sheets. This qualitative semi-structured exploratory grounded theory interview research examined points to develop best practice approaches for implementing human capital with artificial intelligence within organizations. Human capital is categorized as the economic value of employees' knowledge, skills, and experiences. Today, organizations must learn to categorize artificial intelligence in workforces. Such change is driving paradigm shifts. First, artificial intelligence was presented as a new approach to human capital aimed at expanding human capability. From nine (9) research questions, 24 themes were revealed. Major findings were that organizations are faced with a new human capital category, mechanistic learning and its impacts, which must be intertwined into required competencies due to artificial intelligence. A significant conclusion is that there has to be a transformation of job processes as well as position redesigns for the purpose of ushering in this new era of employees plus technologies for more effectual outcomes as collaborative units in this fifth industrial revolution encompassing artificial revolution. This text offers to practitioners, learners, and academicians information for long and short term business growth and adaptive progression.

Keywords: Artificial intelligence, human capital, strategic leadership, adaptive progression, adaptive learning

INTRODUCTION

Technology disruption has affected human life since the first industrial revolution, thereby expanding the number of jobs as well as productivity. Through technology we glean artificial intelligence. Artificial intelligence technology and human capital, plus AI's significance to human capital linked performance is still in the beginning stages. A prevailing point at issue is whether or not AI is a boon or a blight to the nearness of human preservation? Marcus and Davis (2019) conjectured that science is not near the point of realizing artificial as general intelligence; however, there is the possibility to attain this goal. In 2014, 74% of companies stated their organizations had a digital strategy; however, merely 15% of these organizations trusted that they had the needed knowledge, skills, and capabilities to implement such strategy (Fenwick, 2014). Today, 89% percent of businesses have implemented what is termed a "digital first" strategy; this change will significantly impact the work environment (UiPath, 2018). The data shows the 2018 data percentage as 79% humans and 21% robots; however, the expected 2020 percentages will be 58% humans and 42% robots (UiPath, 2018).

This article will review the world of artificial intelligence and its connection to human capital in addition to reveal leading responses about the ubiquitous technology state of strategizing understanding in the human capital space. The article offers responses to questions such as: What are artificial intelligence devices and how are they employed in the human capital environment? How is the technology used and applied in performance? What are artificial intelligence impacts to the human capital environment? What are the diverse transformative avenues that artificial intelligence serves (e.g., business automating processes, revolutionizing as an organizational tool, and strategic opportunity) in this human capital driven environment? Is there a need to upskill, improve the skills of employees so that they perform better at their jobs? This research will pull forward documents and information concerning practical organizational capabilities to approach comprehension through artificial intelligence, in addition to helping readers better understand the involved and precipitously changing topography of higher education and human capital in this internationalization era.

This researcher will scrutinize today's artificial intelligence perceptions, optimisms, pessimisms, as well as the definition of artificial intelligence and the insight into artificial intelligence mechanism. Also, this article will examine comprehension of the potential meaning of artificial intelligence and artificial intelligence devices for human capital uses as artificial intelligence technology usage endures to be re-envisioned. Furthermore, this article will uncover developing artificial intelligence usage in remote as well as diverse locations. This article will consequence in a more contemporary grasp of artificial intelligence, human capital application,

along with the vigorous role of artificial intelligence and human capital in the application and processes of artificial intelligence in this first century of the third millennium, the 21st century.

LITERATURE REVIEW

This literature review about the cyber-world, specifically AI, and human capital will evaluate the literature, and synthesize the data of such literature into a summary. Next the literature review will critically analyze the data collected by detecting gaps in current knowledge, showing limitations of points of view, reviewing areas of controversy. Also, the literature review will present the literature in an organized manner.

Modern society transformed through three industrial revolutions (i.e., steam engine, age of science and mass production, and rise of digital technology (Daemmrich, 2017). Next society began moving through a fourth industrial revolution, technology fusing physical, digital, and biological worlds (Daemmrich, 2017). This fourth industrial revolution, Industry 4.0, propelled manufacturers to the sequencing of intelligent devices, machines, systems and to building smart networks from materials to production (the value chain) that are able to control one other (Atwell, 2017). According to the Kohler and Weisz (2016) response to the fourth industrial revolution, "Industry 4.0 is the German response to the threat posed by the eruption of digital technology on industrial value chains (abstract)." Industry 4.0 is a technological determination to yield size 1 series at prices equal to those built through mass production by initiating cyber-physical production systems in factories (Kohler & Weisz, 2016). Yet, Prisecaru (2017) offered the interpretation of the fourth industrial revolution as not just the next transformation in the manner in which products are developed and consumed, nonetheless an important revolution in the way that the world operates. Influencing all disciplines, economies and industries, and all the more so the fourth industrial revolution is confronting conceptions and impressions in relation to the meaning of existing as a human. Beginning in this fourth industrial revolution, but being extended in the fifth industrial revolution is artificial intelligence.

Artificial Intelligence Defined

Artificial Intelligence is the structure, non-static, (DeAenlle, 2018) for constructing machine based decisions as well as actions employing machine learning instruments and analyses (Dimiduk, Holm, & Niezgoda, 2018). This framework, AI, is redesigning business across fields and transitioning the manner in which people communicate, are employed, and live. Articulated by Google's Chief Sundar Pichai, artificial intelligence is more essential to humankind than electricity or fire (Chainey, 2018). The revolution beginning AI is preceded by three industrial revolutions with all revolutions fundamentally changing the world. These distinctive eras

unraveled the concerns of the time utilizing tools available during the period. A commonality characteristic held by the industrial revolutions was the search for phenomenal interconnection between manufacturing systems, enhanced ease of data access, increased data transparency, speedier and more capable production models, as well as the launch of diverse equipment needing minimal human intercession (Sykes, 2019).

The first industrial revolution (1770-1830; Ventura & Voth, 2015) ushered in the steam engine and transitioned countries towards manufacturing processes. The second industrial revolution, a period of swift industrialization (1860-1900; Atkeson & Kehoe, 2007; 1870-1914; Chappine, 2019) ushered in assembly lines and mass production. The third industrial revolution (Krawczynski, Czyzewski, & Bocian, 2016) ushered in the digital revolution (the microprocessor), nuclear energy, and renewable energy. The microprocessor, developed in 1969 by Intel, utterly altered the workplace with the creation of the personal computer (Malone, 1994). Multifaceted and recurring tasks were completed by programs, permitting process orientation and automation (Malone, 1994).

The next industrial revolution, the fourth, according to Naidoo (2019) occurred with no significant event. As given by Muir (2019), the fourth industrial revolution connected technology to people and thus drove the desire to use mobile phones, tablets or other devices using the Internet. Today's fourth industrial revolution which is expected to infuse each facet of new technological change endeavors (i.e., Internet of Things, biotechnologies, large developments in AI) in this 21st century. This fourth industrial revolution is the proposition and progression of computer systems capable to complete tasks that customarily necessitates humanoid intelligence, such as decision-making, speech recognition, visual perception, and interpretation connecting languages. Even though it is a technology platform the fourth industrial revolution is driving developments in communication and connectivity (i.e., 3G to 4G to 5G; Muir, 2019).

Artificial Intelligence is expected to cover numerous industries - Business Intelligence, City Planning, Construction, Cybersecurity, DevOps and Cloud Hosting, Education, Fashion, Healthcare, Manufacturing, Mental Health Diagnosis and Treatment, Senior Care, Retail, and Supply Chain Management (Forbes Technology Council, 2019). According to Bostrom (2014), AI is apportioned largely divided into three separate stages: artificial narrow intelligence (ANI), artificial general intelligence (AGI) and artificial superintelligence (ASI). Artificial intelligence (AI), a term coined in a 1955 proposal (AI timeline, 2018; Dennison, 2003; McCarthy, Minsky, Rochester, & Shannon, 2006) by John McCarthy, Marvin Minsky, Nathaniel Rochester, and Claude Shannon (McCarthy, Minsky, Rochester, & Shannon, 2006) is the intelligence from humans that is simulated by machines. The distinguishing point about McCarthy's plan was his stress on employing mathematical logic (Hayes & Morgenstern, 2007). As given by Hayes &

Morgenstern (2007), this mathematical logic included together a language for signifying the information that an intelligent machine should include and as a "means for reasoning with that knowledge" (Hayes & Morgenstern, 2007). As given by Andrew Moore at Carnegie Mellon University in Pittsburgh, during a 2016 interview with Charlie Rose of The Charlie Rose Show, artificial intelligence is divided into two subcategories of work, autonomy and cognitive assistance (Conversation with Andrew Moore, 2016). Autonomy is "…having machines survive by themselves and figure out stuff by themselves when humans can't help them" (Conversation with Andrew Moore, 2016). Cognitive Assistance is "…machines helping humans be smarter" (Conversation with Andrew Moore, 2016). Later, Newton (2018) added to the definition and offered that AI is that which offers machines' intelligence and enables machines to rationalize like human-beings. AI technology's capacity is to get rid of repetitious, replication, and redundant actions. These actions should consequence in a work setting able to provide better gratification to human workers.

What are the Challenges and Fears of Artificial Intelligence?

Challenges and Fears exist regarding AI and the concerns it delivers (Newton, 2018). What is not known is whether these challenges and fears arise out of the manner in which society as a whole will involve itself with technology or whether the rise of technology will cause so much fear as it paralyzes a large portion of the world. What is clear and apparent is that numerous challenges and fears about AI exists. As given by Romm, Harwell, & Timberg (2018), the technology industry has to remain cognizant of its responsibility of developments as well as regulate the usage of such creations. Let's review three fears regarding AI.

A continued fear is that machines will take over the jobs of people. Thoughts exist that, if allowed, AI will drastically increase unemployment. Some of these fears are swath in individuals' experiences in the field of technology having seen a shift in the industry through quicker microprocessors and networks. Manufacturing employees have the implementation of AI-powered analytics to information for enhancement productivity, and product quality, to include employee safety. Another example is driverless busses. As given by Abramsky (2018), the Columbus, Ohio Transit Authority inked a contract with May Mobility regarding a pilot for an electric driverless shuttle. Considered by drivers to be a threat if it succeeds, this system is expected to push lay-offs of drivers. Additional changes which are seen as reducing the need for human workers are in the hospitality industry. Some hotels have initiated smartphone check-in systems that reduce the necessity for front desk personnel (Abramsky, 2018). Also, kitchens at some of the loftier resorts are utilizing robotic salad makers, which reduce the need for personnel (Abramsky, 2018). Even though workers' experiences lead them to believe one

way, as given by (Niraula, 2018), the replacement of positions by automation actually allows workers to advance to other positions which need the decision-making skills of a person. On the other hand, the question is how many employees are able to transfer to other positions, and how may are displaced? Other fears continue to exist. Such concerns eek out of what is known as artificial narrow intelligence (ANI).

Yet a second fear rises from the sci-fi genre which is driving the notion that AI will take over the word and leave the need for human-beings fruitless. For example, AI robots such as Star Wars: The Last Jedi's C-3PO, R2-D2, and BB-8, or Extinction's Synths are just that on-screen robots. According to Greenwald (2018), actual robots are not at the level of possessing humans' native skills to ascertain, research, account for, reason, speak, or establish lookout about abstract and realistic matters. As given by Husain (2019), AI language examination methods are now in existence to congregate data on inhabitants all over the world. These suspicions entail the notion that AI will become so advanced that technologies will turn against man and then take over the world (TechZulu: Fear about, 2018). In addition to fears, AI challenges exist.

Let's review two challenges. First, Meskó, Hetényi, and Győrffy (2018) offer the argument (a) as to whether locations with limited resources will be challenged with implementing AI, and (b) in terms of the price, will this overall disruptive technology be too expensive for underdeveloped countries, consequently pushing these countries even further behind in the wake of improving healthcare. Dasgupta (2018) postulated that AI helps to deliver medical access to remote locations in India where there may be no trained doctors and where AI can help humans determine and offer diagnostics. Also, the onset of AI caused skepticism; however, today and through increased developments, India produces 1.7 STEM graduates per year (Bughin, Seong, Manyika, Chui, & Joshi, 2018). A STEM model is significant to prepare a workforce ready to deliver research and community solutions (White, 2018). Beginning January 2017, India delivers the second-highest automation conceivable world-wide (Bughin et al., 2018). On the other hand, in underdeveloped countries, populations not as developed economically as other nations, suffer from a lack of funds.

Underdeveloped nations have harder treks to attain the financial backing to develop AI and increase their economic and scientific standing. Developed nations are more apt to design and implement artificial intelligence. Conversely, underdeveloped countries will more than likely receive help to gain a foothold in AI. For example, Abu Qader constructed an inexpensive computer program that utilized AI all for the purpose of reading mammograms to help medical staff diagnose concerns (Cole, 2017). This tool was used in Afghanistan and can be used in other underdeveloped nations (Cole, 2017). While cost is involved, the key point was not to

take jobs away from anyone. In terms of cost, AI project price is contingent on the work being conducted to create a product. Deciphering an overall understanding of the project phases could help with determining a rough valuation of the cost of the work.

Another challenge is whether society will construct and organize their public and private education systems, social contracts, organizational models, as well as intercontinental agreements to take advantage of the implausible potential AI delivers or will the world step back and remain anxious and apprehensive. Because this article is centered on artificial intelligence in the context of human capital, it is important to explain these components. Artificial intelligence is a key driver of this fourth industrial revolution wherein technologies comprise the internet of things, biotechnologies, and significant developments in artificial intelligence. Ark (2018) offered AI as the extremely vital change force in modern society; nonetheless, AI remains a usual for high school graduates to not understand the subject matter, the way AI operates, or prospects AI initiates, plus what citizenry should guard protect against. Kindergarten to 12th grades (K-12) have not fully engaged with AI, whether teaching or using it, usage is narrow (Murphy, 2019). This research speaks to teachers' work being augmented, instead of replaced. This point fits well into human resources. Other points from this article connect with AI and machines, therefore; they will be reviewed in different research (Ark, 2018). In May of 2018, a committee was formed to determine what students should comprehend and be able to perform in terms of AI; these points were (1) the world is recognized by computers through the use of sensors, (2) systems retain models/representations of the world coupled with utilizing them for interpretation and analysis, (3) data feeds computers as for knowledge, (4) creating systems to interact naturally with humans is a considerable task for AI developers, and (5) AI applications can effect society positively and negatively (Ark, 2018). The continued upward rise is thought to affect the believed social contract, an understood covenant between the people of a society to work together for social benefits for the world.

Thoughts exist that AI will deliver vast social disorder and political breakdown stemming from prevalent unemployment and deep inequality (Lee, 2018). The basis of the social disorder and political breakdown is connected to AI's disruptiveness of the citizenry to include the workforce. For example, the United States transitioned through a period of 200 years before changing from the 1800s with 90% agricultural economy, to the existing 3% farming economy (Johnson, 1997). The changes brought on by the infusion of AI are faster and becoming a part of society (i.e., Alexa, Amazon Echo, Cortana, Siri, driver-less vehicles, and etc), and are making a swing to the social contract. If the driver-less vehicle is perfected, what will happen to the 3.5 million truck drivers (American Trucking Associations, 2018)? According to Matheson (2017), other aspects of technology affecting social contract are Waze, which is routing traffic

through neighborhoods which were considered quiet, as well as electronic parking meters which are reducing the number of meter maids to man parking. The question is, how fast will society adjust to such advancing technologies? All of this technology for AI wraps into organizational models (i.e., primary education - kindergarten thru sixth grade, secondary education - middle and high school, post-secondary education (i.e., public and private community colleges, 4-year colleges, and universities), government agencies, commercial businesses, and 501C3 nonprofits.

Organizational Models necessitate a large amount of information to perform correctly. Through inputting information into standardized AI templates, professionals lacking AI knowledge, skill, and capability become equipped to ascertain key points to augment organizational efficiency (Murawski, 2019). With this said, one key school of thought is organizations' best resources are their people and the greatest organizations are those which the leadership lead and manage human capital most operatively and proficiently (Burrell, 2018a). In other words, human capital is the economic value that staff use within and to advance an organization. The value of this human capital is concluded by the knowledge, skills, experience, and education every worker owns and uses within the organizations. The knowledge, skills, and experiences include advantages and benefits such as acumen, education, knowledge, preparation, promptness, talents, training, well-being, plus additional points organizations determine as significant. A challenge in terms of human capital is to understand at what level will human capital and AI augment each other truly, instead of AI taking over the roles of people?

Artificial intelligence allows machines to reason like people as well as complete tasks like absorbing information, providing oversight, solving problems, making judgment calls, processing languages, handling exceptions, and intellectualizing. With this said leadership will need training, particularly the human resources team in understanding this aspect of cybersecurity (Burrell, 2018a). Essential to realizing the full possibility of AI across a business entails expanding enterprise-wide backing for the AI initiatives, this means theorizing with stakeholders the positive organizational results for attainment (Ronanki, 2019). Not only do we have to think of AI in terms of public and private education systems, social contracts, organizational models, but also in regarding its intercontinental aspects.

Over the previous 20 years, AI continues to improve. Nowadays the question is whether this technology is considered especially mature. As given by (Vaishnavi & Achwani, 2018), AI in today's society is still in its initial phase of not entirely acclimating into society. The data shows that in 1956, psychologist Frank Rosenblatt, invented the central design for an artificial neuron; this is the equivalent neuron design being utilized in today's deep learning networks (Simonite,

2015). Even though the numbers continue to change, according to (Wagner, 2018), the majority of the world's countries have only recently begun to consider their own AI future on a serious note. However, it was 2017 and 2018 when the preponderance of the world's bigger economies announced their AI initiatives. Yes, AI service obligations related to next-generation tools and methodologies are being offered by business leaders internationally. On the other hand, AI with its potential to change industries, need the assistance of human-beings to continue to advance the world's technologies, and processes, (Greenwald, 2018; Vaishnavi & Achwani, 2018). To establish an advanced world, what is needed are the required means, sources, and know-how to be of assistance in supporting AI to work effectually. AI requires the knowledge of people who understand and can exact the right tools at the right time, also, a method that can be implemented to offer a border to a multiplicity of knowledge-based tools (Do, 1998). Internationally, businesses and governments will need people to offer novel ideas. Plus, people are needed to handle crises and make needed associations with other people. Even though there are challenges and fears regarding AI, benefits do exist.

MACHINE-LEARNING ALGORITHUMS

Data is fed to systems as mathematical instruction, algorithms, step-by-step processes to solve problems (Hill, 2016; Nofre, 2018). Algorithms free up human beings' time as these algorithms perform predictable activities benefiting them. The more the algorithms take in data needed for training, then it is conceivable to generate more exact models founded on such information (Hill, 2016). The question here is how do algorithms affect employees in the workplace? These machine learning algorithms allow humans the ability to work on the things people do best such as, real-time flexibility, definitive assessment, and employing calculated hand maneuvers with objects, and within environments outside of factory walls which are tasks immensely problematic for robots (Hodson, 2018).

Clean data allows for gaining the best worth from machine learning algorithms. Personal assistants like Microsoft's Cortana, Apple's Siri, and Google's Alexa have made AI a part of the world's day-to-day subsistence. In the meantime, groundbreaking change such as self-driving automobiles are within reach of being a normal occurrence. During the 2019 World Economic Forum in Davos, LinkedIn's Allen Blue revealed AI and machine learning are developing as fundamental to the manner in which all technology is built, taking into account phones, banking, and numerous additional products and activities (Mphuthing, 2019). Nevertheless, machine learning is not a straightforward procedure.

Algorithms' abilities to duplicate human decision-making in a fraction of the time is certainly a value-add. Conversely, these actions to copy human behavior can be twofold and

backfire. A significant concern is what happens if the followed human behaviors that determine the manner algorithms convert input data becomes flawed outputs (Hao, 2019). If not immediately detected, when the responsibility of the action is relied upon by the machine, a rancorous and inhuman circle could exist which wreak havoc on processes. It is important to ensure appropriate machine-learning in order to be rewarded with needed benefits.

WHAT ARE THE BENEFITS OF HUMAN-BEINGS CONNECTING WITH ARTIFICIAL INTELLIGENCE?

Today's business executives and human resource leaders are earnestly working to understand AI, and then determine how to merge AI, human resources, and human capital for the advancement of human resources along with increasing the general furtherance of workers' survival (Vaishnavi, Amritaa, & Achwani, 2018). Akin to other fields, AI has a home in human resources, specifically human resource management (HRM). Artificial intelligence is helping improve human resources in the following ways: survey reporting and analytics, scheduling meetings and interviews, performing workflow tasks, as well as supporting talent acquisitions, talent management, and succession planning. Human resources management is a coordination of actions, and strategies that focus on efficaciously overseeing employees at all levels of organizations to attain the organizations' goals and objectives (Heathfield, 2019). Human resources is utilized to designate both the people who work for an organization as well as the department responsible for managing resources related to employees (Fejfarová & Urbancová, 2016; Mathis, Jackson, Valentine, & Meglich, 2017). For the human asset component of organizations, human capital, one of four types of assets, is categorized as the economic value of employees' knowledge, skills, and experiences (Mathis et al., 2017). Significant to remember is that the human asset remains the cornerstone to connecting all other assets together to realize positive results (Mathis et al., 2017). Categories comprising advantages and benefits are business acumen, education, knowledge, preparation, promptness, talents, and well-being. Machine learning, a form of AI, enables a machine to learn from information as opposed to learning via precise programming from human-beings. Understanding machine learning, a branch of artificial intelligence, is significant in today's fast paste technological world. This technology is understood to be mature and effective. Machine-learning was grounded in the 1950s investigations from IBM's Arthur Samuel (Cowan & Nelson, 2010; Tsidulko, 2016). These investigations were called cognitive computer, machine-learning (Tsidulko, 2016). Over the years, machine learning evolved. Today's machine learning is different from yester-years understanding. Arthur Samuel introduced pattern recognition. In 1962, Arthur Samuel's

program for checkers-playing proved successful as it won against checkers expert Robert Nealey (AI timeline, 2018).

People interacting physically with the outside world do not face an essential doubt in the manner that objects will respond to touch; however, robots do face this challenge (Hodson, 2018). Through machine learning we get machine learning models in numerous domains (i.e., Astronomy, Financial Services, Government, Healthcare, Manufacturing, Oil and Gas, On-demand Music Streaming Services, Retail, Smart Cities, and Transportation). Straightforward machine learning models develop increasingly better at their individual functions, but then again, these models nonetheless need some human guidance. For example, when AI algorithm outputs an erroneous likelihood, then human intervention is required to conduct fine-tuning. While machine learning is a subfield to AI, deep learning is a part of machine learning.

Deep learning arranges algorithms in layers to generate an artificial neural network; this artificial neural network is enabled to absorb information and then deliver knowledgeable findings (Dimiduk et al., 2018). The biological neural network of the human brain informs the plan of an artificial neural network (Duggan, 2017). This informing process guides a process of learning that is considerably beyond the capability of standard machine learning models. Note that deep learning models are crafted to repeatedly scrutinize and evaluate data with a logic structure akin to the manner in that humans come to decisions and inferences (Newton, 2018). Neural networks and deep learning are frequently utilized in computer vision applications, image recognition, and speech (Dimiduk et al., 2018). Let us review 10 domains in which learning models reside.

Grappling with Artificial Intelligence in Astronomy. Artificial intelligence has pierced the science of Astronomy and has the capability to discern the internal state of a star by viewing the vibrations that spread from the stars, individual cores to the surface (Gohd, 2018). Experiments from the science of astronomy produces large amounts of data with some generating daily terabytes which are increasing in numbers (Falk, 2019). Significant is this avalanche of data which has driven scientists to work with AI because computer-simulated networks of neurons that imitate the human brain function are able, from end-to-end, to till amid masses of intricate information for the purpose of pinpointing irregularities and identifying forms that individual scientists would never be able to distinguish (Faulk, 2019). Scientist are using generative modeling, a method that has shown itself as unbelievably powerful and adaptable (Fail, 2019). With the use of AI, scientist can detect previously unnoticed significant data obtained from the space.

Significant to understand is that AI is not and will not stand by itself, the human factor is and will continue to be needed. According to Bhaduri (2017), companies, to increase their

talent pools, are hiring experts from the field of Astronomy and Physics to educate them in a different strategy, AI. By employing to solve the gap between man and machine scientists will have real-time flexibility to perform work which AI cannot handle, as well as prepare for the time when some organizations, not all, may be completely powered by AI (Bhaduri, 2017).

Grappling with artificial intelligence in financial services. Technology is swiftly altering the financial services sector, conceivably more so than any other business landscape barring retail and marketing (Marr, 2019). DeAenlle (2018) offered that AI is handling increased roles in decisions regarding investments, as well as being able to analyze information, learn from data, perform definite investing models (i.e., high-frequency reading), and assist fund managers with work that depend on assembling and construing large quantities of data. What can be understood is that while AI is handling algorithms and exacting models, the human component is still required for definitive assessment. Within the article *The Rise of the Financial Machines* (2019) we find significant information regarding how AI has shifted into the financial sector.

Machines are managing investing, buying and selling of securities, as well as examining and censoring the economy and dividing up capital, a job previously and completely managed by people. According to Marr (2019), banking industry's leaders have forecasted that ultimately, one-half of the banking sector's human labor force could be interchanged by machines. On the other hand, humans will continue to be needed in terms of handling long-term portfolios (De Aenlle, 2018).

Grappling with artificial intelligence in healthcare. The United States' Healthcare field is just one expected to drive growth in artificial intelligence (Lu & Burton, 2017). Confirmed through an interview between Glaser and Gerald (2018), the following 10 years will be marked by digital disruption, specifically next generation machine-based intelligence which is expected to influence health care in numerous ways. Artificial intelligence is being used in AI-assisted surgery with robots, and as simulated nursing assistance in addition to administrative and workflow tasks. Let us examine significant changes regarding AI-enabled technology in healthcare. Chart Assist, a contextual aware workflow electronic tool, was designed to diminish doctor exhaustion, augment the clinician's experiences, as well as increase productivity (Cerner Corporation, 2019a). Next are virtual scribe AI-enabled tools that are primarily utilized to reduce the clerical documentation on doctors (Glaser & Gerald, 2018) such as retrieving patients' records, studying patients' medical histories, and updating medical notes (HelloRache, 2019). AI-enabled technology is continually being built to combat macro-level trends effecting health care, for instance (a) mounting health care prices, (b) doctor burnout, (c) conversion of data into binary code - digitization, (d) gigantic amounts of structured and unstructured data produced at extraordinary rates alongside convenience concerns that stem from endeavoring to house and

manage such data (Cerner Corporation, 2019b). Robot-assisted surgery has the highest value promise of all of the business sectors; this method, minimally expensive, is able to augment patients' overall treatments with reduced time spent in medical facilities (Richards, 2018).

While this AI-enabled technology can assist, it is designed to support humans (i.e., caretakers) for more palatable outcomes. For example, the human will make the final clinical judgment or diagnosis with the help of the AI. Another example of the human need is as follows. According to a quote from L. Wilson (2018), AI algorithm can be developed to identify if blood is in the brain or not. However, comprehending the cause of a patient developing the hemorrhage is a different level of intricacy. As we can see the human factor is still essential.

Grappling with artificial intelligence in manufacturing, oil, and gas. Artificial Intelligence (AI) technology continues to infiltrate numerous industries' investing for financial returns using assorted techniques. The oil & gas industry gets no exemption, prognosticating the demise for one of the final areas in America where the blue-collar workforce was able to earn six-figure salaries (Matthews, 2018). Beginning 2014 oil and gas prices dropped 75% over a 20-month period, businesses discovered that the usage of new technologies would help reduce expenses (Matthews, 2018). Even though the oil and gas industry has implemented automation, as well as digitization of records, collecting, analyzing, and using enormous quantities of data for considerably increased operational improvements, its move to being digital is far behind other industries (Biscardini, Rasmussen, Geissbauer, & Maestro, 2018). Digitization occurred via the implementation of sensors, analytics, robotics, and control systems. Sadaqat (2018), in an interview with Abdul Nasser Al Mughairbi, digital group SVP at Adnoc, noted that AI is enabling the future of the oil and gas sector to decrease the expanse of time that staff will work in possibly treacherous sites. The idea is that people will learn to trust the information presented through AI and use such data to answer concerns as well as offer collective worth athwart the different sectors.

As given by J. Williams (2019), the oil and gas industry decreased its overall labor force. Causes of this downward shift include lower oil and gas prices that have continued ever since the end of 2014, mergers and acquisitions, diminutions of investments, a focus on cost management, as well as a focus of this article, technical enhancements and innovation (PetroLMI Division of Energy, 2019). Even though new positions will evolve due to AI; new roles will more than likely be filled with different people who have skills to compliment automation (Matthews, 2018).

Grappling with artificial intelligence in on-demand music streaming services. While the Internet and digitization greatly spurred the online music streaming industry growth. Music streaming services allow music to be played without storing large high-quality music collections

on a device (e.g., smartphone or ipod). The preponderance of all of the 2016 music industry in the United States yielded from streaming music services (Koppula, 2018; Roettgers, 2017). Artificial Intelligence's integration into streaming music platforms by major service providers (e.g., Amazon, Apple, and Spotify) is transitioning music services a level higher (Koppula, 2018; Roettgers, 2017). According to (Marr, 2017), Spotify has been thrusting technological boundaries, plus applying artificial intelligence, big data, and machine learning to steer success. Integrating AI and machine learning into today's music streaming algorithms is swiftly turning out to be the new standard for meeting music listeners needs (Koppula, 2018). Mounting internet saturation, tablets, and smartphones in the up-and-coming markets are propelling the development of today's online music learning market (Koppula, 2018). Even though on-demand music streaming services have widely changed the way music is listened to, the need for the human component remains.

Certain jobs will decrease such as CD salesmen, orders, and the like. For example, Best Buy made the decision to stop selling CDs because of decreased physical sells, and the increasing demand of music streaming (Wang, 2018). Available jobs for on-demand music streaming services includes but is not limited to Product Manager-Video Streaming, Audio Visual Director, Music Researcher, Streaming Intern, and Manager of Streaming Music Marketing. Steaming, a relatively new industry, is one wherein jobs are on the rise. Over 1,569 Streaming jobs were posted by Neuvoo (2019).

Grappling with artificial intelligence in retail. George Gospodinov and team of Shopin platform and app initiated R.I.D.E., the Retail Intelligence Data Engine, with the intention to renovate the retail web into a decentralized Amazon-like model through transferring of control of an activity or organization from one individual office or authority to numerous local offices or authorities (Eyal, 2019). The Retail Intelligence Data Engine introduced a universal interpretation of purchase data, priming the sphere for the universal shopper profile (Muley, n.d.). Artificial intelligence is affecting retail as it affects other sectors. Instances of employing AI for retail experiences exist at retailors such as North Face, Sephora, Lowe's, and Walmart.

Artificial intelligence has transformed the traditional retail experience of North Face's customers by advancing their shopping experiences with automation, personalization, and amplified efficiency (Morgan, 2019). North Face an outdoor apparel and equipment retailer (Lamicella, 2015), utilizes consumers' locations and gender to advise on the absolute kind of coat or jacket for undertakings (Greenwich, 2018). IBM's Watson, cognitive computing technology, ask customers about how clothing will be used in order to provide the best suggestions (Greenwich, 2018). Sephora, seller of cosmetics, beauty products, fragrances & tools, has engaged in the AI movement.

Within the Sephora store, customers can have their faces scanned using Color IQ and learn the color of makeup needed (Morgan, 2019). Online, the chat app Kik affiliated with Sephora to introduce its chatbot; customers talk with Kik about and gain assistance with suitable makeup tips and reviews based on their preferences which they taught Kik through a survey (Donaldson, 2016). Amazingly, Sephora's site appears atop the app and customers can purchase supplies through the app. Sephora is employing AI and is assertively growing worldwide, thus flourishing in today's unforgiving retail environment. The AI fever has hit Lowe's, too.

Lowe's, home improvement retailer, presented LoweBot, an autonomous retail service in-store robot in 2016 from a two-year pilot project launched in 2014 (Couch, 2017). Speaking numerous languages, the LoweBot, using computer vision to send current data to store associates, can scans shelves; this functionality can occur while Lowebot is helping customers (Taylor, 2016). Capability, due to the use of AI via an augmented reality app is available for customers to do such things as shroud the right Lowe's products against a photograph of a kitchen and ascertain how the product may mix with the kitchen before it is purchased (Greenwich, 2018). Consistent testing is a means to advance technology and deliver better customer experiences, and support process improvement.

Walmart, the largest U. S. employer, opened a tech incubator in Levittown, New York that houses AI-enabled cameras, interactive displays, plus an enormous data center; all of this inventiveness and design helps Walmart discover the abilities AI can provide to the retail look and feel (Smith, 2019). Walmart's HANA continues to support the reduction of resources necessary for the retailer to address its work quantity, increase efficiency, and process transaction records (Fonseca, 2018). Self-scanning robots are examining inventory, prices, and misplaced items (Vincent, 2017). These self-checking robots rest in recharging stations in the store pending work directions from a staff member such as reviewing a specific aisle to determine re-stocking requirements (Morgan, 2019). Also, another smart assistant is the autonomous floor scrubber that will mechanize a selection of low-level, monotonous tasks for stores (Mandviwalla & Patel, 2019; M. Wilson, 2019).

As given by Vincent (2017) Walmart robots will handle repeatable, predictable, and manual tasks, and people are not expected to lose their jobs. On the other hand, there is fear of less people being hired to handle certain job roles. Uttering Mandviwalla & Patel (2019), in messaging for Walmart, jobs are not predicted to vanish; alternatively, they will develop into more customer-focused opportunities. At Walmart employees will be allowed more time to sell merchandise, attend to customers' needs, and complete required work. Another example is instead of a person cleaning the floors, robot smart assistants will support the employee to work

with the smart assistants and finish other work within their roles (M. Wilson, 2019). The level and usage of AI utilized by Walmart is akin to that which is materializing in smart cities.

Grappling with artificial intelligence in smart cities. Smart cities must have three key components - sensors, networks, and mobile-based engagement; these aspects shape the mainstay of any smart city's perception and stand as an elevating platform to the countless ingenuities that can increase effectiveness and better lives (Urban Hub Newsletter, 2019). These key aspects are assisted by the Internet of Things (Dawson, Eltayeb, & Omar, 2016). Smart cities are continually evolving locations which remain ahead of the demand of the multiplying numbers of people, sensors, automobiles, smartphones, tablets, as well as an assortment of devices that mandate network access plus produce inconceivable quantities of data (Mattern, 2017). Smart cities incorporate technologies that support cities to operate better or more effectively. Striving to remain competitive and viable, the 2019 Smart Cities Council, a program in its third year, propose to community populations "interactive workshops, mentoring and digital tools that help them develop their smart cities plans, build community support and strengthen their projects to deliver more widespread and inclusive results" (Smart Cities Council Launches, 2018). Let's review some examples of smart cities and how they earned the designation.

LaGrange, Georgia achieved international focus for providing free Internet access to its citizenry through cable television (Mechling, 2017). Also, LaGrange developed a smart grid system for their advanced broadband network (Mechling, 2017). LaGrange focused on its economic future, conducted a SWOT analysis, and developed an integrated, community-wide strategy to make the best of its assets and work on continuous digital enhancement (Mechling, 2017). Boston, Massachusetts is utilizing technology such as sensors and cameras on its streets to grasp the manner in which its populace interact while on and with Boston's streets (City of Boston, 2017). Boston is listed in the top 50 of smart city governments, released in 2018 (Eden Strategy Institute and ONG&ONG Pte Ltd., 2018).

According to P. Williams (2017), at the start, smart cities will need to prepare the citizenry for change brought on by the way cities will function through automation associated with the Internet-of-Things. While smart city automation should improve the lives of its people, the people must not be provoked to anger; policy modification should be addressed well in advance of the perceived changes. People should have an understanding of how they may be redeployed (Williams, 2017).

Grappling with artificial intelligence in transportation. New York, New York incorporated numerous transportation innovations such as sensors for connected-vehicle technology, on predetermined streets, which are expected to lessen customary causes of accidents by

signaling drivers if they are at risk of driving through a red light, whether sight impaired individuals are in crosswalks, as well as if a vehicle numerous cars ahead brake suddenly (Berger, 2018). New York City is the largest to pilot connected-vehicle technology; this data will be anonymously transmitted to the U. S. Department of Transportation as helpful data to build the technology; however, the data will not be consumed to track particular drivers or vehicles (Berger, 2018).

Grasping the connections between human-beings and ubiquitous technology. The fourth industrial revolution brought about other understanding such as the term ubiquitous technology. Ubiquitous technology is a part of comprehending the cyber-world which includes artificial intelligence and its association to human capital. Able to appear anytime and everywhere, this technology is about objects implanted with smart microprocessors used to build architectures that reinforce omnipresent computing (i.e., artificial intelligence, networking, and wireless computing; IGI-global, 2019). Minimal organizations are left untouched by some aspect of technology. Technological tools are steadily becoming more effective and powerful. As its tools become ever more powerful and complex, the Digital Age is artfully restructuring the manner in that society lives, works, and plays. The workplace is driven to leverage and use ubiquitous technology. Societally, we have moved into a world of having to understand and function through aspects of the digital age.

Employers continue to require graduates who are equipped to use and influence technologies in a manner to propel organization's goals, strategies, and operations. To respond to the need for technologically-educated graduates, technologically-improved andragogy,

technologically-equipped facilities, and online delivery of information, educational edifices must continuously generate significant new financial, human resources, and human capital. While the essential to garner technological enhancements and advancements exist for the furtherance of organizational causes, these are the same technological enhancements and advancements which increase competition between working onsite, telework, and alternative work schedules (Philip, Najmi, Orudzheva, & Struckell, 2017).

In general, precipitously mounting user expectations, technology costs for individuals and organizations are continuously driving and widening gaps between the haves and have-nots. Reliable broadband access is essential to thrive in the 21st century. Remaining is the need for job growth to include small businesses. Overall technological development and advancement is the direction for cities to improve the citizenry's overall economic development, education, quality of life, and urban services (Woodin, 2019). Let's review the benefits and challenges of technology noted in Table one.

Table 1: Benefits, Challenges, and Resolutions for AI technology Advancement

Benefits	Challenges	Resolutions
Artificial intelligence outperformers	Artificial intelligence low performers	Bridge artificial intelligence skill gaps
Cost efficiencies due to automation	Reduction of jobs due to AI	Place people in positions to handle crises and make needed associations other people
	Economic disadvantages to purchase the technologies	Ensure work locations, schools, the disabled, and the elderly are equipped with necessary technologies
Ease of information access	Reduces broadband capabilities in certain locations	Creation of smart cities to enhance overall broadband capability
Increased Internet connectivity	Security and privacy apprehensions	Enhance technology related to security and privacy of connections
Better communication avenues	Understanding capabilities not completely grasped by all	Engage in on-going technology communications education
Mimicking the perceptual tasks of the human brain - image or speech recognition	Grasping conversations or causal relationships	Merge deep learning with other methods to achieve true AI

To understand AI in this 21st century cyber-world, we must review the Internet of things (IoT), and adaptive progression. AI is the wits that will enable analytics and governing from data collected by IoT. On the other hand, IoT is the billions of computing devices set in objects and connected through the Internet allowing data to be sent and received (Muench, 2014). Put differently, AI deciphers this data so that it is sensible and coherent.

Internet of Things (IoT) and the Human Factor

In this 21st century Digital Age, the world is becoming more and more connected. As given by the Business Insider Intelligence (2019), Internet of Things Report, through the integration of modern day devices by internet linkage, the overall IoT market is on track to expand to over $3

trillion annually by 2026. The differentiator that will facilitate organizations to persist in competitiveness is digitization and a relentless increasing system of mobile and wearable devices (Bhatia, 2018). This differentiation is changing and altering the manner in which organizations do business. These changes affect people, processes, and technology. First, let's gain a better understanding of the IoT and then how IoT relates to human capital.

The term 'things' characterize physical devices and machines, in addition to virtual functions and services (Muench, 2014). The Internet of Things (IoT) continue to unveil wholly new realms for organizations to address their persistent concerns of linking the devices and utilizing the information to absolutely effect their decision-making procedure (Aamir, 2019). With this said, IoT is unraveling an utterly new range of scenarios and use cases wherein organizations can turn the actions of the IoT into actual operations.

The swift growth of IoT has generated an intellect of insistence to recruit and retain high ability engineers and decision-makers who drive direct influence within their individual organization by driving innovation and leading growth (Bhatia, 2018). Consistent evolving market trends and shifting forces combined with progressing technology plus an universal landscape form the vigorous skill sets industry leaders require the workforce to have and maintain in order to continue as vital performers in the field (Bhatia, 2018). Worldwide, organizations and governments are transforming to the integration of IoT to diverse facets of businesses for instance such as human resources, manufacturing, marketing, and others. Policies are being created and implemented wherein human resources development is one of the significant pillars of IoT effectuality. Organizations and institutions of higher learning are working together to educate the masses to understand the need of IoT as well as what leaners need to know. Examples in Indian corporations are introducing IoT in areas such as developing and implementing IoT academic curriculum, launching worldwide student exchange programs, developing know-how in the field to even the demand for IoT skilled people, also establishing awareness through the media (SHRM India, 2018).

The introduction of IoT into the noted vast areas will support the plethora of emerging tools and technologies such as smart speakers, machine learning, and 5G. These changes are expected to permit enormous efficiency gains in addition to more control in workplaces and homes. Five industries are noted as driving the IoT and they are consumer electronics and cars, healthcare, manufacturing, transportation, and utilities (DeNisco-Rayonne, 2017). Within these industries the human factor will continue to be able to work through people-centered things such as, real-time flexibility, definitive assessment, and employing calculated hand maneuvers with objects, in addition to work on tasks within environments outside of factory walls which are vastly problematic for robots (Hodson, 2018).

Adaptive Progression, Learning, and Human Capital

Today we are in a transformative worldwide economy. To remain viable in this shape-shifting environment organizations must be able to be nimble and adaptive. Adaptive describes people and processes that are flexible, malleable or pliable. Progression is the practice of developing or evolving steadily towards a more forward-looking state. Therefore, adaptive progression is about advancing in the comprehension and application of new information, whether people or machines, increasingly in today's ever-changing world. On the other hand, learning is about increasing in discernable know-how as regards to some educational objective.

Artificial intelligence is being used to dynamically modify information as necessitated for each individual's workforce needs (Posner, 2017). As these budding technologies and methodologies redesign organizational learning, adaptive learning, is rising to the forefront of interest (Posner, 2017). Instead of continuing through learning in a direct and undeviating manner, adaptive learning allows learners to gain knowledge in needed areas as efficiently and effectively as possible plus according to current knowledge of the subject matter. This change drives towards mastery of information as opposed to what can be learned in a certain amount of time. As related to human capital, the progression of knowledge, skills, and ability is a needed staple for AI. Specifically, new and enhanced knowledge has to be focused towards learning information that is concentrated in the areas that drive AI maintenance, to include adaptive progression development, and training (people and machines). Examples of organizations entrenched in adaptive progression are Waze, Amazon, the medical field, and the legal profession.

Artificial Intelligence and the Fifth Industrial Revolution

Arisen out of innovation and computational power is what is believed to be the fifth industrial revolution (Ericsson, 2019). Globally, the world has crossed the threshold into an innovative era of intelligent and super-intelligent machines. Industries are starting to personalize machines and systems to meet high-demands of individual consumers. This evolution of AI and humanity is also referred to as Industry 5.0 (Rossi, 2018), and recognized as the advancement from 4G to 5G. 5G mobile broadband, a driver of Industry 5.0 is building from the fourth industrial revolution, and modifying the socio-economic condition for all mankind (Muir, 2019), is functioning on a larger scale than Industry 4.0. Through Industry 5.0 is the establishment of higher speeds, lessened latency, in addition to amplified dependability and capacity (Ericsson, 2019). Industry 5.0 denotes the essential interaction sandwiched between people and machines; it regards robots supporting people to work better and faster (Østergaard, 2019). Rossi (2018) alleged the effect of industry 5.0 on humans is that businesses will be able to craft

higher-valued jobs and that these businesses will be able to allow employees the autonomy of design responsibility as opposed to manufacturing processes. Also, people will be able to focus on non-laborious tasks. For example, an AI onboarding solution will free the time of those in human resources to perform more strategic tasks (Muir, 2019). Collaborative robots and cobots will lead the next industrial revolution; in terms of the workplace this industrial revolution will experience increased human-robot collaboration (Gotfredson, 2016; Nahavandi, 2019). Let's review salient points about the human-centric fifth industrial revolution and its sustainability.

Three key points to remember about the fifth industrial revolution is that humans will be the focus, not machines (Fazzi, 2018' Muir, 2019). Human efficiency and productivity will be intensified (Østergaard, 2019). Whether it is termed Industry 5.0 or the fifth industrial revolution, this trend of technology is on a path of forward movement of no return (Fazzi, 2018). While there are positives about AI and its connection to people, crucial critiques exists.

Critique of Artificial Intelligence within the World of Human Capital

In the course of the fourth industrial revolution (Industry 4.0), the world is experiencing the breakdown of borders connecting the real world, the virtual world, as well as machines (Kohler & Weisz, 2016). For example, terabytes of data can be housed remotely and transferred around the biosphere within minutes due to the progression of computer technology (Lewis, 2017). Entrepreneurship is now able to contribute to not just local and national, but to global economies (Studdard et al., 2016). Also, mobile learning continues to virtually connect people across the world (Burton, 2016). Last, IoT tools are permitting manufacturers to observe individual environmental conditions and adjust them, whether automatically or through remote human interaction, according to occupancy or operational requirements (Sykes, 2019). The confluence of technologies continues to drive the fourth industrial revolution. Let us take a look at the critiques regarding Industry 4.0 and the given implications.

Critiques of the term and concept of Industry 4.0 contend that improvements in technology have constantly been slow and steady subsequent to the beginning of the industry (Lewis, 2017). Furthermore, critiques assert that the present view of Industry 4.0 suggests that technological innovations have just lately transpired from a stationary period of time; in spite of this believe, the information is not accurate (Lewis, 2017). Since Industry 4.0 comprise concerns about artificial intelligence, big data capture and analysis, as well as record levels of connectivity, the reservation is about the concerns of Industry 5.0? How much will robotics play a role over humans?

A more compelling question is whether the whole of the fifth industrial revolution will help to enhance human life? According to Naidoo (2019), the Industry 5.0 will eliminate people's job

tasks and leave the tasks to machines that are, without people involvement, able to deliberate and learn independently. During the 2018 World Economic Forum in Davos, Jack Ma offered his leadership advice regarding AI, specifically noting that big data is a menace to humankind (Chainey, 2018). Even though not at the conference, Makridakis (2018) purported that the proponents of AI assert a future when AI will attain and then transcend human intelligence, thus realizing singularity, a period when machines and robots would be efficient enough to do all manual and mental tasks, at present, completed by human-beings. This change will present the initial impressive competitor to humans' governance of the world (Makridakis, 2018). Within this same text, Makridakis (2018), offered that the serious concern is not about AI's past successes, but more accurately the future direction of technology (i.e., machines and robots fueled by AI taking over human labor), and the inferences of upcoming developments in every phase of human lives (i.e., work, societies, conceivable mass unemployment, and enormous income disparities). Other questions continue to loom.

Will the fifth industrial revolution usher in new positions that change the trajectory of education? Whether concern or challenge by higher learning institutions be the driver to prepare learners for position requirements of Industry 5.0. People will need to be prepared to make changes in their careers, particularly the jobs that will disappear due to automation. Let's review Table two regarding new jobs for Technology 5.0.

Table 2: Job Changes for the Fifth Industrial Revolution (Industry 5.0)

Declining/Changing Human Jobs	Industry 5.0 Robotic Jobs	Why the change?
Assembly lines	Automates Processing	Software and robotics can outpace people regarding repetitive tasks
Cashiers	Self-service Checkouts	Decrease organizational costs
Data Analysis	Statistical Process Control Analyst	Robot able to process the data faster and incorporate more data into the analysis
Drilling	Automated Drilling	Shift to automated, collaborative systems
Data Entry	Automated Analysis	Shift to automated, collaborative systems
Manual and paper-based processes	Automated Processing	Digitization
Sales Representatives	Automated Assisted	Sales representatives will gain knowledge from AI about where to focus to meet sells quotas

While new roles will emerge for people, the challenge will be to get enough people educated to handle the needed jobs. Examples of new positions will be the work of Chief Ethics and

Humane Use Officers, supervisors for new automated systems, staff to affect immediate pronouncements, and staff seeking occasions to raise quality and production procedures. The challenging understanding that has to be disseminated to workers is that robots and cobots can fulfill the automated manufacturing of goods. Internet of things (IoT) devices beside the manufacturing line will be able to gather significant production data. Automated systems or devices will monitor data to pinpoint information for anything out of the ordinary. If data is found to be inconsistent or out of line, systems will activate a procedure that will alert the assigned employee to act and make the required decisions. Other critiques exist for AI.

Will there be a calamity of trust for technology by the human component? In line with the Center for Democracy and Technology (2019), more than not, Algorithms engender advertisements for being more precise, less subjective, or more proficient than people in terms of decision-making or accomplishing tasks. But then again, akin to decisions made by people, limitations exist considering the limits on trust to place on automated decisions as tools outputting such decisions have been documented to exaggerate or cloud their practicality or correctness, thereby provoking undeserved trust (Center for Democracy and Technology, 2019). Correspondingly, it remains blurred as to whether algorithms are able to identify their own imperfections any more than a group of people can ascertain if they are accurately demented (Burt, Veale, Stiefel, Williams, 2018). Other trust statements exist. Lauchlan (2018) spoke to the attrition of the trust of people regarding social media. Rossi (2019) offered concerns about data handling and who will handle the AI systems. Suspicion exist about conceivable biased choices that AI algorithms could produce (Rossi, 2019). Another misgiving is about the answerability and obligation when AI systems are mixed in the problem of unwanted consequences (Rossi, 2019).

While AI holds the promise of delivering valuable insights and knowledge across a multitude of applications, broad adoption of AI systems will rely heavily on the ability to trust their output. Human trust in technology is based on the understanding of how it works and the humanoids assessment of its safety and reliability. For example, the app, Grammarly, an automated grammar checker, as offered by Max Lytvyn, co-founder of Grammarly, utilizes AI and machine learning to support the enhancement of individual's writings by offering recommendations and clarifications for the purpose of gaining users' trust (Geron, 2017).

To attain an optimistic and sustainable usage of AI, developing individual trust concerning this type of technology turns into an exceedingly serious task (Kim, Park, & Lee, 2018). Consistent with (Mojsilovic, 2019), in order to trust a pronouncement given by an algorithm, there is the requirement to know that the information is dependable and fair, plus the information can be depended upon and will not trigger any harm. Also, confidence is needed

that algorithms cannot be tampered with and that the system remains safe (Mojsilovic, 2019). Further, AI professionals will require confidence that the worth and norms of this 21st century societies are also mirrored in diverse systems' outcomes. Until there are sound answers to the noted concerns, people will continue to be devoid of trust for AI systems.

SEMI-STRUCTURED EXPLORATORY GROUNDED THEORY INTERVIEWS

Qualitative research contains non-statistical approaches of investigation to examine social phenomena using inductive processes. Through the inductive reasoning process, themes and categories emerged from collected semi-structured interview data, all through data analysis period. The relatively small numbers of semi-structured exploratory grounded theory interview participants, 10, maintained the distinctiveness of each examination. Participants contributed from the fields of Cyber-security, Information Technology, Higher Education, Innovation and Technology, Risk Management, Automotive Technology, Music Technology & Academia, Diversity & Inclusion, Law, and Healthcare. Emergent themes were used to ascertain meaning from the phrase *in this artificial intelligence era human capital is needed for companies to accomplish goals, cultivate, as well as remain innovative*. The qualitative data offered descriptive information regarding lived experiences of the semi-structured interview participants (Burton, 2014). This research information provided participants' observations and emotional changes contra to define results.

RESEARCH METHODOLOGY

Methodology for this article is qualitative inquiry. Quality inquiry (QI) offers an interdisciplinary opportunity for qualitative methodology and associated concerns in the human sciences for problem solving initiatives (Soltanifar & Ansari, 2016). The article delivers an in-depth and detailed observation which builds openness to inspire individuals to reply on new subject areas not originally contemplated. This methodology will focus on methodological concerns ushered in by qualitative research as opposed to the content or results of the research. Further QI focused on progressions in explicit methodological strategies or techniques. Specific designs for this article were literature review, semi-structured interview, and intrinsic exploratory case study.

Literature review as a research design maintains an objective and realistic method (Anees-ur-rehman, Wong, & Hossain, 2016). This type of design explains how the proposed article was linked to prior data exploration (Narayanamurthy & Gurumurthy, 2016). Also literature review displays the novelty and significance of the research concern. Next is semi-structured exploratory grounded theory interview.

Semi-structured exploratory grounded theory interviews were employed to assemble focused, qualitative textual data. Conducted for one hour conversationally and with one participant at a time (Adam, 2015), the semi-structured exploratory grounded theory interview research used a blend of closed and open-ended questions, frequently supplemented by questions such as 'why' or 'how' (Acheampong & Berko, 2015). By using the semi-structured exploratory grounded theory interview technique, this researcher had more control over the subject manner of the interview. Theoretical sampling, intended to generate and develop theoretical data, was the method used to select respondents for interviews, and involved selecting interview participants based on explicit characteristics (Cunningham & Carmichael, 2017). The last design is case study.

Intrinsic exploratory case study was used to examine phenomenon inside its context employing an assortment of data informants to maintain that the issue is not investigated via one lens, conversely a collection of lenses which allows for various sides of the phenomenon to be exposed and comprehended (Lune & Berg, 2017). This researcher chose intrinsic design due to having a sincere interest in the case with the goal of improved comprehension of the case and the dynamics within the case (Baranchenko, Yukhanaev, & Patoilo, 2014). The exploratory aspect is to search those conditions in which intervention being reviewed has no lucid, single set of results (Pitchayadol, Hoonsopon, Chandrachai, & Triukose, 2018). Data will be gathered and amassed using the particulars to build a larger conclusion.

LIMITATIONS

Methodology and design limitation/boundary conditions subsist for this article. The first limitation is the semi-structured exploratory grounded theory interview design which requires a limited sample size, 10-20 (Blandford, 2013) for the number of the units of analysis. This researcher understood that qualitative sample sizes must be large enough to gather data to adequately explain the phenomenon of and address the research examination with the goal of attaining saturation (Boddy, 2016). As given by Glaser & Strauss (1995), sample size in most qualitative studies should largely keep with the notion of saturation, when the gathering of new information does not illuminate any additional data on the concern under examination. Also, application of semi-structured exploratory grounded theory interview allows for self-reported data. Self-reported data from the selected subject matter experts can have unknown bias (e.g., attribution, selective memory, telescoping, and exaggeration). The second overall limitation is the use of qualitative methodology. First exists the inability to generalize the research findings. Even though data shows that generalizability is not the mission for qualitative study; through qualitative examination was gleaned transferability of information from reports and descriptions

being correct and precise representations of the phenomenon referred and are backed by evidence (Parker, & Northcott, 2016). Participants were chosen using theoretical sampling, the participant's aptitude to offer data which could provide consequent theory development (Carmichael & Cunningham, 2017); in other words, provide transferable constructs in the area of research examination (Parker & Northcott, 2016). Next is the possible out comes from the data. However, diverse viewpoints chronicled were examined based on the limited comprehension of the homogenous group of participants.

DELIMITATIONS

Delimitations, choices made by the researcher, include this article's focus on artificial intelligence and human capital. Further, this text, within the realm of cyber security and AI, is not centered on systems and machines, but human capital. Also, this article will not center on incorporating intelligence, compassion, and empathy into technologies, thus planning and generating previously mysterious technology and services. Comprising all of these information points would make the journal article far too complex. Such delimitations were set as this researcher is separately researching specifics of the following – cyber security, AI, and machines.

RESEARCH FINDINGS

Responses to each interview question are summarized in this section. Included were discussion points developed from the qualitative semi-structured participants' interview sessions. Nine tables of themes were documented. Per each set of themes, there is an overview with quotes attributed to the participants. Next are the themes and the discovered data.

Responses to Semi-structured Participant Question 1

To answer the first (1st) research question, semi-structured interview participants were asked the following, "*In what ways can the use of artificial intelligence enhance your business operations or processes*"? Qualitative content analysis of participant responses yielded 3 themes that corresponded to the usage of artificial intelligence and how it enhances business operations or processes. These themes were shown in Table 1 and further described in the text using sample responses from semi-structured interview participants. Examples of semi-structured participant responses were as follows. According to K. L. Brown-Jackson, Sr Medical Reg, QMS SME, ACTTP, & National Science Foundation Fellow (personal communication, October, 8, 2019), "By using AI, we can unravel patterns and trends in medical data, a

fundamental to addressing healthcare's most clamoring problems regarding predictive and preventative care." "Currently it [artificial intelligence] assists composers in creating compositions for the entertainment industry and providing the content in the formats needed for the industry," (W. E. Smith, Assistant Professor Music Technology, Hx2 Enterprises Composer, Author & Music Business Consultant, personal communication, October 22, 2019). "I believe that the term AI is somewhat of a hyperbolic moniker assigned to both distinguish and corroborate the directional nature of machine learning," (L. Jones, Cyber Security and Risk Management professional, personal communication, October 11, 2019). Also, the benefits of AI would be utilizing the technology to automate routine processes for areas in business, IT, HR, etc. without the need for smart hands/live person." Review the three (3) analyzed themes in Table 3.

Table 3. Themes Identified from Responses from Question 1

Theme Numbers	Themes
1.1	How is artificial intelligence impacting change in business fields?
1.2	How can artificial support communications in business fields in terms of solving concerns?
1.3	Where to use AI in that it will be most effective.

Theme 1.1 is *How can artificial support communications in business fields in terms of solving concerns*? One participant replied, "AI is already making an impact on our industry in the form of mixing software and sound analysis software. There are recent attempts at actual artificially composed music. Even though systems are being used to handle the mixing, people are needed in terms of the analysis" (Hodson, 2018). "It [AI] can also help employees determine the best benefits and resources for them. These participants' thoughts are in line with Hodson (2018) in terms of machine learning algorithms allowing people to work on the things they do best like real-time flexibility, definitive assessment."

Theme 1.2 is *How is artificial intelligence impacting business and human capital*? A participant stated, "AI could assist me in interpreting complex HR legal situations. Working through forms could take hours by an individual attempting to track the data." "I appreciate its [AI] undeniable utility; to the extent that we will be able to contain its progressive learning and ability to take decisive action over human will." Conversely, AI will function in communication to help with determining learning paths for employees." This theme supports the Dimiduk et al.

(2018) notion that AI algorithmic artificial neural network absorbs information and then delivers knowledgeable information that is impactful to businesses and their human capital.

Theme 1.3 is *Where to use AI in that it will be most effective*. A participant stated, "In automotive repair, is where AI will be most effective. It is difficult to use AI except in instances for diagnosis. Shipping and driving is where AI will play a major part." Other participants offered information on how AI can be most effective. "Data analysis is where AI will serve industries the most. This is because it takes too many people to mine data and get the most accurate results."

Responses to Semi-structured Participant Question 2

To answer the second (2nd) research question, semi-structured interview participants were asked the following, "*What do you see as the impact of artificial intelligence on people in your workplace?*" Qualitative content analysis of participant responses yielded 3 themes that corresponded to the question. These themes were shown in Table 2 and further described in the text using sample responses from semi-structured interview participants. Examples of semi-structured participant responses are as follows: "It [AI] is definitely helping to make music composition and production easier and faster but there are those who would argue that the quality of the music and production has declined due to the ease of access to music production software and the knowledge of the details of music composition is decreasing," (W. E. Smith, Assistant Professor Music Technology, Hx2 Enterprises Composer, Author & Music Business Consultant, personal communication, October 22, 2019). Even though technology can be good, it is driving change in terms of people interaction. It seems that AI is affecting the self-employed; it is believed that the self-employed do not have access to AI as those who work in brick and mortar offices (Manne, 2019). Also, workers with higher pay are less prone to be affected by AI (Manne, 2019). Review the three (3) analyzed themes in Table 4.

Table 4. Themes Identified from Responses from Question 2

Theme Numbers	Themes
2.1	How is artificial intelligence deducing skillsets in business fields?
2.2	How will artificial intelligence affect employee hiring and teaming decisions?
2.3	How will artificial intelligence determine success rates of human interactions?

Theme 2.1 is *How is artificial intelligence deducing skillsets in business fields?* One participant replied, "There may be a natural phase out of many jobs, however many more will crop up as technology and the digital age continues to advance. The impact on the work force of today and in the future will be to keep up with existing and emerging technologies. Our lives and our livelihoods will depend on it." This participant spoke directly to changes in skillsets due to emerging technologies. Another participant offered, "Implementing AI could possibly impact the reduction of workforce which has it negative and positive sides." Yet another offered, "Technological knowledge in the diverse fields will certainly affect hiring, as employees of tomorrow will need to be able to work alongside robots."

Theme 2.2 is *How will artificial intelligence determine success rates of human interactions, thus affect hiring and teaming decisions?* "I think as with any new technology there are good and bad consequences." Another respondent added, "I think as with any new technology there are good and bad consequences." Look at this response. "I do not think it's cliché to think that robots and cowboys will replace many of the jobs that exist today through artificial intelligence, particularly when you consider that two out of three children in elementary school today will have jobs in the future that do not yet exist."

Theme 2.3 is *How will artificial intelligence determine success rates of human interactions?* "Determining success rates for employees will become very tricky. The concern is that companies will begin using AI powered relationship bots in an attempt to forecast the success of relationships between people, trustworthiness, empathy, and other qualities that typically would be understood through direct experiences with people." "The concern with AI determining success rates of human interactions lies in the training of the relationship bot. The key question is will the bot have the needed skill to interpret diverse behaviors of people from the across the United States, let alone the world?"

Responses to Semi-structured Participant Question 3

To answer the third research question, semi-structured interview participants were asked the following question: "*In what ways do you think the introduction of artificial intelligence will change or influence the culture of your organization?*" One anonymous participant offered, "Initially, I don't think AI would influence the culture of my current organization, they would be very resistant to it." As given by W. Cekala Jr., Vehicle and Equipment Supervisor (personal communication, October 8, 2019), "Artificial Intelligence will change the automotive industry for sure, particularly how mechanics repair vehicles. This change will be due in large to the hundreds of sensors installed throughout vehicles." Also, according to W. E. Smith, Assistant Professor Music Technology, Hx2 Enterprises Composer, Author & Music Business Consultant,

(personal communication, October 22, 2019) offered, "I feel, in general, AI will have a positive impact on music composition and production. There are more opportunities for the use of music in society, and the use of software and hardware makes the delivery of music faster, cheaper and more accurate to the situation. Because of this, however live musicians may lose some work. Also, the roles of certain musicians have changed." For example, "drummers are now using drum machines alongside their drum sets. Keyboardists are programming musical sequences as well. This affects the culture by how artists interact. Because the drummer can program percussion he/she does not need to hire a percussionist. The keyboardist does not need to hire a string quartet or brass quartet. AI will also affect the amount of pay each musicians receives based on the role they are playing. Also, the change will also affect who will be hired to play. Knowledge of music software and hardware are key to accessing work." Review the three (3) analyzed themes in Table 5.

Table 5. Themes Identified from Responses from Question 3

Theme Numbers	Themes
3.1	How is or will artificial intelligence change culture specifically within organizations?
3.2	How will artificial intelligence serve as a major disruptor of business and industry?
3.3	What are the main cultural angles that AI will impact?

Theme 3.1 is *How is or will artificial intelligence change culture specifically within organizations?* One automotive industry participant said, "Mechanics will ask their phones questions about tough vehicle repairs and get links to where to find answers." Knowledge exchange between mechanics could experience a decrease; however, "not sure of this program at this minute." An IT professional said, "I believe AI can be intimidating for the organization because people don't have an understanding of it and how it benefits people, processes, and technologies." "When people do not understand artificial intelligence, this void of understanding can have a negative impact an organizational culture, an example being fear instead of embracing AI change."

Theme 3.2 is *How will artificial intelligence serve as a major disruptor of business and industry?* A health and regulatory leader offered, "Artificial intelligence is primed to become one of the most significant business disruptors of this century. Driving towards disruptive innovation,

organizations are seeking to understand as well as implement the positive impacts of AI on organizational culture. The change is a shift in paradigm from fearing AI and calculating AI as a threat to grasping opportunities accessible through new AI and cognitive technologies." A risk manager replied, "I've heard it said in a couple of different technology related conferences that in the near future all organizations will become technology companies and the business that they happen to be in specifically, will be secondary to there being a technology company. For example, all banks will become technology companies that are in the banking industry. In fact, that was a statement made by a chief information officer of a large bank. As a leader who currently works in the retail industry, I believe that artificial intelligence will impact the industry in ways not yet known."

Theme 3.3 is *What are the main cultural angles that AI will impact?* "AI will manage culture by organizations conducting individual AI 'as-is' cultural assessments. Using AI allows for pulling in more data than what could be feasibly analyzed by one person or possibly a team of people to determine behavioral patterns. Viewing the behavioral data sets will enable organizations to understand better their individual cultures. Also, using AI will allow organizations to know their individual target cultures. AI could be used to predict the best target culture through the usage of hundreds of thousands of external and internal data informers." Another respondent added, "AI's real ability to impact cultural angles will depend on the manner in that the algorithm is trained. In other words, will the informing data be one sided (a few cultures) or be developed from data sources of all cultures." Review the three (3) analyzed themes in Table 5.

Responses to Semi-structured Participant Question 4

To answer the fourth (4th) research question, semi-structured interview participants were asked the following, "*In what ways do you think that the introduction of artificial intelligence will impact or influence the structure of your organization?*" According to one anonymous respondent, "I do believe it will have to do with the ready identification of fraudulent activities, asset protection, cybersecurity, supply chain and other areas." W. Cekala Jr., Vehicle and Equipment Supervisor (personal communication, October 8, 2019) offered "Impact will include needed in-depth investigative and research processes." Other input included, "Higher education needs to respond sooner rather than later. We - administrators and educators - are churning out students into a world where artificial intelligence job have not been wholly defined, and these students are not completely prepared to operate within this evolving ubiquitous technology,"(H. R. Harris, Director of Innovation Center, personal communication, October 24, 2019). "I believe implementing AI will have an impact regarding reductions of workforces of people onsite" (J. V.

Noel Sr., SPHR, retired Human Resources Director, and now University Professor, personal communication, October 22, 2019). Review the three (3) analyzed themes in Table 6.

Table 6 Themes Identified from Responses from Question 4

Theme Numbers	Themes
4.1	How is artificial intelligence impacting change in business fields?
4.2	What types of organizational restructurings are advances in AI causing?
4.3	How will AI impact strategy for diverse organizations?

Theme 4.1 is *How is artificial intelligence impacting change in business fields? One answer was,* "I think there would be a tremendous learning curve for individual organizations. The leadership will be very reluctant to embrace this technology. Also, managers will more than likely feel threatened by the technology. There will need to be tremendous amounts of Organizational Development to cultivate champions to guide the impacts before the organization could experience the value." Here is an example of impact. "If the company goes to the kiosks, AI would arrange work orders in terms of which vehicle needs to be fixed. This change may be able to increase production on a daily basis. Also, for vehicles with the bigger problems, they would be worked last. AI will be able to keep overtime to a minimum."

Theme 4.2 is *What types of organizational restructurings are advances in AI causing?* One explanation is, "AI technological advances are and will continue to cause restructuring efforts to overall organizational dispositions, human resources departments, hiring practices, as well learning and development initiatives." Specifically, we are transitioning through an era wherein, "We can picture a world where data is fed from many sources such as HR data, exit interviews, induction processes, performance management, business processes, leadership forums, and discussion threads to extract real-time behavior patterns to build an almost daily picture of the culture." "Artificial intelligence may seem to be eliminating jobs, however this is not the case. Actually, AI is impacting the tasks associated with diverse jobs. These tasks include those which are repetitive, highly rule-based and do not require human intervention". With this said, "New jobs are being created which require humans. It is yet to be determined all of the new titles for such jobs."

Theme 4.3 is *How will AI impact strategy for diverse organizations?* One explanation is, "Different organizations are or will be driven to rethink established strategies. For example, "As

opposed to seeking the absolute qualified individual for a position, the focus will center on cultural fit and adaptability for the job." "People being employed will need more than just skill; they will be required to demonstrate their willingness, as well as ability to acclimate their modes of communication, motivating, and managing athwart countries and different cultures." "As AI evolves, people working with AI will need to progress."

Responses to Semi-structured Participant Question 5

To answer the fifth (5th) research question, semi-structured interview participants were asked the following, "*With the introduction of artificial intelligence what do you see as biggest ethical issues or concerns?*" "An on-going ethical consideration is the potential of replacing live people with AI technology because AI could possibly have the ability not to make mistakes and errors as do humans" (M. T. Lu, ISSM, CASP+, Information Technology professional, personal communication, October 21, 2019). Other AI and ethical considerations include but are not limited to the following:

- Adversaries and Unintended: Determining how to overcome malice in machine learning, as well as with unintended consequences. Adversarial artificial intelligence refers to malicious development of technologies. An unintended consequence could be whether deep learning is used to determine a cure for diabetes. In the long-run, robotics could eliminate people with diabetes, an unintended consequence.

- Artificial Folly: Artificial intelligence systems must be able to perform as intended. Testing is a plus. Humans will be needed to watch and ensure that robotics perform as intentioned.

- Artificial Intelligence Bias: Artificial intelligence systems are created and trained by people. As with training people, systems can be ill-educated and cause grave concerns such as racial profiling - e.g., bank loans, legal convictions, and etc. (Artificial intelligence gets its day in court, 2018).

- Artificial Intelligence and the Distribution of Wealth: The current economic system is predicated on wealth. With this said there has to be understanding of what happens to the wealth generated through robotics. Specifically, what happens with profit sharing when companies owned by employees use robots to generate products and services. A significant question is, how will funding be divided?

- Rights of Robots: Understanding what any human rights are connected to robots. For example, what are the rights when a musician or company uses robotics to create music? Who will get the royalties?

- Safety and Artificial Intelligence: Building a wall for cyber security is and will remain significant. The more technologically advanced systems evolve, the more protection is needed to defend the good and ward against the nefarious.

The notion of developing machines with thinking abilities and capabilities nurtures ethical considerations. Such concerns are two-fold and connect to safeguarding the understanding of thinking machines not hurting or destroying humans plus other morally germane beings, and to comprehending the idea of moral statuses of the thinking machines. Review the three (3) analyzed themes in Table 7.

Table 7 Themes Identified from Responses from Question 5

Theme Numbers	Themes
5.1	What are specific ethical considerations AI will affect?
5.2	What are the concerns around biases and assumptions as these points connect to artificial intelligence?
5.3	Where does AI fit into the overall legal system?

Theme 5.1 is, *What are specific ethical considerations AI will affect?* "There is also the new conversation about musical compositions created by AI and the copyright concerns surrounding them." "Privacy matters during human resource investigations is another concern." "Artificial intelligence, in the future, could enable a deeper level of privacy through the reduction of the number of people needing access to specific information." "In the automotive industry, it is best to be transparent with customers. With AI, customers will not be charged for work not needed because AI will guide the best way to perform needed repairs."

Theme 5.2 is, *What are the concerns around biases and assumptions as these points connect to artificial intelligence?* "Another concern that I see with AI is the lack of consideration for how the technology operates when engaging people of color. I do not think it is necessarily deliberate, but I do think where there is a critical shortage of African-Americans and other people of color at the AI design table. There is significantly less opportunity for the genetics or biometrics that pertain to African-Americans to be integrated into AI technologies. Although the implication is that artificial intelligence is a cognitive process, it is highly dependent on technologies. Therefore, without express considerations that would pertain to all people, there is a great chance that African-Americans and other people of color, specifically, will be left out of

the intent of AI in some ways. For example, this has been a problem in facial recognition technology."

Theme 5.3 is, *Where does AI fit into the overall legal system?* According to Corrigan (2019), AI will need to be used in national security agencies for them to keep up with the abundance of data required to remain a leader in the geopolitical world. An anonymous participant in the legal field offered, "To official and legal governing bodies artificial intelligence algorithms used for societal functions must be expectable. To appreciate the meaning of this type of predictability, contemplate the following analogy. Whenever possible, judges are required to follow previous precedent in terms of decision making. Programmers and machine trainers may consider this understanding to be confounding and ridiculous. A noteworthy concern is, because technology is continuously advancing, what is the purpose of fastening the future to the past?" Keep in mind that legal thoughts regarding AI are not just residing in purely legal systems; we see such penetration in overall organizational development.

Responses to Semi-structured Participant Question 6

To answer the sixth (6) research question, semi-structured interview participants were asked the following question: "*How do you see artificial intelligence applied in terms of people performance?*" According to L. Jones, Cyber Security and Risk Management professional, (personal communication, October 11, 2019), "Systems will have to be trained to develop what is needed for algorithms. Generally, AI relies on extensive volumes of data to attain best possible data solutions." As given by Pawar (2019), performance can be monitored, in real-time, by AI, as well as offer prompt feedback. Such system can help with employee recognition, reward, and development (Pawar, 2019). "Artificial intelligence systems can help to reduce late reviews and upset employees" (J. V. Noel Sr., SPHR, retired Human Resources Director, and now University Professor, personal communication, October 22, 2019). Review the two (2) analyzed themes in Table 8.

Table 8 Themes Identified from Responses from Question 6

Theme Numbers	Themes
6.1	How does artificial intelligence affect the daily individual work load?
6.2	How can artificial *intelligence* support organizational performance?

Theme 6.1 is *How does artificial intelligence affect the daily individual work load?* "I believe that the more "intelligent" day-to-day activities become for the workforce, there will be an increased likelihood of not having to put as much focus and innovative thought into potential opportunities. A simple example would be the fact that a couple of decades ago the average person had to remember phone numbers. Now, we have databases at our fingertips that holds those numbers so we no longer have to allocate mindshare." Another semi-structured interview participant offered the following, "I believe that as devices become increasingly connected, there will be more reliance on artificial intelligence. At the highest point of this happening, I would wonder if artificial intelligence would possess the ability to be innovative or will there be an opportunity for humans to continue on a creative path."

Theme 6.2 is *How can artificial intelligence support organizational performance?* "AI technology has the ability to increase the workload and processing that people may not have the ability to do." "What AI will do to support people is to bring forth jobs that must be performed by people." "Also, AI could take over work and staff scheduling. Scheduling could be so that AI takes over to ensure better efficiency." "In the automotive field, AI will remove gut feelings and ensure the right parts are replaced. This change could improve an overall shop's performance." Additionally, "AI can consistently improve employee engagement. Changes can occur through the development of AI driven on-boarding experiences, tracking employees' feelings more often to gain understanding of job satisfaction, determining learning and development needed per employee (e.g., leadership, advancement, and development), as well as recommendations on how to organize teams to get the best outputs."

Responses to Semi-structured Participant Question 7

To answer the seventh (7th) research question, semi-structured interview participants were asked the following, "*In terms of artificial intelligence devices (i.e., Siri, Alexa, Cortana, smart phones, televisions, doorbells, etc.) and how do you understand them to be applied in terms of people in the workplace?*" Having AI devices in the workplace is changing the trajectory of office and water cooler language as it captures wording, resonance, and mawkishness (D'Allegro, 2018). During an interview, L, Jones, Cyber Security and Risk Management professional (personal communication, October 11, 2019) offered, "These devices can serve as instantaneous communications, and alert systems." Also, "The use of voice activated assistant devices are being introduced in some offices, and more research is being conducted in other offices regarding the best way to use the devices,"(M. T. Lu, ISSM, CASP+, Information Technology professional, personal communication, October 21, 2019).

Voice activated assistant devices have been used to add events to office calendars, and set reminders for meetings (Zakrzewski, 2017). "Another purpose for voice activated assistant devices is to search for information on the world-wide-web," (M. T. Lu, ISSM, CASP+, Information Technology professional, personal communication, October 21, 2019). Additional detail came from the interview with (L. Jones, Cyber Security and Risk Management professional, personal communication, October 11, 2019). "There are benefits to having devices connected, and some belief of productivity gains." "On the other hand, there are also numerous risks (e.g., privacy and security) that are involved," (J. V. Noel Sr., SPHR, retired Human Resources Director, and now University Professor, personal communication, October 22, 2019). Review the three (3) analyzed themes in Table 9.

Table 9. Themes Identified from Responses from Question 7

Theme Numbers	Themes
7.1	How is or will the accuracy of artificial intelligence's voice recognition affect the workplace?
7.2	What could be specific workplace benefits of artificial intelligence assistants?
7.3	Other than productivity, what is the attraction of artificial intelligence assistants to the workplace?

Theme 7.1 is *How is or will the accuracy of artificial intelligence's voice recognition affect the workplace?* The office environment poses challenges for which intelligent assistants are not ready to handle, such as full voice recognition. "This voice recognition is being able to track exactly who is talking during meetings and associate their spoken words". The concern here drifts back to human resources, as well as legal concerns regarding privacy. Another concern with intelligent assistants is that natural language process technology is not fully perfected (Gebhart, 2017), therefore full attempts to comprehend users' requests remains complicated (Han, & Yang, 2018). Yet other concerns are, "Social biases regarding voice tones and sexist natural language processing." "We are living in a time of constant change; the information we thought we knew is no longer exact. Also, we have stepped into the fourth and fifth revolutions and are now living in the era of 'voice recognition' where the junction of artificial intelligence and voice recognition has changed and continues to change the way we all live" (D. N. Burrell, Faculty, Organizational Social Scientist & Leadership Development Consultant, and Certified

Diversity professional, personal communication, October 15, 2019). "Let me add that before purchasing any voice recognition software, organizations should perform risk assessments to understand any additional risk brought on by the procurement. User acceptance testing is also requisite to be sure the software will deliver intended results. The goal is to implement an effective solution that drives business value and provides an ample return on investment," (L. Jones, Cyber Security and Risk Management professional, personal communication, October 11, 2019). Voice recognition software remains in its infancy; therefore, more research is needed in this area for all voices tones to be understood.

Theme 7.2 is *What could be specific workplace benefits of artificial intelligence assistants?* "Artificial intelligence assistants are useful in providing real time access to knowledge and for providing support in the form of ease of access to systems (e.g., computers) and possible entry access (e.g., secured elevators)." Other uses of intelligent assistants include but are not limited to researching recorded conversations to include telephone calls for the purpose of locating significant talking points (Nicastro, 2017), and transcribing meeting minutes (Zakrzewski, 2017). Another example of artificial intelligence in the work environment is the use of robots in restaurants. The restaurant, Robot Captain Crabs, located in Newark, use two hostess robots, as well as three additional robots to serve customers (ABC Action News, WPVI-TV, 2019). Important to know is that the human jobs are still in place. Further gain is workplace productivity. Moreover, as technology advances, the use of AI in the work place continues to gain momentum.

Theme 7.3 is *Other than productivity, what is the attraction of artificial intelligence assistants to the workplace? "*The drawing attraction to artificial intelligence assistants in the workplace could be the theory of parasocial relationships, partisan relationships, wherein individuals tender emotional energy, concern and time to another party, (e.g., personality, character, figure, and etc.) wholly oblivious of the other's actuality," (K. L., Brown-Jackson, Sr Medical Reg, QMS SME, ACTTP, & National Science Foundation Fellow). Attractions related to AI assistants for business leaders and decision makers to grasp are task, social, physical, and security (McCroskey & McCain, 1974). Task attraction denotes users' perception of AI assistants' abilities to finish given tasks, plus, trustworthiness to work in partnership (Han and Yang, 2018). The next attraction is social. The research of Han & Yang (2018) described social attraction as an operator's aim to interconnect and befriend artificial intelligence assistants. Described are users' associations of humanness to the voices of the assistant, thereby offering the context a human-computer interaction. The last attraction, physical, stems from the look of artificial intelligence assistants, and indicates that there needs to be a level of attractiveness to the assistant (Han & Yang, 2018; McCroskey & McCain, 1974)

Responses to Semi-structured Participant Question 8

To answer the eighth (8th) research question, semi-structured interview participants were asked the following, "*It is stated that artificial intelligence is having an effect of jobs in the work place, what are your thoughts?* According to D. N. Burrell, Faculty, Organizational Social Scientist & Leadership Development Consultant, and Certified Diversity professional (personal communication, October 15, 2019), "artificial intelligence is precipitously affecting daily living in numerous industries (e.g., academic, law, automobile, healthcare, engineering, and others). Also, AI is affecting and in some instances substituting human employment (e.g., sales, marketers, proof readers, customer service, and teaching)." Data shows the fourth industrial revolution changed the manner in that the world operates (Prisecaru, 2017). "Now, the world is faced with future technological displacement of labor forecasted to be momentous" (J. V. Noel Sr., SPHR, retired Human Resources Director, and now University Professor, personal communication, October 22, 2019). "There must be checks and balances to ensure people are educated and trained to be able to sustain in this technological world. Businesses must work to guard against levels of catastrophic societal unemployment," (D. N. Burrell, Faculty, Organizational Social Scientist & Leadership Development Consultant, and Certified Diversity professional, personal communication, October 15, 2019). "AI will definitely have an impact in the work place as it is designed to increase production while making less or no errors in processing information" according to (M. T. Lu, ISSM, CASP+, Information Technology professional, personal communication, October 21, 2019). Moreover, artificial intelligence impact jobs. Review the three (3) analyzed themes in Table 10.

Table 10. Themes Identified from Responses from Question 8

Theme Numbers	Themes
8.1	How will artificial intelligence impact jobs?
8.2	What can be done to reduce the effects of artificial on jobs roles?
8.3	How to analyze the potential impacts of artificial intelligence?

Theme 8.1 is *How will artificial intelligence impact jobs?* "Humans can only access so much of their brains' powers, but artificial intelligence infers that intellect can be far reaching with unbridled capacity." With this said "data shows that, for forward thinking organizations, AI will streamline some HR functions like benefits and performance evaluations; however, new jobs

will be discovered which require the human touch. I think that HR is heavily invested in a high-touch culture, and AI is more of a high-tech view." Another semi-structured interview participant offered the following. "Impacts to jobs will be realized for such jobs with the majority of the tasks being able to be automated, and for job functions requiring large numbers of workers such as assembly lines."

Theme 8.2 is *What can be done to reduce the effects of artificial on jobs roles*? Reduction of the effects on artificial intelligence on jobs stem in understanding the job functions and what is needed to move to the next level of productivity. "Business leaders and strategists have to understand that jobs, crosswise the entire employment gamut, are concurrently challenged by artificial technology's combining of the speed and efficiency of learning machines with the imagination and thinking of people. Increased output due to AI may not mean increased employment. There has to be for-thought of future skills needed as well as the development of education to meet such needs. Such thinking will require research and think-tanks." "Focus must be geared toward whether workers will be able and prepared to alter current skill sets before being replaced."

Theme 8.3 is *How to analyze the potential impacts of artificial intelligence?* "The analysis of artificial intelligence impacts will more than likely be via various frameworks, and then developed through diverse models. Whether the models be ones like exploring jobs data and then analyzing the automation potential, or researching and developing hundreds of AI use cases and then studying such use cases to estimate their impact on jobs, the outcomes must be studied in an effort to reduce major societal and political upheaval."

Responses to Semi-structured Participant Question 9

To answer the ninth (9th) research question, semi-structured interview participants were asked the following, "*What are you or will you do to prepare for the advancement of artificial intelligence in the workplace?* All of the semi-structured interview participants had similar response to this question. Let's review some of the responses. One anonymous respondent stated, "Artificial intelligence is affecting the legal world immensely. To increase my knowledge, I continue to take continuing education unit credits." Another anonymous respondent offered, "Progressively law enforcement is using AI to amplify their officers and agencies. As an indispensable factor in law enforcement, AI is contributing in many areas (e.g., crowd control and surveillance, facial recognition, and perusing video footage for irregularities). Yet, due to new technological findings, I am constantly attending courses, and reading to learn all I can." As given by W. E. Smith, Assistant Professor Music Technology, Hx2 Enterprises Composer, Author & Music Business Consultant (personal communication, October 22, 2019), "I plan on

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learning the new software and be very proficient in the programming of this technology. I will embrace it." "Recognizing that artificial intelligence will gravely affect the workforce, I will learn more about AI through research and analyzing AI media," (J. V. Noel Sr., SPHR, retired Human Resources Director, and now University Professor, personal communication, October 22, 2019). "Acknowledging the impacts of artificial intelligence, I will prepare by becoming more knowledgeable about AI in the HR community. By becoming knowledgeable I can serve as a champion for this technology," (R. McClintock, M.Ed. MSIST, Sr. Corporate Training Manager, personal communication, October 22, 2019). "I will gain knowledge of AI technology in all aspects and learn the tools that will be utilizing AI," (M. T. Lu, ISSM, CASP+, Information Technology professional, personal communication, October 21, 2019). According to L. Jones, Cyber Security and Risk Management professional (personal communication, October 11, 2019), "I will continue to stay abreast of some of the changes that are happening with machine learning and artificial intelligence and how they apply to my profession of managing risk. To help manage cyber risk, I use automated threat intelligence sources to gather raw data that can be structured and aggregated to better understand threat actors and their potential attack vectors. Also, I am developing information for those in grades K-8 to use for better understanding artificial intelligence." "Recognizing that AI is affecting all industries, reading about AI, I will be ready and prepared when the time comes," (W. Cekala Jr., Vehicle and Equipment Supervisor, personal communication, October 8, 2019). "Healthcare is using artificial intelligence; however, more understanding is required. I am attending seminars, reading white papers and trade journals, and speaking at conferences to remain abreast of the on-going changes," (K. L. Brown-Jackson, Sr Medical Reg, QMS SME, ACTTP, & National Science Foundation Fellow).

Table 11. Themes Identified from Responses from Question 9

Theme Numbers	Themes
9.1	How to prepare to learn more about artificial intelligence and remain abreast of this evolving technology?

Theme 9.1 is *How to prepare to learn more about artificial intelligence and remain abreast of this evolving technology?* Replies to this question wrapped around some form of education. Semi-structured interview participants spoke to enhancing knowledge through attending courses and reading. Other responses were, "I plan to attend conferences, and workshops." Another

answer was, "I intend to become certified in artificial intelligence." Yet another participant offer, "I am considering a Ph.D. in artificial intelligence and cyber security."

CONCLUSION AND FUTURE STUDIES FOR ARTIFICIAL INTELLIGENCE AND HUMAN CAPITAL

Artificial intelligence's influence on the workplace is expected to be profound. Certain jobs, professions, plus definite skills will wane; conversely others will increase and change as people complete job tasks while working beside consistently changing and progressively adept machines (Manyika & Bughin, 2019). The mammoth task is to preserve the flexibility to improve through people, processes, and technology, while splintering blockades that obstruct harmonious change through knowledge growth and collaboration. Society's need to believe that they can trust leadership and implemented systems is waning. According to Benner (2012), after trust has been lost, it extremely problematic to recuperate from the situation.

What has to be understood is that artificial intelligence will not replace humans. Organization will continue to value human interaction. Artificial intelligence is not positioned to offer all needed answers. Automated responses do not always answer questions asked as it is challenging to maneuver all the distinctions of human interaction (Zahabi, 2019). More research is required to develop best practice approaches for implementing human capital in artificial intelligence approaches in organizations. This qualitative semi-structured exploratory grounded theory interview research combined compatible frameworks and methodologies to connect knowledge and practice in a useful manner. Three recommendations can be made based on the findings of this research.

First, more research is needed regarding the determination of new job categories. Data needs to determine whether the job categories will materialize partly or absolutely, therefore displacing others. For all of the job categories, data is needed as to what skill sets will be required. Job descriptions and the understood skill sets should be available for that will be considered the old occupations. For the new occupations, those changed or emerged by artificial intelligence, organizations must understand the manner in that work will transform to include how and where people will work. Also, this data will need to reveal any diverse affects to males, females, and the transgendered. Further data is needed for the dynamics of industry gender gaps. Conducting studies on preparing data for determination of new job categories would add to the body of knowledge for artificial intelligence and cyber security for understanding what jobs will be available. Once people understand job availability in the age of artificial intelligence, they will need to see written descriptions of the avenues to prepare for such job roles.

Second, future research should be how to prepare current and future workers to meet the age of artificial intelligence head on. Data needs to be available regarding the way to approach the subject matter now, not later. People will need to understand that change is coming, and that all jobs will not remain the same. For that fact employees will need to know that certain positions will disappear. For those positions that are expected to disappear, what skills are needed by those workers to remain employed. Also, workers will need to understand how to advance. Conducting studies on preparing current and future workers to work in the advancing age of artificial intelligence would add to the body of knowledge for artificial intelligence and cyber security for understanding the changes to process improvement, and people development.

Other future recommended studies included developing a process for human resource leaders to learn to implement human resource processes and procedures, how to handle ethical considerations when robots and cobots are concerned, and how to better support leaders to lead in a world of robots and cobots. AI has remarkable insinuations across diverse sectors and delivers its own concerns – maybe the largest being the ethical inferences and the influence AI will have regarding jobs for people.

Future studies should be qualitative and mixed-study as well as include data reviews (i.e., all levels of employees' surveys, counts of job roles, numbers, and genders of employees, and salary distributions). To gather the feelings and beliefs of people, interviews, and focus groups should be conducted, too. The recommendation was for this research to be conducted annually. Each new research report should be related to changes in the previous year's data.

As a current senior leader of learning and development, process improvement, AI, and change management, this researcher has had the opportunity to be involved in numerous technology (Burton, et al., 2016), human resource (Burton, 2014), and change management (Burton, 2016) initiatives. These initiatives included the analysis, design, development, implementation, and evaluation of learning and development, research and establishment of process improvements, and the implementation major change management across enterprises. The results of this study and the researcher's own experiences agreed in their suggestion that artificial intelligence is changing the world (e.g., daily, work, and social lives); therefore, is significant to the advancement of people and technology in this age of artificial intelligence, the fifth industrial revolution. Uzialko (2019) suggests and this examiner concurs, that automation is no longer a term associated with manufacturing, but that automation is touching almost every field. With this said, data is needed to fill artificial intelligence knowledge gaps. The results this research confirmed that organizational leaders value knowledge capital, incessant learning, being able to guide employees and support employees, and other practices discussed in this

research. In this ubiquitous fifth industrial revolution, differences in levels of understanding of automation, and artificial intelligence andragogy were prevalent. Consequently, more studies are needed to stimulate discussions and research aimed to comprehend artificial intelligence and its useful practices as well as long-term implications of technology in personal, work, and social lives.

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KEY TERMS AND DEFINITIONS

Adaptive Learning - Adaptive learning allows learners to gain knowledge in needed areas as efficiently and effectively as possible plus according to current knowledge of the subject matter.

Algorithms - An algorithm is a step-by-step technique to solve a problem. Algorithms are employed to influence data in numerous ways such as inserting a new information item, probing for a specific item or classify an item.

Artificial Intelligence - Artificial intelligence is an area of computer science that accentuates the formation of intelligent machines that work as well as respond like people. Computer with artificial intelligence are designed with the following activities: learning, planning, problem solving, and speech recognition

Artificial Narrow Intelligence (ANI) - Artificial narrow intelligence concerns a computer's capacity to complete a single task tremendously well (i.e., crawling a webpage, playing chess).

Business Intelligence – Business Intelligence denotes practices, applications, and technologies to be used for the analysis, collection, integration, and presentation of business data.

Cybersecurity – Cybersecurity, information technology security, is the technique of protecting data, computers, networks, and programs from unsanctioned entry or attacks that are intended for misuse.

Human Capital - The economic value of employees' knowledge, skills, and experiences.

Industrial Revolution - Industrial revolution, generally referred to as the first industrial revolution was a time that ushered in the steam engine and transitioned countries towards manufacturing processes. Today, historians, academics, and industry professional recognize five separate industrial revolutions.

Smart Cities Council – This smart cities council is an annual program that helps cities and states advance their smart cities initiatives for meeting ubiquitous technological needs.