

Artificial Intelligence in the Computer-Age Threatens Human Beings and Working Conditions at Workplaces

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Abstract: Due to the fact that there is a huge technological progress and automation trend in the working world in this 21st century, Artificial Intelligence (AI) is not only considered as a new innovative product of technological advancement for humankind but it also perceived as a new serious threat for workers during new industrial revolution in the computer-age. The main purpose of this article is to study on the effects of AI on working conditions, environments and skills at workplaces. Because of this study is considered as an exploratory research or qualitative research, data is collected by interviewing some workers in industrial sectors in South Korea and interview videos which provide some critical opinions on Industrial Revolutions, robotic trend and AI. And then the arguments are discussed and supported by the results of other academic studies. As the result of the mentioned process, it is possible to say that AI has a great influence on employment condition in the computer-age and this study can identify four significant effects on working place. One of those effects is that AI directly and indirectly hinders human-being relations in the workplace. Another effect is to destroy our working knowledge and skills which are needed for a job in the traditional working world. Additionally, AI gradually demolishes workplace engagement and organizational identity. Apart from these unexpected effects, AI is commonly perceived as a main cause leading to such a serious unemployment growth in our society. In order to cope with these new challenges which might be caused by AI and rapidly technological development at workplaces, some significant solutions are introduced including AI is created for increasing the capacity of workers rather than replacing human workers, putting obligations and responsibilities on AI which is intentionally created and used to replace human workers and law enforcement on the areas which should be fully support for developing Artificial Intelligences and which sectors cannot be allowed to be dominated by AI is necessary. The article conclusion, limitations and suggestions for the future research will be discussed in the next parts respectively.

Keywords: Artificial Intelligence (AI); Employment; Human beings; Workplaces

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1. Introduction

There is a huge progress and advancement in technological development and innovation in mankind history in this 21st century. The development and advancement of technology has a great influence on many areas such as industrial, agricultural, managerial, energy, socio-economic, military developments, etc. Due to the fact that technological advancement and achievements in the past decades can lead humans to a greater success at the new era in scientific research, economic development and social welfare improvement, our society tends to depend on technological develop-

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ment more and more. In order to satisfy human needs at the new level and achieve a greater goal in development and competition, many governments, researchers and technological innovators put more effort and financial supports in developing technology. Because of these new trends in supporting technological development, many researchers comment on the current development that human has been moving to computer-age which computer will play a crucial role in all aspects of human life and development in the world. There are many sectors and workplaces which can be managed and controlled by computers such as industrial machine production, factory production lines, medical operations, scientific researches, transportations, military operation, etc. Because of better effectiveness and efficiency of technological achievement in performing functions which are used to be performed by humans, the new trends of robotic development have emerged in order to increase the capability of humans in performing a function and increasing both quality and quantity of production results. In some areas, independent robots or machines are developed to perform functions instead of humans such self-driving car industry, drone industry, security industry, and so on. This means that human intelligence has been transferring to machines and artificial intelligence is invented to manage and control machines or robots and these machines and robots can perform tasks as human-performance level independently or better. This phenomenon has indicated that mankind can achieve a new era of technological development and innovation. However, it is still a controversial issue relating to capability and reliability of artificial intelligence. Kaplan (2016) acknowledged that machines or robots with artificial intelligence can perform better than human performance level in some certain circumstances only. Kelly (2012) also agreed that some existing jobs can be performed by robots more effective than humans and robotic machines can do some jobs that humans cannot perform such as dealing directly with poisonous items, work under atmosphere with high pressure or limited oxygen and other risky tasks. On the other hand, there are some scientists, researches and scholars who are quite pessimistic in the roles and influence of artificial intelligence on human beings at workplaces. One of those scholars is Kiulian (2017). He stated that robots will nominate all jobs at workplaces and it will be a main manager at the working places. In addition, Stephen Hawking also commented that artificial intelligence might lead to worst situation in the mankind history (Kharpal 2017). In the same vein, Elon Musk who is the CEO and Co-founder of Tesla added that artificial intelligence might be able to bring catastrophic disaster to human beings (Sulleyman 2017; Richardson 2017). Because of this interesting argument, this study will solely concentrate on the negative effects of artificial intelligence on working conditions and workers at workplaces. Generally, this article will be divided into four main parts such as introduction, summary relating key terms in the article, the main negative influences of artificial intelligence, and then some significant solutions are next proposed. The conclusion, limitations and suggestions for the future research will be finally introduced.

2. Artificial Intelligence

There many technological researchers, computer scientists and other scholars attempt to define Artificial Intelligence based on their academic background, knowledge and experiences. As a result, there is a wide range of definition relating to artificial intelligence. John McCarthy, 'A father of AI', has defined AI as a program can make a machine to behave in intelligent way as the same as human intelligence (Peart 2017). In a similar vein, Kaplan (2016) also stated that AI is a computer programming that can make machines to perform an action as human behavior and that action is considered as intelligent one. Moreover, Russell and Norvig (2010) defined AI as an art which can make machines to perform and think rationally. Besides this, AI is still defined as a technology which is designed to duplicate human intelligence as well as self-learning and self-improving. Because of this, AI might be able to do better than humans in some days (Spacey 2016).

According to Russell and Norvig (2010), the evolution of AI is classified into 10 phases. The first development of AI was taken place between 1943-1955. In 1943, Warren MacCulloch and Walter Pitts introduced an artificial neurons model which can learn about the network of neurons. In 1949, Donald Hebb had developed Hebbian Learning which can modify the strength of connection among neurons. In 1950, the first neural network computer was invented by Marvin Minsky and Dean Edmond. The second significant step in developing AI is the year of 1956 which is considered as the birth of AI. When John MacCarthy took a lead in organizing a workshop which was attended by researchers who are interested in study on neural nets, automation theory, and intelligence at Dartmouth in 1956. The role of AI in com-

puter science and controlling machines was firstly indicated in this workshop. AI researchers energetically made a research on AI and they also highly put a great expectation on AI research from 1952 to 1969. There was a significant development in Knowledge-based system which is considered as a key power of AI during 1969 and 1979. The expert systems were invented between late 1960s and early 1970s and AI has been being entered in commercial industry since 1980. The artificial neural networks and hybrid intelligent systems were developed and invented respectively (Negnevitsky 2002, p. 8). These systems are considered as milestone steps in developing AI because these systems are used in programming machines and robots and can make those robots and machines to perform a task as a human-level intelligence. The evolution of AI can be possibly categorized in three main phases such as Neural Networks (1950s-1970s), Machine Learning (1980s-2010s) and Deep Learning in the current times (Montagnier 2016). Nowadays, AI is still considered as a main task in researching and developing technology, socio-economy and science sectors. AI tends to have an influence on human daily life and workplace more and more. According to the prediction of John McCarthy, all human tasks will be able to be performed by high level machine intelligence in next 50 years and all human jobs will be able to perform by full automation of labour in next 124 years (Peart 2017). AI can be classified in many types based on its function and capability. Based on Matthews (2017), AI consists of four main types such as limited memory AI, reactive machines AI, self-aware AI and theory of mind AI. In computer science, Artificial intelligence or AI can be classified into three main types including Artificial General Intelligence, Super Intelligence and Narrow AI (Traugott 2017).

3. Workplace and Working Conditions

A workplace or working place is a place where jobs are performed or done. More than half of human life time is spent on working at workplaces (Revision Sociology 2016). Sitkus (2017) also showed that humans spend 1/3 of their life-span at workplace. As a result of this, workplace is an integral part of workers and the daily life of humans. People have a very close relationship with working place. Workplace has its own culture, ethics, morals and styles (Janićijević 2017). These cultures, ethics, working styles, core business, etc have formed organizational identity and diversity. The organizational identity and diversity will influence and shape that workplace members' behaviors and ideas (Guillaume & Austin 2016). Due to the fact that there is a continuous cooperation, communication and interaction among workers, colleagues, between employees and managers or supervisors and subordinates, the relationship, teamwork, friendship, creativity, fairness, commitment, motivation and conflicts are also formed and emerged at workplace (Ray 2017; Dimostakis, Scott & Koopman 2011). In addition, workplace still consists of organizational structure, strategies, managing system and leadership style (Janićijević 2017). The organizational structure, managing system and leadership styles are still classified into a lot of departments, divisions and units. These managing structures have their own specific functions and skills. For example, HR department is a main unit to manage human resources within organization and this department includes professional and experts in recruiting, selecting, training, managing, rewarding human resources or employees. Besides this, workplace is still a place where there are other wide range of human skills and knowledge. These skills and knowledge are used to support and facilitate strategic and organizational goals of workplaces.

(Based on the interviewing 25 Korean employees and Video interviews on AI and its influences on workplaces)

Advantages	<p>To increase the capability of workforce in performing jobs that can create positive effects on society such as supporting rescue workers, farmers and doctors (Richardson 2017).</p> <p>To upgrade the intelligence level, quality and quantity of the existing products (Montagnier 2016).</p> <p>To improve efficiency and effectiveness in producing products (Semens 2017).</p> <p>AI can enhance human life and make humans healthier more creative, productive and happier (Dean 2017; Nie 2017).</p> <p>To boost the productivity and performance of labors in developing economy and paving the way for economic growth in the future.</p>
Disadvantages	<p>To increase or contribute to unemployment rate growth.</p> <p>To Hinder human being relations at workplaces.</p>

	<p>To Diminish basic working knowledge and skills in the working world.</p> <p>To Demolish workplace engagement, commitment and organizational identity</p> <p>AI might be used to harm or destroy opponents or human by using massive destructive weapons or machine killers (Tegmark 2017; Hass 2017).</p>
Solutions	<p>To Control and limit the purposes of AI usage and development (Semens 2017).</p> <p>To apply tax laws or regulation on AI robots and machines (Vincent 2016).</p> <p>To encourage Law enforcement globally (Purdy & Daugherty 2016).</p> <p>To reeducate or retrain workforces with new skills in order to match with the needs of new jobs in the future (Vincent 2016).</p> <p>To reform educational system which can cope with the new changes because of AI (Jack Ma 2017).</p>

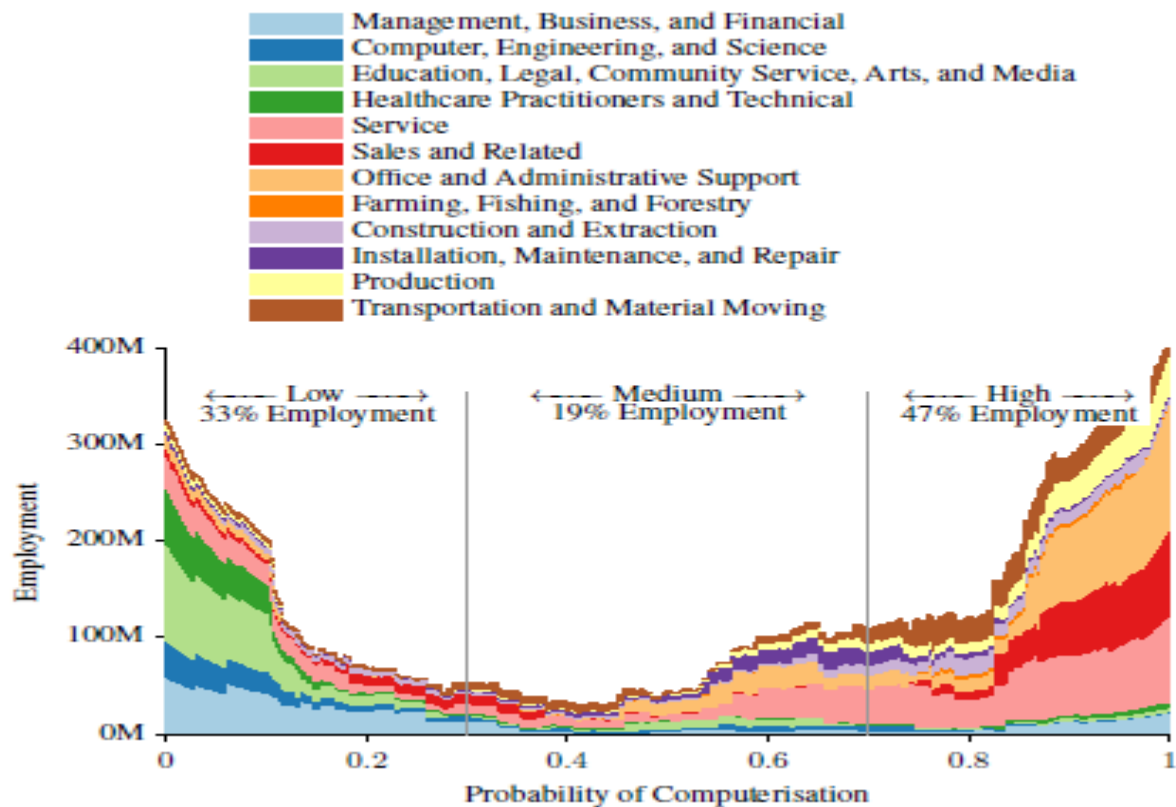
Table 1. The positive and negative effects of AI on workplace and workers and its solutions

4. The Influence of AI on Working Places

In terms of the roles and influences of AI on workplaces, AI plays a significant role in many areas at workplaces and working capability of humans. It might be able to make a lot of positive influences and impacts on improving and developing working ability, efficiency, effectiveness and quality of workers at workplaces. AI has and might have a lot of advantages on workplaces and working conditions. On the other side, AI can possibly cause and bring some significant negative and unexpected effects to original workplaces, traditional working condition and workers in both short and long terms such as hindering human beings and relationship at workplaces, diminishing human foundation knowledge and skills, demolishing both worker and organizational engagement and identity and growing in unemployment rate.

4.1 Growing in Unemployment Rate

AI is perceived as one of the most serious threats to employment in this 21st century in the working world. This means that AI is blamed as a significant contributing cause of unemployment growth in human society in the modern world (Brent 2018; Barden 2017). In fact, there many scholars and researchers attempting to research on the relationship between technological development and unemployment growth in 19th and 20th centuries but it is still a controversial issue until now (Campa 2014). Lucas and Prescott (1974), Davis and Haltiwanger (1992) and Pissarides (2000) argue that there will be a high increase in job turnover and unemployment rate when there is an increasing pace in technological development. Additionally, the study of Campa (2014) that makes a research on the consequences of AI development in robots and machines on unemployment based on four scenarios in the future, it reveals that there will be a huge change in employment structure and human workforce will be reduced and replaced by robots and machines that can perform a job as a human-level performance in these four scenarios. Surprisingly, humans can be possibly regraded to the slavery level under control of robots and machines in the dystopian scenario. Conversely, humans will work less or will not work at all but humans can enjoy their lives and consume sufficiently over the hard works of robots and machines. In a similar vein (Jerry 2016,) also states that, some certain jobs and human tasks at workplaces will be replaced by robots and machines because of the development if AI especially blue-collars workers and white-collar professionals. According to the research of Frey and Osborne (2013) on the risks of American jobs in 12 groups of working areas which might be replaced or managed by computers, machines and robots in the 21st century, it indicates that there is 49% of American employment which is highly risky to be computerized especially in the working areas of administrative support and office, sales and related sectors, and services (figure 1). Based on International Bar Association (2017), there are three main groups of workers which might be replaced by machines as the result of development in robotics and artificial intelligence such as high-routine workers (court clerks, accountants, desk officers, etc.), manual or simple physical workers and technophobia workers. According to the research of World Bank on the impact of automation on jobs in more than 50 countries in 2013, it indicated that there is around 57% of jobs on average which are automated especially in China and India consist of 77% and 69% respectively (Manyika *et al.*, 2017, :21).



(Source: Frey & Osborne 2013, :37, https://www.oxfordmartin.ox.ac.uk/downloads/academic/The_Future_of_Employment.pdf)

Figure 1; The chart demonstrates the probability of computerization among 12 employment areas at three different levels (Low, Medium and High).

4.2 Diminishing Traditional Working Knowledge and Skills

The rapid development and advancement in technology and AI does not harm only employment and lead to increasing unemployment rate, this new change also diminishes and destroys human working knowledge and skills. There are many foundation knowledge and skills which are required to perform jobs at traditional workplaces such as interpersonal skills, applied skills and knowledge, social skills and organizational skills (NNBIA 2014). Some of these skills and knowledge will be disappeared or replaced by machine and robot techniques as the result of developing smart machine and robotic systems at workplaces which traditional workplace will be transformed into automated workplace (Davies Fidler & Gorbis 2011). This means that jobs or working activities will be automated and working processes are redefined at workplaces based on the functions of robotic machines. When robots or machines function instead human workforce, some interpersonal skills and knowledge which are considered as important skills for workers at workplace will not be used or put in practice such as critical thinking, interpersonal, self-dependence reinforcing, motivating, negotiating, decision-making (Doyle 2017). As a result, these skills and knowledge on these areas might be forgotten and replaced by other different skills such as sense-making skill, computational thinking skill, social intelligence skill, etc. (Gray 2016; Davies, Fidler & Gorbis 2011). Apart from this, social and organizational skills might be another group of skills and knowledge which are negatively affected by AI advancement and influence. When workplace automation is emerged and AI is developed at the stage of super AI, the structure of organization will be completely changed (International Bar Association 2017; Linzon 2017) and the interaction between human workers will be replaced by computerized connection and programming controlled functions (Manyika *et al.* 2017; Chui Manyika & Miremadi 2015). Additionally, AI Robots do not need holidays, sick leave, maternal leave or other incentives (Sirkin 2015). As the result of this, planning, organizing, team-work, managing skills, rewarding strategies and some HR functions will be destroyed and replaced by new skills and automatic systems (Kolbjørnsrud, Amico & Thomas 2016).

4.3 Hindering Human-beings Relations

In the era of AI, human workforces have to work along with machines and robots. As shown in the figure 2, the trend of using robots in industrial area has been continuously increasing in all around the world especially Japan, South Korea, Thailand, Qatar, Indonesia, India, Malaysia, china, Keya, Morocco, Czech, turkey, Mexico, Costa Rica, Peru, Columbia, etc. (Chui, Manyika & Miremadi 2017, Manyika *et al.* 2017). According to Mcrae (2017), it will increase by five times of 2017 in USA alone in 2025. Another example is that there were only 347 robots per 1000 workers in South Korea, 339 robots per 1000 workers in Japan and 261 robots per 1000 workers in Germany in 2011 (Moniz & Krings 2016). And then robotic machines were sold and installed in China, South Korea, Japan and USA were increased by 30%, 55%, 20% and 17% respectively in 2015 (International Federation Of Robotics 2017). In 2016, the robotic machines were sold and installed in China, South Korea, Japan and USA were increased by 31%, 53%, 30% and 31% respectively. And there might be approximately 1.4 million new industrial robotic machines which will be globally deployed and installed in working places (International Federation of Robotics 2016). Due to the massive growth of robotic machines among human workforce, human workers have to manage, work and interact closely with robotic machines. As the result of this, there are some significant negative effects and influences on human being relation and interaction at workplaces. Generally, people have to interact and make a relation with other managers, employees, supervisors, subordinates, partners or co-workers, customers in the working world (Carpenter 2016). Because of human beings, moral, etiquette, respect, understanding, loving emotion, conscientiousness, empathy, connection, motivation and close relationship are emerged and formed. These psychological and emotional actions are considered as main driving forces contributing to employee and organizational productivity and performance (McClellan 2017; Rashid, Asad, Ashraf 2011; Markos & Sridevi 2010; Mone, Eisinger, Guggenheim, Price & Stine 2011). Due to the fact that there is no conscience and emotions in robotic machines, all human relationship and interactions might be eliminated from workplace (Barden 2017). When human workers cannot interact with robotic machines as humans, this situation can possibly lead to dissatisfaction and less motivation (Qureshi & Sajjad Syed 2014). Additionally, human workers are required to have a long-time sit and have a close monitor robotic machines performing jobs at the workplace in general. As the result of this work routine, it can cause health hazards and mental illness among the existing human workforces (Barden 2017).

The Countries Where the Potential for Automation Is Highest

Percentage of work activities that could be automated by adapting current technology.

AFRICA		ASIA/AUSTRALIA		EUROPE		NORTH AMERICA		SOUTH AMERICA	
Kenya	51.9%	Japan	55.7	Czech Rep.	52.2	Mexico	51.8	Peru	53.2
Morocco	50.5	Thailand	54.6	Turkey	50.4	Costa Rica	51.7	Colombia	53.0
Egypt	48.7	Qatar	52.0	Italy	50.3	Barbados	48.7	Brazil	50.1
Nigeria	45.7	South Korea	51.9	Poland	49.5	Canada	47.0	Chile	48.9
South Africa	41.0	Indonesia	51.8	Spain	48.5	U.S.	45.8	Argentina	48.2
		India	51.8	Germany	47.9				
		Malaysia	51.4	Greece	47.8				
		China	51.2	Austria	47.4				
		Russia	50.3	Switzerland	46.7				
		Philippines	47.9	Sweden	46.0				
		U.A.E.	47.3	Netherlands	45.4				
		Oman	46.8	France	43.1				
		Bahrain	46.1	U.K.	42.8				
		Saudi Arabia	46.0	Norway	42.4				
		Australia	44.9						
		Singapore	44.2						
		Kuwait	41.1						

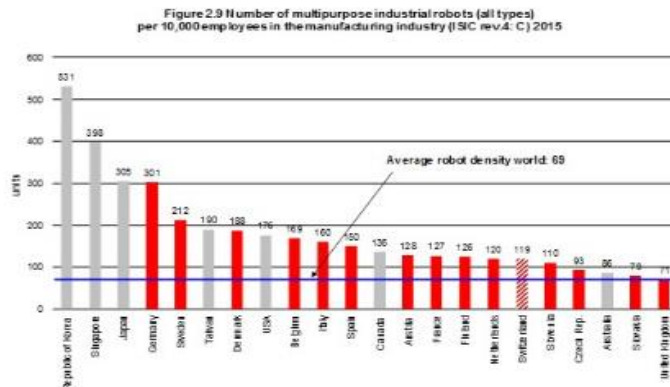
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(Source: Chui, Manyika & Miremadi 2017, <https://hbr.org/2017/04/the-countries-most-and-least-likely-to-be-affected-by-automation>)

Figure 2; The table shows the list of countries with high potential for automation.

High robot density in EU countries



15 •



(Source: International Federation of Robotics 2016, <https://ifr.org/ifr-press-releases/news/world-robotics-report-2016>)

Figure 3; The bar chart shows the high robot density in some Asian and European countries.

4.4 Demolishing Workplace Engagement and Organizational Identity

Apart from increasing unemployment rate, destroying working skills and diminishing human being relations at the workplace, AI possibly demolishes organizational engagement and identity. When AI robotic machines are replaced human workforce, there will be a huge change in the structure of jobs and managing systems within organizations or companies such as compensation, unionized, welfare, risk management systems, HR functions, etc. (International Bar Association 2017). In a similar vein, AI does not only make a change on organizational structure but it will also make a change in leadership and managing styles of organizations (Kolbjørnsrud, Amico & Thomas 2016). In the research result of Boronea, Zaharia and Atanasiu (2010), it also showed that AI can make a huge alternation and influence on managing system within an organization especially management, leadership, decision-making system. A massive organizational change often leads to altering organizational identity (Campa 2014). Organizational identity is considered and perceived by its workers as a central distinctive and organizational culture which have a great influence on both managers, employees and organizational, ideology, working motivation and behaviors and engagement (Sarangi & Srivastava 2012; Ashforth & Mael 1989). McBain (2003) added that when organizational identity is changed, it might have directly negative impacts on the engagement of existing employees. Price and Vandick (2012) also confirmed that organizational change also affects and diminish relations between employees and their organizations. In some cases, organizational change directly contributes to decrease in organizational engagement and commitment of workers. As a result, low level of organizational engagement or commitment is a significant cause of poor organizational performance and productivity (Saks & Gruman 2011).

5. Solutions

Due to the fact that there is a rapid growth and development in technology and AI in these recent years and both private and public organization tends to increase more investment and support in developing AI day by day. Some AI experts argue that human-like and independent will be possible in the near future and some robotic machines prove that these robots can perform better than human-performance level. At the same time, there is also a wide spread in concern for developing AI and its impacts on human society and workplaces in the future. Therefore, it is necessary to have effective and efficient solutions to cope with the new changes because of AI development in the working world. Computer scientists, technologists, futurist and AI scholars have been attempting to create and introduce some significant solutions to the new change in current and future workplaces based on their academic disciplines. However, these view-

points have shared a certain common ground and it is possible to summarize into three main solutions, which might help humans to adapt to a quick AI development and changes at modern workplace more effectively and efficiently and can keep AI advancement under control in the future. Those solutions include law enforcement for controlling AI development, Taxing AI robotic machines and Adapting educational system for the new changes in the era of AI and rapidly technological advancement.

5.1 Globally Law Enforcement on Developing and Using AI Robotic Machines

In order to make sure that AI development is under human control and facilitates humanity's civilization rather harming humans, enforcing law on the purpose of developing AI robotic machine is necessary especially in the area of employment. AI robots or machine should be invented for increasing the capability and effectiveness of human workforce rather than replacing human workers in order to avoid unemployment crisis in the future (Jerry 2016; Fitzpatrick 2016; Alzou'bi, Alshibly & Al-Ma'aitah 2014). Richardson (2017) added that super AI robot should be developed for increasing the capability of workforce that can make a good impact on human society such as farmers, rescue workers, nurses or doctors. In addition, AI development for the military-might or killing purpose should be limited and prohibited. The reason is that AI robot might be capable of using its might to destroy or harm humans when it is completely autonomous and can improve itself (Tegmark 2017; Hass 2017). Conversely, when AI is developed for the purpose of social economic development, social welfare, solving social setbacks or rescue tasks should be fully supported by global laws or regulations (Marr 2017). When super AI robot or independent-automated machine exists in the working world or AI development can reach singularity which robot can completely improve its-self, safety regulations or laws should be introduced in order to guarantee AI robotic machine' behaviors (Elman & Castilla 2017; International Bar Association 2017; Jerry 2016). In other word, AI robot or independent automatic robots should be responsible for its own harmful behaviors based on laws or AI regulations. Benson (2017) also insisted that it is necessary to have laws to control the computer science and computer programming which is heart of AI development in order to eliminate illegal actions of human-like robots in the future. Otherwise, human might be at risk in terms of safety and social security.

5.2 Taxing on AI Robotic Machines

It might be true to say that AI development can make a great contribution on economic growth in the future and number of robots and machines performing jobs instead of human workforce has been increasing continuously in both developed and developing countries all around the world (Purdy & Daugherty 2016). Meanwhile, it is also true to say AI development can possibly cause massive growth in unemployment rate in human community when AI robots are replaced human workforce (Brent 2018; Campa 2014; Miller & Atkinson 2013). As a result of a huge number of unemployment, it also possibly to bring a lot of negative impacts on individuals, society and a whole country as well (Simpson 2017). For instance, unemployment will lead to low living standard, health problems, increasing poverty, social setbacks, etc. (Jakimovski 2010). Apart from contributing to growing unemployment rate, AI advancement also put human at safety risk (International Bar Association 2017). Therefore, AI robots or smart machines have to share obligations to solve the mentioned problems by paying tax as humans do. William Henry Gates, co-founder of the Microsoft Corporation, also suggests that taxing robots or smart machines which are used to replace human workforce at workplace (Weller 2017; James 2017). The tax income from robots can spend on improving social welfare and training workers who lose their jobs to robots or smart machines to new jobs that are created to serve workplace automation (Paul 2017). Apart from this, there are still many countries considering enforcing tax regulation on AI robots and robots' employers such as USA, South Korea, EU countries and Switzerland in order to share social responsibility with robots (Massoglia 2017).

5.3 Adapting and Creating New Educational System for AI Era

Due to the advancement and progress of AI development, there is a wide range of human careers that will be taken or replaced by robots or machines. Meanwhile, there are also new kinds of jobs emerging in modern society especially in industrial countries. Based on International Bar Association (2017), some new jobs will be created and there will be a high demand in certain kinds of current existing jobs such as data scientists, crowd-workers, IT lawyers, jobs on IT

management and Science, teaching, social science, humanistic, media science, artistic, and healthcare areas. Davies, Fidler and Gorbis (2011) also argue that there are new skills that are required in AI era which machines and robots can take a key role in workplace such as sense-making, social intelligence, adaptive thinking, cross-cultural competency, computational thinking, new media literacy, trans-disciplinarily, virtual collaboration, design mindset and cognitive load management skills. Due to the changes in organizational and job structure and skills needed at modern workplace, it is necessary to improve and adapt educational systems and structure in order to supply human resource with new skills for the future workplaces which might be different from traditional workplaces. Vincent (2016) and Passy (2017) indicated that human workforce must be reeducated and retrained in order to supply the requirements of new jobs in the modern working places. In a similar vein, Jack Ma, the founder of Alibaba Group, educational system must be reformed in order to cope with the new changes because of AI and technological advancement (Jaipragas 2017). In the agreement of World Economic Forum 2016, it clearly stated that current educational curriculum, system and programs must be adapted to the new changes, which are caused by AI development in order to match with new standards and job qualifications at new type of workplaces (International Bar Association 2017). In short, new educational system is required in order to equip new skills and knowledge for human workforce to perform jobs at modern workplaces or automated workplaces in the future (Rainie & Anderson 2017).

6. Conclusion

Currently, there is a huge development and progress in computer science, technological and AI researches. When people tend to depend on technology more and more in order to improving living conditions and developing socio-economy, technology and economy have become a center of development of many countries. In the working world, technological development has been considered as a new driving force for organizational performance and productivity. AI is a part of effort in developing technology to support and facilitate organizational performance and productivity and AI can bring a lot of changes to workplaces and human workforce. It might be true to say that there will be many positive influences on workplaces when AI can be put in real practice. Meanwhile, AI can be perceived as a new threat for employees and workplaces as well. The reason is that AI advancement and development can be used to replace human workforce. As a result of this, it can possibly lead to growing unemployment rate, destroying human skills, diminishing human relations and eliminating organizational identity and engagement at original workplaces. Because of these issues, there are some futurists, computer scientists, technologists and AI researchers attempting to find out the solutions for the changes in the future workplaces. They have introduced a number of approaches to cope with workplace changes because of AI robots or robotic machines such as controlling the objectives of AI development in order to facilitate human performance and productivity rather than replacing human workforce at workplace, sharing social responsibility with robots and machines which are directly replace human workforce at workplaces by taxing those robots and machines and adapting our educational system in order to equip human workforce with new skills for the modern or automated workplaces. However, these recommending solutions have not shown a crystally clear evidences that they can work effectively in the real world.

Limitations and Suggestions

Despite the fact that this study is not an empirical research and it is a likely theoretical study, there is limited statistical evidence to support the arguments. Additionally, it is still lack of researches and studies on some specific areas such as the relationship between AI and human skills and interactions at workplaces, taxing robots or machines and adapting educational system in the AI era because these are still considered as new things in the scientific researches of mankind history. In order increase the quality and reliability of research results, it is suggested that there should be empirical researches on these areas and using the statistical number to prove study results in the future research instead of using second-hand data. Apart from this, AI advancement and development might affect each working place differently such administrative, agricultural, economic or military fields because each area and organization has different volume and requirements in depending on technology or AI development in order to improving performance and productivity. In addition, it impossible to replace human workforce by AI robots or robotic machines in some working areas, so those

areas might not be affected or influenced by AI development or advancement. Therefore, the future research on the influence of AI should focus on specific area which is likely vulnerable to the influence of AI or technological development.

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