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Artificial Intelligence: A Study on Governance, Policies, and Regulations

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ABSTRACT

Artificial Intelligence (AI) is displacing jobs and creating an upheaval in the world. It will change the way we work and the way we live. What should be the AI governance, policies, and regulations? How can AI governance, policies, and regulations mitigate and alleviate the negative aspects of AI advancement? How will AI governance, policies, and regulations impact the future of work and the future of humanity? This longitudinal multiple case studies research will study the evolution and revolution of AI governance, policies, and regulations, and how governance, policies and regulations impact AI advancement and are impacted by AI advancement. The research plans to study the top five leading countries in AI research – China, US, Japan, UK, and Germany.

Keywords

Artificial Intelligence, Machine Learning, Robots, Automation, Governance, Policy, Regulation.

INTRODUCTION

Artificial intelligence (AI) is a fairly broad concept and is ubiquitous today (Siau and Wang, 2018). The recommendation assistant from Amazon, virtual assistants such as Apple's Siri and Google Assistant, systems that detect of credit card frauds, and face recognition applications are all supported by AI technology. Self-driving cars and home assistants are well-known AI-based applications. These applications are able to carry out specific tasks very well and this type of AI technology is known as narrow AI (or weak AI). The Artificial General Intelligence (AGI, or strong AI) is able to support multitasks simultaneously and is regarded as the intelligence that can surpass or even replace human intelligence.

Experts have different opinions about how soon AGI will become a reality. For instance, AI researchers Muller and Bostrom report in a survey that AGI will have 50% chance to be developed between 2040 and 2050, and 90% by 2075 (Health, 2018). Some AI experts believe that AGI is still centuries away. Nevertheless, the investment and research in AI cannot be ignored. AI attracted US \$12 billions of investment from venture capitalists globally in 2017, double the volume in 2016 (Yu, 2018). In July 2017, China unveiled a national plan in which AI will be built into a US\$152.5 billion industry by 2030 (Yi, 2017). According to Columbus (2017), 80% of enterprises have some forms of AI today, 30% plan on expanding their investment in AI, and 62% expect to hire a Chief AI Officer.

AI is a double-edged sword. AI can assist us in our jobs and lives, and release us from mundane and monotonous tasks (Siau, 2017). However, AI is replacing human jobs (Siau and Yang, 2017; Siau, 2018). Amazon Go, a cashier-free supermarket, has demonstrated AI's ability to replace cashiers. Self-driving trucks are predicted to take over 1.7 million jobs in the next decade (Health, 2018). Another big concern is the ethical issues caused by AI. What is the role of governments in creating, adopting, and enforcing ethical and moral standards? AI and automation are expected to further widen the wealth gap. What kind of government policies and regulations can help to close the wealth gap? What should the governments do to help the workers who are replaced by AI? Should Universal Basic Income be implemented? If so, how to fund the Universal Basic Income? How can the governments verify/certify that AI applications are not contaminated with human biases (especially those biases that are unlawful)?

The same situation existed in the early days of the Internet. Policymakers, at that time, were struggling with how to best deal with that shifts and how to regulate the new technology to capitalize on its potential benefits while mitigating the potential risks. The previous governance experience will be helpful in resolving today's AI issues. AI, as a new phenomenon, will likely create governance and regulatory issues that are not encountered in earlier technology evolutions. This qualitative study will collect data from literature and policymakers in different countries to analyze the governments' economic policies and regulations, and examine how these policies and regulations impact AI advancement and are impacted by AI advancement.

LITERATURE REVIEW

Nature of AI

Although AI has been widely applied to areas such as medical, finance, education, transportation, courtrooms, and homes, there is no universally accepted definition of AI. AI is regarded as an umbrella term that refers to a wide range of disciplines and techniques. Machine learning, automation, and robotics are all relevant to or belong to AI technology. AI can be broadly classified into two categories: weak AI and strong AI. Strong AI is a highly controversial topic and some regard strong AI as an existential threat to humans. Many weak AI applications exist and the adoption of weak AI has already led to policy, governance, and legal issues. For instance, safety and privacy issues, and justice and equality issues.

Gasser and Almeida (2017) highlight three challenges of building a governance model of AI. First, the "black boxes" in AI applications (e.g., deep learning applications have very limited capability to explain their recommendations or decisions) give rise to people's limited understanding of technological and social implications of AI, causing massive information asymmetries among AI experts, AI users, and policymakers. Second, finding normative consensus among different stakeholders is not easy. Third, the undercurrents put limits on traditional approaches to policymaking in the AI age. Advanced governance models, such as active matrix theory and hybrid regulation, may be able to shed light on the governance of AI.

Concept of Governance and Policy Change

Governance refers to the various ways in which social life is coordinated. It has become a popular buzzword in a variety of scientific fields, leading to a considerable debate about the many uses of the word. Toikka (2011, p.10) defines governance as “self-organizing, inter-organizational networks that are charged with policy-making.” Fukuyama (2013) writes that governance is “a government's ability to make and enforce rules, and to deliver services.” Policy change refers to incremental shifts in existing structures, or new and innovative policies (Cerna, 2013). However, path dependence model argues that it is generally difficult to change policies (Greener, 2002) because the institutions are usually sticky and the policies are designed to be hard to change. Policy learning, which is an important aspect of policy change, suggests that countries and regions can realize policy change by learning from others and shifting their beliefs (Hecl, 1974).

Previous study of governance and policy change of AI

There are not many studies on AI governance, policy, and regulatory issues. However, the potential threads of AI and the challenges posed by AI must receive the attention of policymakers. More than 20,000 researchers signed a letter, warning policymakers of the dangers of autonomous weapons that may use algorithms to strike specific targets (Zeichner, 2017). This signature event is caused by the concerns on the possible military uses of AI. Policy change and governance arrangements can come both from the street level (bottom-up theory) and authority's statute (top-down theory) (Ewalt, 2001).

Researchers, practitioners, and policymakers are starting to pay attention to AI governance, policies, and regulatory issues. In the Spring of 2016, United States government announces the “White House Future of Artificial Intelligence Initiative” to explore the impacts of artificial intelligence (Lyons, 2017). Initially funded with \$27 million, the Ethics and Governance of Artificial Intelligence Fund have started to “catalyze global research that advances AI for the public interest, with an emphasis on applied research and education” (Slotnick, 2017, para. 4).

GOVERNANCE THEORIES

Good governance should be transparent, accountable, effective and equitable, ensuring that economic, social and political priorities are based on broad consensus. In order to apply governance, which offers organizing theories, the objectives of governance must be specified. According to Ewalt (2001), the objective of governance includes but not limited to resulting citizens value, winning adherence to norms, identifying the mission, services, and customers, building accountability, separating service from control, and expanding customer choice.

Given that the threats of AI are indisputably real, governance and regulation are inevitable and necessary. A distinction is often made between economic and social regulation (Den Hertog, 1999). Economic regulation can be grouped in positive and normative theories. According to positive theories of regulation, regulation occurs because “the government is interested in overcoming information asymmetries with the operator and in aligning the operator's interest with the government's interest” (“Theories of Regulation”, n.d.). Another theory of regulation, normative theories of regulation, conclude that regulators should minimize the costs of information asymmetries, provide price structures that “improve economic efficiency, provide regulation under the law, and establish regulatory processes that provide independence, transparency, predictability, legitimacy, and credibility for the regulatory system” (“Theories of Regulation”, n.d.). From the economic perspective, the supply-side policy encourages cutting taxes to stimulate economic growth. Cutting taxes, however, can result in budget deficits and unemployment may remain high (“Theories of Economic Policy”, n.d.).

According to Lyons (2017), the responsibility of governance and policy is global. Governance theory will not be a one-size-fits-all prescription, but a coherent framework upon which each practice can vary in recognition of cultural and contextual particulars. The AI governance will ultimately cross borders and leverage international governance bodies. A global AI governance system must be “flexible enough to accommodate cultural differences and bridge gaps across different national legal systems” (Gasser and Almeida, 2017, p.58). Werlin (2003) argues that the difference between poor countries and rich countries has to do with governance rather than resources. Governance will play an important role in ensuring the appropriate redistribution of wealth and alleviating the job losses caused by AI.

RESEARCH QUESTIONS AND PROCEDURE

This longitudinal multiple case studies research will study the evolution and revolution of AI governance, policies, and regulations, and how governance, policies and regulations impact AI advancement and are impacted by AI advancement. The research plans to study the top five leading countries in AI research – China, US, Japan, UK, and Germany.

We will utilize the qualitative approach to conduct this research (Yin, 2016). Governance, policy, and regulatory issues related to AI is a new and complex topic, and many people have different ideas and opinions on the topic. Qualitative

research provides the flexibility in gathering data and manage the research process, which may be lengthy and ambiguous. Case study research is an effective methodology to investigate and understand complex, comprehensive, and in-depth issues in real-world settings. It is especially recommended to answer how, why, and what research questions (Harrison, Birks, Franklin and Mills, 2017). In this study, a multiple-case case study will be conducted. The target participants are policymakers and government officials from five countries that publish most research on AI (Jacobsen, 2018). To understand the research question better and track the fast-changing technology environment, a longitudinal study will be implemented to trace the evolution and revolution of AI governance, policies, and regulations in these five countries.

CONCLUSIONS AND EXPECTED CONTRIBUTIONS

Understanding and addressing governance, policy, and regulatory issues related to AI are still in an infancy stage. Nevertheless, AI is advancing rapidly, and the governance, policy, and regulatory issues are critical and need to be discussed now. This research aims to call attention to the urgent need for various policymakers and government officials to pay attention to these issues. While attempting to formulate the governance, policy, and regulatory models for AI, we will gain insights into the future development of AI technology, understand the economic, social, and political impact of AI better, and improve our understanding and application of governance, policy, and regulatory theories in the AI age. This study is expected to contribute to both the academic progress in the field, and the writing and implementation of governance, policies, and regulations that are related to AI.

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