The Impact of Awareness of New Artificial Intelligence Technologies on Policy Governance on Risk

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Abstract

Background/Objectives: This study examined the risks of new AI technologies and their impact on policy governance. Artificial intelligence is bringing about changes in various fields such as politics, economy and culture through information society and technology. In particular, it has a positive effect on solving various problems of existing society and overcoming limitations. But this advancement in artificial intelligence can create the opposite problem as expected. This appears to be a risk. We identify the factors that recognize this risk and investigate the possible impact on government governance.

Methods/Statistical analysis: The questionnaire and data of this journal were analyzed by Korean public portal data, and the analysis data were designated by the Korea Information Technology Agency, AI related company, AI association, Ministry of Science, ICT and Future Planning, IT society, government research institute, Korea Communications Commission, and National Security Agency The questionnaire survey was based on AI experts working in the field.

The analysis program uses IBM SPSS Statistics 22. The analysis methods are descriptive statistical analysis, reliability analysis and exploratory factor analysis.

Findings: This study examined the risks of new AI technologies and their impact on policy governance. The survey was conducted to clarify comments on awareness of new AI-related technologies, awareness of AI risks, and improvements to AI-related policies.

AI risk has become an integral part of regulation and the government's role as a risk manager is important.

Improvements/Applications: Further discussion is needed regarding the commercialization effects of AI technology awareness, benefit items and timing items on policy governance through risk awareness.

Keywords: AI, demage, government policy, AI technololgy benefits, government policy

1. Introduction

The development of computer software and the development of hardware are bringing tremendous changes to society, including economy, culture, and politics, through big data analysis.

This is happening at an increasingly fast pace. Technology development has the positive effect of revolutionizing many areas of artificial intelligence, solving existing social problems and creating opportunities.

On the other hand, these artificial intelligence technologies are two-sided, which can cause bigger problems than the ones they solved.

The pessimism around AI says that it has a spectrum that ranges from job loss due to weak AI automation to the end of humanity following the emergence of strong AI.

Depending on the commercialization stage of AI technology, various policy responses need to be prepared. The Effective Altruism Foundation classifies current AI risks into current, mid-term, and long-term and proposes appropriate policy alternatives. (Effective Altruism Foundation, 2015)

Features of AI can increase the unpredictability of risks, transfer risks to social warfare, and spread these risks from online to offline.

This study examined how the recognition factors for new artificial intelligence technologies affect policy governance based on the perception of risk.

2. Materials and Methods

Artificial intelligence, which combines advanced innovations such as big data analysis, smart factories, and the Internet of Things, has various forms, from optimism and simple malfunctions of convenience, efficiency, and new market creation, to medical accidents, military robots, financial events, and unemployment.

The view of artificial intelligence optimism is basically a view of future technology as a new growth engine. The basis for this is the improvement of productivity due to technology development, the creation of new jobs and the improvement of the quality of life (Barrat, 2013).

Governments and corporations must also prepare for intellectually, technologically, politically, ethically, and socially (Paul, 2017).

The possibility that more than 47% of jobs in the US will disappear within the next 20 years (Frey and Osborne, 2013) and the emergence of robots and artificial intelligence technology are also increasing the possibility of an existential risk that shakes the human foundation itself (Bostrom, 2002). The development of Korea has greatly changed the number and type of jobs, and ahead of human intelligence, threatening current jobs and furthermore, the era of full employment will be impossible. (Hutzler et al., 2003)

Science and technology are both a source of amazing productivity and a source of lethality. (Energy Outlook, 2004)

Most of these claims of optimism are focused on improving the productivity of firms and focusing on evaluating technological developments in terms of efficiency and convenience.

Pessimism to look at artificial intelligence reflects the problems of the current society such as digital divide and inequality, and there are various forms, from the problem of job loss due to the automation of artificial intelligence to the end of mankind due to the emergence of artificial intelligence.

As the 4th Industrial Revolution, such as Big Data and Smart Factory, has gained great attention from all over the world, national investment in artificial intelligence technology R & D is rapidly increasing, and interest in various effects of AI on our society is also increasing. Relevant legislation on artificial intelligence-powered drones and autonomous vehicles is being promoted in each country (Rahman et al., 2019); (Rahman, 2019); (Rahman, 2017).

Therefore, the development of artificial intelligence creates a collingridge dilemma.

In other words, in the process of influencing or controlling technology development, there is a dilemma in which two opposing problems, information problem and power problem, which are closely connected to each other, are faced.

Such preventive technological risk management, in spite of scientific uncertainty, is recognized as a necessity when it is determined that a particular act is likely to cause serious, irreversible and widespread harm (Collingridge, 1980).

3. Results and Discussion

This study examined how the perception of new artificial intelligence technology affects policy governance through perception of risk.

Theoretical discussion on the risk of artificial intelligence and the research issues considering the impact on policy governance are as follows.
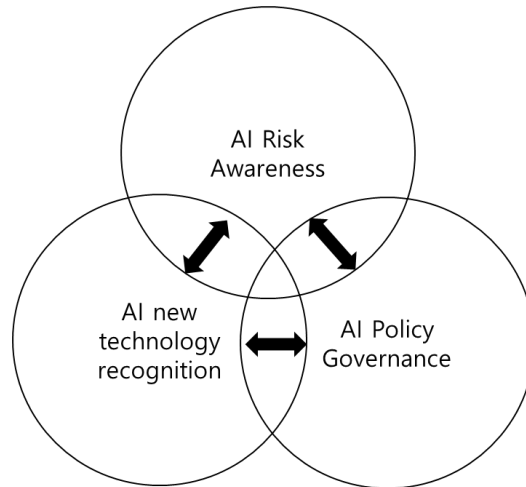
Figure 1. AI policy governance model

To determine the intent associated with the issue, each of the 21 items

Survey data were used to classify AI into new technology awareness, risk awareness, and policy governance.

Table 1. Questionnaire

Domain	Q	Intentions
Recognition of new technologies related to artificial intelligence	Q1	About the development of AI technology General
	Q2	AGI(Artificial General Intelligence) Development time
	Q3	AI Technology Benefits (Benefits)
	Q4	Benefits by sector due to the development of AI When to realize
	Q5	Commercialization level of AI technology by sector
Awareness of the Dangers of Artificial Intelligence	Q6	• Probability • Risk awareness • Future generation impact the risk to future generations) • Scale and severity of risk (seriousness) • Dread of danger • controllability of risk; (controllability) • Clarity of responsibility for risk (accountability) • Irreversibility of damage; • Social risk status effect • boomerang effect [10]"
	Q7	Risk occurrence and expression level by sector
	Q8	Infringement of social value by AI
	Q9	AI damage level according to AI
	Q10	Ethical Considerations for AI Technology

	Q11	Regulations on AI research and development Necessity Preregulation vs. Post Regulation Sectoral Regulatory Needs Specific Regulatory Activities
Improved AI Policy	Q12	Improvement of legal system
	Q13	Areas requiring a proactive approach Identification
	Q14	Supervisor of potential technical risk
	Q15	The primary responsible body for potential risks;
	Q16	Risk Assessment Agency
	Q17	Priority due to labor market changes Government policy
	Q18	Necessity of government regulation among future technologies
	Q19	The Need for Government Policy for AI Degree
	Q20	AI among precautionary policy measures Policy appropriate to risk
	Q21	AI risks in resilience policy measures Resilience Policy

3.1 Recognition of New Technologies Related to Artificial Intelligence

In the future, AI technology will be able to think and solve problems on its own, and will have the ability to evolve with free will. The respondents answered higher in the order of enhancing, convenience of life, and increasing in the order of increasing wealth, increasing social equity, and improving human fellowship.

It is expected that new artificial intelligence technology will be able to proactively cope with various industries based on the development of advanced big data and analysis technology in the near future, and through this, it will be possible to develop new industry and technology (Qi, 2019); (Rahman et al., 2018).

3.2 Awareness of the Dangers of Artificial Intelligence

The risk of artificial intelligence may be limited to the parties using it, but in the long term, there is a general opinion that it may occur universally to everyone. In the case of risks, 'intentional cyber attack, information manipulation, the economy, transportation, etc. were higher than other sectors. Especially, it was considered as the biggest recognition factor for AI risk in hacking and cyber attack.

3.3 AI-Related Policy Improvements

84.2% of the need for regulation of risk and safety incidents related to AI research.

'It is necessary', and 70.0% of the respondents thought that 'pre-registration and post-regulation are necessary'. The field of medical care was the most needed field in which the precautionary principle was applied, and responded in order of crime policing, labor, and transportation.

The government responded with 48.4% of the most appropriate oversight agents for future new technology risks, including artificial intelligence.

In the case of potential risks and safety accidents of artificial intelligence, 41.6% of the respondents said that they were the first to be responsible for 'manufacturers', followed by 'government' (24.3%), and so on.

4. Conclusion

Table 2 combines the three questions in the questionnaire: the benefits of Q3 AI technology, the infringement of social value by Q8 AI, and the necessity of government policy in preparation for Q19 · AI through four factors of artificial intelligence through factor analysis and correlation analysis. Through this, the infringement of value caused by AI (Beck, 1992)

Freedom was high, according to the necessity of each policy against artificial intelligence risks.

And policies that enable early prediction and monitoring of future risks of AI.

Benefits are divided into technical and social benefits.

Table 2. Factor analysis

Risk factors of artificial intelligence		factors			
		1	2	3	4
With artificial intelligence Infringement Degree	4) verity	**.759**	.124	-.114	-.012
	2) Free	**.752**	.019	.033	-.072
	5) Human dignity	**.730**	.124	-.012	-.078
	8) Security	**.716**	.186	-.081	-.024
	6) Self-determination ability	**.677**	.234	.097	-.202
	1) safety	**.646**	.080	-.088	.119
	7) equal	**.633**	.161	.058	-.257
	3) health	**.607**	-.104	-.257	.214
	9) Privacy protection, including invasion of privacy	**.566**	.246	.198	-.229
A.I Prepared for risk Policy Needs	5) Information disclosure policy on AI risk for citizens' right to know	.142	**.840**	.163	-.023
	1) Policies to predict and monitor AI's future risks early	.185	**.826**	.050	.028
	2) AI hedging policy	.143	**.815**	.002	-.014
	6) Resilience Enhancement Policy for AI Risks	.202	**.801**	.150	.020
	4) Policy that citizens can participate in the introduction of artificial intelligence risk assessment system	.131	**.791**	-.038	.072
	3) The policy that the beneficiary can bear the cost of AI risk	.045	**.679**	.143	-.077
Artificial intelligence Convenience 1	2) automation of routine tasks	-.012	.127	**.814**	-.084
	1) Promoting Life Convenience	-.027	.203	**.796**	.022
	3) Productivity Improvement	.012	.050	**.781**	.055
	9) High level robot development	-.017	.007	**.683**	-.010
	10) Promoting health care	-.034	.032	**.632**	.276
	5) Improve resource utilization	-.071	.014	**.625**	.387
	11) extending human lifespan	-.031	.107	**.568**	.359
Artificial intelligence Convenience 2	7) Improve social equity	-.095	-.036	.001	**.787**
	8) Improve human fellowship	-.122	.060	-.054	**.745**
	12) eternal life of man	.067	.013	.113	**.648**
	6) Reduction of adverse effects on the global environment	-.131	-.038	.353	**.625**
	4) increase in wealth	-.056	-.040	.328	**.582**

This study examines the theoretical discussion on risk and how it affects policy governance. Cyber attacks in our society due to artificial intelligence technology. Information manipulation and other risks are emerging, and these risks have a need for regulation.
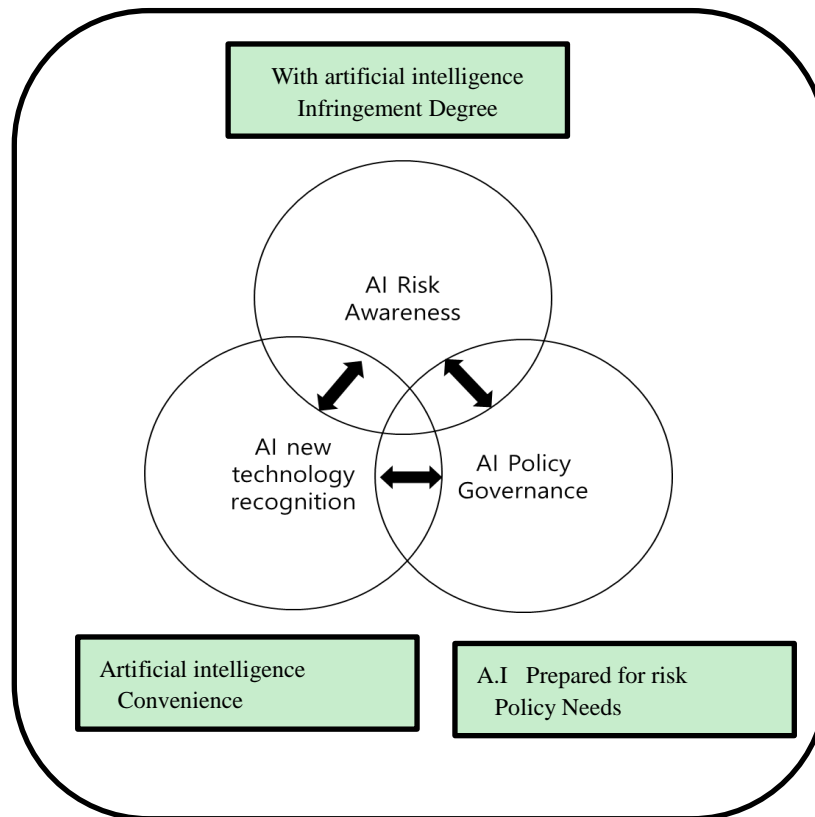

Figure 2. AI policy governance model

With the development of technology, new regulations, social norms, ethical discourses, regulatory and legal system improvements, risk management, etc. should be managed by the government as the supervisor, and the responsibility of accidents should be primarily the manufacturer and the government.

Further research is needed to analyze further how commercialization of AI technology recognition, benefits items and timing items affect policy governance through risk recognition.

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