

The Cultural Role and Legal Challenges in the Fourth Industrial Revolution and Artificial Intelligence Era

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Abstract: Today is the age of the 4th industrial revolution and the AI by the development of the science and the technology. In such change of age, the culture and law should find new measures and roles to respond to such changes. This study presumes that the meaning of culture expands to diverse concepts in the society. In the analysis of social phenomenon, the consensus of social members and the practice including the cultural ideology are important. Therefore, the interdisciplinary considerations beyond the science or law will be proposed. In the age of 4th industrial revolution, the data and the idea will be the source of core competition, and the law should support them. However, the social system exemplified with the law promotes the development of the science and the technology but paradoxically, it includes more strict regulation. In the modern society where the technology is being developed and new inventions appear everyday, the culture and the law should be developed to fit to the age. In the age of 4th industrial revolution and AI, the crisis and the opportunity come simultaneously not only to the society but also to its members. To respond to that, the role of science culture, which is in the center of soft power, should be emphasized.

Keywords : The 4th industrial revolution, Culture and Law, Artificial intelligence(AI), Cultural phenomenon, Legal task

I. INTRODUCTION

The fourth industrial revolution is the revolution of Artificial Intelligence (here abbreviated as AI) based on the Big Data. The cognitive ability, judgment ability and forecasting ability of the AI, which learned with Big Data surpass the human capability. Today which is entering into the age of 4th industrial revolution and the AI, the mankind is experiencing the great expectation and the curiosity, and the fear and crisis at the same time. The representative form of the 4th industrial revolution can be seen through the term such as AI, Internet of things (IoT), Big Data, virtual reality (VR) and 3D printing [1].

Particularly, AI is the area attracting the attention in our society. It is apparent that the 4th industrial revolution accelerates AI age. AI has been infiltrating the realm of

human affairs such as a robo-advisor and robot journalist relatively recently [2].

In this atmosphere, the role of culture, which shows the position of human being, cannot but become more important. The legal system is also a part of the culture, but the law is the safety device of the society to protect and flourish the human culture, which stays together with AI. The influence of the AI age built by the 4th industrial revolution on the future society is expected to surpass our imagination.

In such expectation, the study to examine the role of the culture and the arts based on the humanities required as much as the development of technology and the science, and the legal task to support that would be meaningful. The method to prepare the happy future depends on how to view and understand the ongoing 4th industrial revolution in the wider perspective.

II. THE FOURTH INDUSTRIAL REVOLUTION AND ADVENT OF NEW CULTURALLY FLOURISHED SOCIETY

A. Current Meaning of 4th Industrial Revolution

The 4th industrial revolution is a new world enfolded within the convergence of cyber and physics. There is no problem to say that the term '4th industrial revolution' is now settled down as the formal political discourse not only in Korean society but also worldwide.

It is the name meaning that it will cause the 4th industrial revolution after the 1st industrial revolution, which was made through the invention of steam engine started in England during middle of 18th century, the 2nd industrial revolution, which was made by mass-production and the automation using electricity during 19th century and early of 20th century, and the 3rd industrial revolution, which led the mankind to the world of computing and automation system during middle of 20th century. This temporal progression is shown in Figure 1 below.

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 <p>1st Water & Steam Power (Mechanization) 1784 → End of 18thC</p>	 <p>2nd Electricity Mass production (Assembly line) 1820 → Early 20thC</p>
 <p>3rd IT System Automation (Computers etc.) 1969 → Early 70s</p>	 <p>4th Cyber Physical System (AI, Iot etc.) → near future Today</p>

Figure 1: From the 1st Industrial revolution to the 4th Industrial revolution [3]

In the center of 4th industrial revolution, there are AI, Big Data, etc. based on the computer software converging various technologies developed individually. Ai, which has been developed greatly by the computing power increased rapidly and the validity of huge amount of data, enabled the development from the software to develop new pharmaceuticals and to the algorithm to forecast the cultural interest. In addition to them, it can be considered as next generation's industrial revolution led by robot technology or life science, etc.

The origin of the 4th industrial revolution is the Industry 4.0 presented in *Hanover Messe in Germany in 2011*. German Federal Government intended to secure future growth engine through Industry 4.0. Klaus Schwab, chairman of world Economic Forum, Klaus Schwab, chairman of the World Economic Forum, predicted that on this basis, the exponential growth of biotechnology and nanotechnology will bring about social change that opens up new challenges and opportunities [4].

The 4th industrial revolution, which is developed based on the 3rd industrial revolution, has a foundation of the convergence of diverse technologies through the development of IT technology. Such convergence of the technologies is explained with same form of IoT revolution where the all the objects are connected. That is, the technologies connected each other with the major technologies, which enable the link between the things with digital are advanced toward the relation between the things (product, service and place) and the human based on diverse platform.

In addition, there are a lot of forecasts that the paradigm of the industrial structure would be changed taking the AI as core growth engine. In other words, the 4th industrial revolution is characterized mainly with hyper-connectivity

and super-intelligence and means the age that everything including the human and things are connected and the reality and cyber are converged, and the AI is emerged over all areas of the society. The stories like the movies Matrix, which depict the convergence of the reality and cyber space, and Terminator, which shows the problem of AI, become a reality gradually.

In this point of view, the 4th industrial revolution means that the boundary of area is collapsed. the machine not human can replace the subject of production and control communicating with IoT. Based on that, it is expected that the boundary between each area would become more uncertain.

In fact, the 4th industrial revolution is the change of paradigm that has been progressed long time ago. Currently, we are in the process that the economic environment and areas of life, where the human exerts the creativity are changed getting away from the labor and manufacturing business-oriented economic environment in the past.

So far, mankind has experienced technology-oriented society several times. Today, which is the age of 4th industrial revolution and AI also can be another place of that experience. People dream of easy living in the society where the robot and human coexist and the robot does the human jobs. This apparently will bring the smart society earlier than makes enrich the human life. However, it does not, of course, make the problems disappear like how establish the position of robot or to what extent the regulation on robot should be recognized. The more realistic problems would be appeared in front of mankind in future in such ambivalent age.

B. Conversion and Role of Cultural Paradigm

The 4th industrial revolution refers to the conversion of paradigm of 'technical revolution' that the isolated areas such as AI, Big Data, nano-technology, 3D/4D printing and genetic engineering and biotechnology, etc. are being developed through convergence among the areas beyond their boundaries.

The destructive technologies such as the computer, which thinks like human, Big Data, life science, etc. will bring unimaginable changes in all areas of the human society such as politics, economy, society, culture, etc. New business and invention that the human cannot imagine will continue to be made using Big Data generated in IoT, etc. The society where the program materialized with AI replaces the human labor in the areas of law, medical service, science and technology, etc. will arrive soon. Here, what can be emphasized again is the culture. Finding the jobs made by new technology like AI is also new consumer culture made by the creativity and the personality of individual.

Culture reflects the appearance of society. Hegel said that the genre or form of arts receive the influence of the history or social condition of that time. The human culture started from agricultural society predicts the birth of new cultural area now in the age of 4th industrial revolution. The link and convergence of virtual world and the real world will accelerate the convergence of

each cultural genre, and the relation between the mortal human and the robot without death is the problem to think about. The dance would be embodied with drone and the pain and delight in art may be disappeared.

Gap not only between the individual but also among the countries will be bigger, and the congruence between the time and the space cause the unequal distribution of enjoyment of literary works. "Arts that goes ahead in the endless change of society" will become mere slogan now.

The 4th industrial revolution throws us a fundamental question about what is the human. That is, it throws the questions what is the humanism and how the paradigm of future society after capitalism should be. So, now entering into the age of 4th revolution and AI, the cultural approach and understanding for that are required more.

In fact, the age of 4th industrial revolution and AI is giving the people the fear that the human being will be alienated by the technology. For example, as it was depicted in SF movie <Terminator>, <Blade Runner>, etc., it is the concern that the domination over human being by AI machine would be realized.



Figure 2: Theatrical release poster

Figure 2 symbolizes the intervention of technology toward human society by crossing film and reality into the future and the present [5]. Although it is the human that appears in the movie as a cultural tool, the culture can show the tasks to predict and prepare for the future society instead of science and technology. As such, in the age that influences on the value of human existence, the culture should contribute to enhancing the unique human creativity more than anything. In addition, the advent of 'Smart Factory' that makes the products with the more exact real-time information using ICT than human throws the fear that it would make the human labor unnecessary.

Nevertheless, the current technology cannot make the machine that thinks. That the robot having intelligence would replace the human is the imagination exaggerated too much. The robot is just 'the intelligence with emotion', yet. The human being in the age of 4th industrial revolution should move its role to another position. The area that can be emerged as important is 'the culture'.

Realistically, it cannot be denied that it is the world that the machine handles lots of works instead of human but there are the works that can differentiate the human from the machine. That is the area of imagination and creativity. The role of human starts from here. However, I am not saying that we should find the role of human being in the age of AI

only in the area of culture. The culture is the unique area of human. Therefore, we should alleviate the side effect by the development of technological civilization of technology through the culture, and at the same time, should accept the change of culture and establish its role again.

Humans are living in lots of cultural contents from the birth. The human being is the *Homo Ludens*, that is, the man the player. The cultural creativity of the human makes the man to take the job as play getting away from working repetitive job instead of machine in the factory. The human should develop and be engaged in more creative recreation culture leaving the repetitive jobs to the machine. Further, the human being should introduce the culture connected to AI in the age of 4th industrial revolution, that is, the artificial intelligence culture and regenerate the culture. The regeneration of culture through AI can be one example.

Such culture is not made simply by the AI but realized by the human imagination and creativity. IoT, which is one of the major subjects of 4th industrial revolution means the hyper-connected society. It means that the connection, which symbolizes as internet, connects not only the computer and the computer, and the man and the man, but also the man and thing. The future of the age of science and technology will become more abundant when the cultural contents are accompanied in such connection and the culturally flourished society will approach to us in that process.

III. LAW AS A SOCIAL SYSTEM IN THE SCIENCE AND TECHNOLOGY ERA

A. AI, Culture and Legal Problems

Law is the cultural power [6]. The science and the technology, that are being developed rapidly in modern society is creating different culture from the past ages. Artificial intelligence technology has been around for a long time. Our life and culture have undergone many changes as well. The characteristics of artificial intelligence, such as rationality, autonomy, and similarity, have a significant impact on the legal system. Legal culture is also swept by the wave of change facing with the society that it never has experienced before. The age of 4th industrial revolution and AI, which is influencing greatly over the entire society beyond the area of science and technology, presents the fundamental questions on the existing image of men, social order and the norm. In other words, the science and the technology, which are being developed rapidly today, is presenting new legal problems matching the changes in our society. The role of law is attracting attention again. In this situation, the legal circles also think hard how to respond to that introspecting the important questions thrown by the science and the technology seriously.

Since the science in future can materialized our life and spirit in the society as an area of culture, our society needs the systematic and stable rule of law. That rule of law will prevent the chaos by the rapidly developing science and make the stable society.

Here, under the assumption that the AI is the technology to lead the

4th industrial revolution, change the future of mankind greatly, we should think about how we approach and solve the damage incurred by AI used for good purpose and how we can make brighter society. One of the problems that occur by the development of AI is the problem of human rights. For example, the position of middle class will be shrunk in the future labor market where the gap between the high-technology and low-technology and the high income and low income becomes greater and the labor of the workers are replaced with machines increasing the social inequality.

The welfare problem and the labor problem, etc. will cause the unemployment by the development of technology and may infringe the right to live like a decent human being. Jacques Ellul, the representative leader of philosophy of technology appeared past century, analyze the phenomenon that the human being is dependent on the industrial machine critically [7]. He took the position that the technology dehumanizes the human being fundamentally in the negative perspective on the technology and the machine. In the meantime, if we examine the normative issue that has been discussed so far on the development of technology related to AI a little in more details, it is observed that the discussion was focused on how to harmonize the autonomy of AI and the human control on that. For example, we should discuss about how we recognize the legal responsibility, if we have to grant to personality to recognize the responsibility, to what extent we should recognize the reliability of algorithm and the problem to secure the neutrality of the algorithm, when we grant the autonomy to AI. As to human control, the problem by occurring the confusion of human dignity or the value of human rights, potential infringement of privacy or personal information, governance of conflict mediation and information gap due to AI may be raised. For the example of such issues are malpractice accident by AI doctor, collision accident of autonomous vehicles, etc. [8,9]. To find out who has the legal responsibility in such accidents, the legal system is needed. Artificial intelligence technology requires a more secure development, not a first, with a discussion of whether it is a domain of science or an area of industry. For the law to function as a social mechanism to realize the Artificial intelligence culture, we should make and revise the law appropriate to that age seeking the contradiction in the law constantly. We need the law to realize the social value pursued by AI.

B. Legal Issues and Tasks

The greatest problem in granting the legal status to AI robot in above example is that the boundary between the human and the things becomes ambiguous by granting the status close to human to the being without consciousness. If we think taking one step forward, when the legal system that allows the coexistence of human and AI is made, the concern that it rather lowers the position of human than it enhances the position of robot can become more meaningful issue. Therefore, the discussion on the human existence in the age of AI should be made more actively [10]. In European Parliament, the discussion if the income tax can be charged

to AI robot raising the need to recognize the legal status that the AI robot has rights and obligations is made [11].

The 4th industrial revolution is based on convergence of information. For example, we share our daily routine, that is, physical activity data such as dietary life, exercise, sleep, etc. with diverse devices such as TV, refrigerator, electric appliances, lighting, etc. Through those information, the business predicts the human behavior. In addition, by analyzing the Big Data accumulated by connecting the human and the object, and the object and the object by internet, certain pattern is identified, based on which the human behavior is predicted and creating new value through a series of such steps is the characteristics of the 4th industrial revolution. However, the problem is that there is a lot of space that the law is involved. The examples for that include ICT convergence O2O (On-line to Off-line) service regulation or unmanned operation of elevator by AI as issue of prohibition, the lack of bio-health 3D printer and outcome certification criteria as issue of permit, lack of legal standards for the health service provided by medical insurance service.

The legal system in the intelligence information society induced by the development of science and the technology apparently causes the conflict between the stakeholders together with legal argument. To promote the development of the intelligence information technology and the service that provides the benefits to the social members, the limitation of regulation by the law is commonly pointed out. Our society is also looking for the improvement point like regulatory sandbox [12], but such problem also should be handled by the law in the age of 4th industrial revolution.

For the activation of blockchain-based new industry, which recently, is receiving spotlight as a core technology of the Fourth industrial revolution, the legal and institutional issue is raised. For example, it is necessary to examine how the legal regulation on the transactions in virtual currency such as blockchain-based Bitcoin and Ethereum are connected to the protection of investor or user and the issue on the institutionalization of the virtual currency transaction through the legislation, etc. Our law guarantees the development of the science and the technology but it is the fact that it regulates that with diverse reasons. Nevertheless, the claim that the technology development should be regulated has a legal problem in certain aspect. The blockchain technology, which already considerable convenience to the people or the smart contract based on that are in the line with such problem [13]. The contract contained the contents hardly accepted by society does not have legal validity. As an example, although it is not arguing here the problem of general P2P contract - for example, the possibility of information leak or the damage to the investor by the fraud and misappropriation or bankruptcy of P2P company, etc.- [14], it is apparent that these social issues accelerate the discussion on legalization of them.

Obviously, the law functions as a social device to protect the culture that technology advances. To this end, society must constantly look for contradictions inherent in the

law and make and revise laws appropriate and necessary for the times. That would be the way to support the social value that the fourth industrial revolution and AI are pursuing. And this can also be called a culture. The future is on the basis of current technology and culture. Figure 3 shows the relationship of these elements.

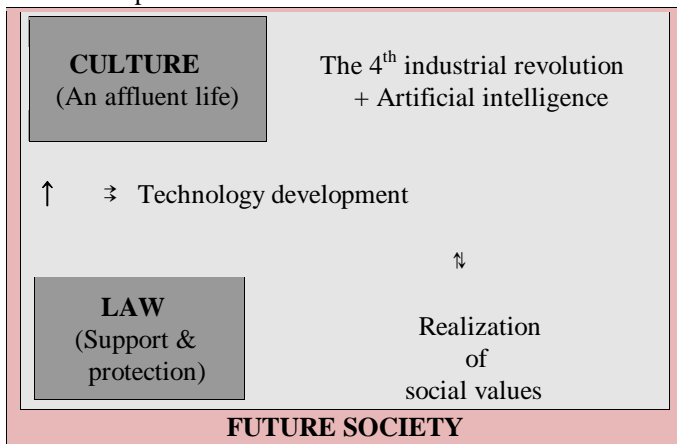


Figure 3: Technological and Cultural Humanism

IV. CONCLUSION

Cultural phenomenon is the mirror showing the society. Culture is formed by countless kinds of knowledge. Knowledge is the theoretical understanding of any subject or field [15]. Now the machine has become an age of understanding knowledge. Culture should walk this age.

One of the human characteristics is to produce and consume the culture. The law as a realization of culture guarantees and protects the freedom and rights of human being. To protect the culture production ability of the human being differently from machine, the legal system also should contribute to the coexistence of the society and the science and the technology. The law is also a cultural phenomenon of a society.

Now, elapsed the one fifth of 21st century, we are living in the stream of the rapidly changing age. The terms such as AI, Big Data, Block-chain, Cloud, IoT are used naturally in our society. Such new technologies are replaced by new technologies and we are living in the rapidly changing society enough to wash out the word 'new'. And finding such case is not hard. Finally, this article proposes three points.

First, our society has entered an era of socio-economic reform that cannot be explained with the previous paradigm. In the current society entered into the rapidly changing age of the 4th industrial revolution, the cultural humanism is needed more desperately. It should become one cultural phenomenon.

Second, through that, the society and economic model after technology-capitalism should be prepared. In this process, laws can conflict with people's needs and this will be a stage of cultural change.

Third, the development of science and technology must be in tune with the cultural sensitivity required by society. The culture of society has had a great impact on the development of science and technology. Now, science and its applied technologies are influencing culture.

The future of the fourth industrial revolution will change the human life beyond the imagination. Mental emotions, such as fear and anticipation sometimes precede the role of reason. And in that world, another culture will be with humans.

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