25th IVR World Congress

LAW SCIENCE AND TECHNOLOGY

Frankfurt am Main

15–20 August 2011

Paper Series

No. 081 / 2012

Series C

Bioethics / Medicine / Technology / Environment

Munenori Kitahara

Law and Technology Security Standard

Munenori Kitahara, Hiroshima / Japan

Law and Technology Security Standard

Abstract: The author will deal with the relationship between law and technology from the viewpoint of technology security standard. One of the relationships can be found in that law has been providing a security level of technology. They have been saying that law would often follow technology. Law is too slow to adapt the changing technology through the advancement of technology. Above all, information technology has an electronic rapidity and a legislation technology has a paper one. There might be a big estrangement between law and technology. However, law must provide a security standard of technology. The standard must be based on a relative security level. The relative level would premise on the ordinary, lawful and ethical use of technology. Most technology has been opened to the public without any technology impact assessment. Technology would have some defect, which the producers have overlooked. As a result, the users might often meet with the accidents caused on the defects.

Then law should provide a technology security standard to exclude the defects from the users' viewpoint as secure as possible. The security standard must be reflected on the architecture standard of technology. The architecture standard may be a yardstick whether the creators can evade the responsibility for the accidents.

The standard would also premise on the ordinary, lawful and ethical use of technology. The ordinary use means that the users should use normally technology within the extent of the architecture standard. The ethical use means that the users should use technology being conscious of the defects in order to avoid accidents.

The relative security level may be the sum of the architecture standard and the ethical use of technology.

Keywords: Law, Security, Architecture, Standard, Relative Level, Absolute Level, Defect, Ethical Use, Normal Use, Abnormal Use, Technology Assessment, Social Justice

I. Introduction

Most technologies are being used in society without a technology impact assessment. I am sure that technologies would include a kind of defect or vulnerability. The technologies which I refer to here include general technologies, information technologies, automobile technologies and public technologies such as road technologies.

Even though a technology has appeared in society without sufficient technology impact assessment, the creators might have first established a security level of technologies. But, the

creators have never closely examined all the ways of utilizing technology. Technology has been always utilized in ways the creators do not intend. The creators have never verified an affinity between different technologies in the same kind.

The users would meet with various accidents in consequence of those defects. The drivers would encounter the traffic accidents, and the Internet users the information accidents.

Then, law should provide a security standard of technology, and let creators and users obey the standard.

This paper has several main goals. First, it aims at proposing that law should provide a security standard and an architecture standard of technologies. The second proposing is that the technology users should practice an ethical utilizing of those technologies considering the defects to avoid accidents. The third proposing is that the standards should based on a relative security level, a lawful utilizing and an ethical utilizing.

In this paper, therefore, first, the theme of technology and defect will be dealt with (II), second, I will talk of absolute security and relative security (III). Third, I will discuss about ethical utilizing technologies (IV). Last, proposing that law should provide a security standard of technologies (V).

II. Information Technology and the Defects

1. The Two-Facedness of Technology

Technology is two-faced. The feature is also true of almost all technologies, which are being used in everyday life. That is, technology is a two-edged sword. Man can pare apples very well with a knife, and can kill others with the same knife. A car can carry persons tens of kilometers an hour and the same apparatus can instantly change into a running weapon. Nuclear technology is being used for power plants and making a-bombs, which only Japanese have been experienced.

This kind of example will be too numerous to mention, as is often the case with most technology. Technology will become a convenient instrument at some time and also the most dangerous weapon at the other time, which brings the worst situation. Whether technology becomes the instrument or the weapon will depend upon the mind of the users'.

Then, it will be required the users of a certain ethical idea. When using technologies, the users should make a self-decision that they would not cause a kind of accidents which might infringe the rights and profits of other persons. That may be called an ethical use of

technology[1]. However, technology is amoral, and inventions are routinely deployed in ways their creators neither intend nor sanction. To hold inventors liable for the misuse of their inventions is to indict progress itself[2].

2. The Neutrality of Technology

Technologies are neutral. Technologies might change into both convenient instruments and destructive weapons as described in the previous section. A technology would be given a different value by the mind of the users'. The function of technologies would never change according to changing mind. That is to say, therefore, all the users of technologies should be required to be in the continuous retention of the ethical use idea described in the later section.

The following story will elucidate the neutrality of technology. A world-wide famous hacker was employed by a big information service provider. The hacker would often attack the network of the provider. The result is that the company appraised his high-level information technology power. Then, the former hacker would intend to protect the networks with the same information technologies as he used to use to attack the networks of the company.

3. Technology and the Defect

All the technologies that we use today would have a kind of defect or vulnerability. But, the creators willingly would never accept the defects. I don't believe in the existence of a perfect technology. I don't believe in the existence of a technology with no defects, either. The technological progress may be an effort to reduce the kind of defects as far as possible. But, the creators can't remove the defects perfectly.

Most products which the technology is applied to, legally, have cleared the security standard provided by the act. When a person uses those products, the user has got injured and dead if worst comes to worst. Therefore, the user of the technology must recognize the defect and use technologies making up for those defects. In using technologies, there might be a problem with the user. Most people cannot understand a handbook or manual of technologies. It can be said that a technology has a defect, if the manual is unkind or misleading to users.

A young child whose shoe got caught in the escalator of department store was seriously injured. There happened an accident where a young child also got caught his body in rotary

---

[1] M.Kitahara, The Information Technology and the Ethical Use, in: Research on Information Society and Social Systems, eds., M.Kitahara and al. Kyushu Univ. Press, 2008, 3-13.
[2] Peter G. Neumann, Computer Related Risks, ACM Press 1994.

door of skyscraper in a big city. Young children were dead with jelly plugged to their throats, when they ate hard and big jelly.

In these incidents, both the escalator and the rotary door must have fulfilled the official requirements. In addition, they met the legal security standard. But the jelly had no legal security standard. The reason of the two former accidents was considered as the defects of technology. The companies did not intend such accidents at that time. The other problem is that young children were free from their parents' authority and control. That is to say, children alone used the escalator and the rotary door. The manufacturers would never foresee those situations.

A technology is not always used in the way how the developer can foresee. The user of a technology might use it in the way how the creators could not imagine. If a user becomes to be injured as the result, the technology might have had a defect. In that sense, the technology creators must give consideration to all the ways of using technologies before they are open to the public.

4. ICT and Defect

The software has morphed into an even more radical position, "the perpetual beta," in which the product is developed in the open, with new features slipstreamed in on a monthly, weekly or even daily basis[3]. The software producer often puts up a few new features on the software. From the viewpoint of security, they might find the very serious problems in the software at the same time. Every several hours an update program begins to install. It also means the reducing steps of defects or security holes of software rather than the imprudent services of software. They will repeat updating the software instead of recalling the products.

The software technology has a problem. Particularly many software have a serious problem from the viewpoint of information security. Software firms tend to defend the current state of affairs by saying that security is a very difficult problem to solve. The vulnerability could allow the attackers to take control of a user's PC after the victim clicks on a specially created URL. By including a long string of characters in the link, the attacker could trigger a memory error known as a buffer overflow that could then be exploited to run a program.

Most people use technologies in all fields. Computer technology, information communication technology, and networking technology, these technologies are recently being used in most wide-ranging. That is, information communication technology, "ICT." If these

---

[3] http://oreilly.com/web2/archive/what-is-web-20.html.

technologies are used only by researchers in the laboratories, it will not cause problems with ICTs. But, various problems are actualized as soon as those technologies reach the society. General people have a little knowledge of ICTs. The information communication technologies have also various defects. Many researchers also have mastered the defects. They can use ICTs avoiding those defects. On the other hand, general people, that is, the end-users have little knowledge of ICTs and the defects. They have no idea of ICT defects. The end-users must always confront the defects. As the result, they could become a victim or an attacker in information accidents.

5. Information Technology and Technology Impact Assessment

Technology assessment on the computer, information communication and network has never so far done except information technology security in law enforcement[4]. Before those technologies appear in the society, the technical experts must consider the fact that the general people use those technologies. The general people have little knowledge of the defects or vulnerability. But, these technologies are even excessively convenient for any person. These technologies have released the human beings from troublesome calculation. These technologies opens from meet communication between persons who live geographically distant. Therefore, the investigation of the defects has so far been neglected. But, if excessively strict technology assessment is done, technology itself stops appearing in society.

The technology with defects is being used in our daily life. It means that an experiment on a human body regarding technologies has been being performed in everyday life, which people do not recognize. In the case of ICTs, the use directly cannot get rid of users' life. If the user continues to strike the keyboard for hours, he/she becomes tendovaginitis. If the user continues to watch the monitor for hours, he/she becomes dry eyes. Woman becomes sterility with consequence of the electromagnetic wave. Cannot the keyboard be developed which does not cause tendovaginitis? Cannot the monitor be developed which does not cause dry eyes? Certainly, the monitor where the electromagnetic wave does not come out was developed. Certainly, the apron which cuts off the electromagnetic wave was developed. But the technology of the apron cannot be ICT.

There can be found the defects even in computer systems and networks. Those are a security hole, in other words, are something which is called the vulnerability and the weak point. In consequence of the security hole of computer systems which the individuals

---

[4] See, U.S. Department of Justice, Law Enforcement Tech Guide for Information Technology Security, How to Access Risk and Establish Effective Policies, 2006.

possess, the user not only receives damage, but also the user has a possibility of causing damage to the other user and networks, with that computer as a steppingstone. There are times when the security hole is discovered to also the application program which is installed to the personal computer of the individual. In most cases, the end users will recognize the security holes in the machine for the first time by receiving illegal access. But, they have no idea of coping with the vulnerability as the individual who is an end user. Many personal computer systems have been exposed to the threat of computer virus and malicious access.

III. Defective Technology and Ethical Use

1. Naked Technology

The accidents will occur whenever the technology with such a defect is used as it is. A defective technology is, so to speak, a *naked* technology. The naked technology is a technology that has not been examined with a technology impact assessment. In a word, a defect has been remained in the technology.

But the creators have not recognized the defect. They think that they invented the technology most perfectly. In addition, the creators have never verified all the ways how general users use the technology in the future. The inventors should disclose the information regarding the trouble in regard to using technology at least.

Then, the technology users must use technology almost according to the manual book, first, which was described by the creators. This is a normal use of technology. Next, the technology users must bear in mind that they should use a technology with a defect in order to avoid accidents. This is an ethical use of technology.

2. Technology and Ethical Use

When such a technology is used, it is necessary for any technology user to recognize the defects. And, it is necessary to use the technology to violate other people's neither right nor profits. In a word, it is necessary for the users to consider it, that is, not to trouble other people. This is an ethical deed. There is a danger bumped by the car behind when a car rapidly stops or changes lines even in driving a motorcar. Traffic accidents would bring various loss or damage. The accidents might deprive the persons concerned of the rights and profits. Those who drive a car should operate the apparatus while observing surrounding circumstances enough. This is an ethical use of cars. This is also an ethical driving. The ethical driving can decrease a lot of traffic accidents.

In this way, an ethical deed is required in the proper use of a technology. As is often the case with ICTs. In order to bury this kind of technical defect, ICTs users are required of an ethical deed in using the Internet and dealing with information. This attitude is the ethical use of information technology. In information society, it is required that all the ICTs users should have the ethical use of technology. The ethical use of information technology should decrease a lot of information accidents. That is to say, all the Internet users should be required of performing information ethics and information morals.

IV. Absolute Security and Relative Security of Technology

1. Introductive Problem –Road Constructive Security—

There is a curve in a road on the mountainside. There have not been constructed guard fences on the sides of the curved road, under which there are cliffs. The legal speed is 30 kilometers per hour. The curved road with no guard fences has reached an official constructive security level. It is provided that the regulation speed on the curved road of 70 meters in the radius is 30 kilometers per hour. The security standard of the road fills the requirements of the road construction act. The act does not require the administrator of the construction of guard fences, either. The road administrators construct the roads and the incidental security facilities according to the road structure ordinance which provides the road technology standard and the security standard. The security standard depends upon the relative security. The administrator cannot introduce the idea of the absolute security because of the construction cost. It is not necessary to set up the guard fences on all the parts of the curve. The administrator cannot prospect the possibility that a car runs on the curve with the speed more than 70 kilometers per hour.

On such a curved road, all the car drivers will be required of a normal using road. The drivers should operate cars with the speed less than the legal one. No cars should fall down into the cliff without guard fences, if they run with the speed less than the legal speed. A car could safely turn the curve, even if it ran with more than 50 kilometers per hour. Another car could not turn the curve with less than 30 kilometers per hour, if it heavily rains. All the cars that run on the curve not always fall down into the cliff. The driver must consider the road situation. The driver must operate the car according to the road situation—the road surface, the weather, the traffic and so on. This is an ethical driving. That driving is an ethical use of the curved road. No cars, then, should not fall down into the cliffs.

Therefore, it requires the driver to practice the normal use of the road not to fall down into the cliff. That is, the driver must run the car complying with the road traffic act. The

driver must drive with the speed less than 30 kilometers per hour if it rains heavily. That is the normal use of the road technology and the ethical use of the road technology at the same time. Only the driver who has performed a normal use and an ethical use of road, should be given a relative security of the road. The road administrator had only to give such a relative security level of roads. For a passing driver with no trouble on the curved road, the driver could have received an absolute security level, though.

The ethical use of the road means that the driver must operate the car complying with the road traffic act, and use the road technology with the proper purpose in the normal way. On the other hand, the road administrator must provide the road technology which the driver could not cause an accident if he/she uses the technology in the normal way. The idea of "relative security and ethical use" can be applied to the other technologies.

2. Normal Use and Relative Security

Technology must have a normal security standard. First, the technology must fill the security standard established in the law. The normal security means the security standard in the law. Second, the technology should be premised on the normal use. That is, no accidents should occur through the normal use. There occur no accidents when a technology is used through the normal use, if the technology has the normal security standard.

That is the normal security standard. This also is the standard of the road technology. Under this circumstance, if a car runs on the curve with 70 kilometers per hour, it is out of the normal use of the road. The car fell down into the cliff out of the road. When the car raises a traffic accident, the driver must be liable for the accident. If the car had run with the speed less than 30 kilometers per hour, it could have turned the curve and might have not fallen down into the cliff, even if the guard fences had not been set up. In that sense, the road administrator has no responsibility for the accident. The road administrator only has to cope with the risk occurred through an normal use. The normal use of the curved road is that the driver runs the car with the speed less than 30 kilometers per hour. The administrator only has to realize the relative security level.

3. Abnormal Use and Absolute Security

To the other thinking, the road administrator has to cope with all the kinds of risks. This means the achievement of the absolute security level of road construction. In this case, the administrator must consider the risk of an abnormal use of the road. The road administrator must construct the road considering that a car may run on the curved road with the speed

more than 70 kilometers per hour. The administrator must set up the guard fences on all the both sides of the curved roads. Then, the administrator gave the road an absolute security level. As for the abnormal use of the road, the administrator has only to cope with an absolute security level. Then, the road administrator will have to set up hard and high guard fences all the both sides of all the roads in the country.

Among the technologies, a nuclear technology and a medical technology require the absolute security level. The technologies must not depend on the use. In any use, the accident should not occur absolutely. The technologies are provided with the highest standard of the security. However the accidents, in fact, occur in the use of those technologies.

In the other technologies, we can't require the absolute security but the relative security. The greatest reason is the cost to make the technologies. We must make a very good adjustment between the cost and the security of the technology. We must accept the relative security of the normal technologies which people use in their everyday's life.

The user of the technologies becomes to own the greater responsibility all the more because the technology has only the relative security. The level of the security should depend upon the user.

V. Technology Security and Architecture Standard by Law

1. Considering Standards

As described in the previous sections, technology has a feature of two-facedness, and defects from the users' viewpoints. If technology is not technically assessed before used in society, law should stipulate the security and architecture standards of technology.

Anyone who buys a personal computer system can use the Internet on the very day. Moreover, people must prepare a computer system and network system if they want to enjoy administrative service from e-Government, the Cloud. Therefore, technology security standard and architecture standard by law will be needed in information technology[5].

2. Security Standard by Law

In the foregoing paragraphs, it was referred to the relationships between technology and law. When we talk of the relationships, one of them is whether or not law has stipulated the security standard of technology. In addition, even if law having stipulated the security standard of technology, the problem is whether or not the standard has been appropriate.

---

[5] See, J.Berleur/J.Drumm(eds.), *Information Technology Assessment*, North-Holland, 1991.

The security standard by law should be premised on not an absolute security level but a relative security level. This relative security level would lighten the burden of technology creators on the one hand. The level would require the users of an ethical use of technology, on the other. And both the relative security level and the ethical use might aim at an absolute security level.

3. An Architecture Standard by Law

Law has often provided an architecture standard of technology. As for the architecture standard of technology, it must be something which includes the consideration to the security in using technology. In other words, the security standard must be reflected into the architecture standard of technology.

Therefore, from the viewpoint of security, the security standard might be coincident with the architecture standard in many technologies. But, the security level which an architecture standard stipulates, hopefully exceeds a security standard. Because a security standard, however, would stipulate a conduct standard of technology users' on the one hand, and an architecture standard would stipulate a management criteria of technology managers' on the other hand, a little alienation has occurred between both standards.

VI. Conclusion

More than the relative security level should not be required of technologies. And it is necessary for general technologies to be provided with the relative security level. Those technologies necessarily include a defect or vulnerability.

However, the users could change the relative security level into the absolute security level. The users should try to bear the ethical utilizing in mind lest they should meet with accidents. The other users would rob of their profits and rights in the accidents. Then, the ethical utilizing would aim at avoiding infringing profits and rights of other users. The ethics will aim at achieving a social justice in a modern technological society.

Address:

Munenori Kitahara

Faculty of Economic Sciences, Hiroshima Shudo University

1-1 Ozuka-Higashi 1-chome, Asaminami-ku, Hiroshima, JAPAN 731-3195