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Yukihiro Furuse

RCSS

文部科学省私立大学学術フロンティア推進拠点
関西大学ソシオネットワーク戦略研究センター

Research Center of Socionetwork Strategies,
The Institute of Economic and Political Studies,
Kansai University
Suita, Osaka 564-8680 Japan
URL : http://www.rcss.kansai-u.ac.jp/
e-mail : keiseiken@jm.kansai-u.ac.jp
tel. 06-6368-1177
fax. 06-6330-3304

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Yukihiro FURUSE*

Abstract

No tools are used without any relation with society. For example we cannot drive the car if we don't have the traffic rules, laws, and maintenance system. ICT tools, like personal computer and the Internet, have some unique structure that is called open system. Open system makes us possible to program software without license, or business contract. This is the reason why PCs and the Internet have grown as the world wide business platform and convivial tools for the people. But there is the dilemma that open system architecture is also open even to the people who want to crash system. We have to learn much about the specialized knowledge of computer system and the Internet for protecting our ICT tools, have to install anti-virus software by ourselves. It is necessary to count the learning cost at adopting new ICT tools at any organization. In this paper, I will reveal the best balanced point between conviviality and security.

Keywords: Conviviality, Security, ICT

1. Introduction

It was around 1975 that we had new coming tools, named "personal computer" at the Bay area, San Francisco. There were several models, like SOL, ALTAIR, IMSAI. All these computers had obvious difference to the other computer system existed at that time. One is the using microprocessor for Central Processing Unit; another is disclosing the system architecture information. Using microprocessor made the computer cheep enough to be bought by even high school students. Disclosed information of both system software and hardware had produced platform business so that many software

*RCSS Research Fellow (Visiting Researcher, The Center for Global Communications, International University of Japan)
Email: furuse@info-leaf.com

and hardware companies are founded as third party.

2. Conceptual Innovation of Open Architecture

This type of new computer architecture is coined *Open architecture*. Open architecture should be estimated as a kind of invention, or innovation in computer fields because this is the reason why personal computer related Industries rose into the power in these 30 years. At that time, all the computer companies enclosed the system architecture information for protecting their technologies, service level, and businesses. No ordinary user could design any system related with system software and hardware because they were kept far away from the information. We had to use the computer system within an imagination of computer companies.

With open architecture, any person in all over the world can hack the system, can design all kind of software and hardware. This means that not only company people but also everybody can create something on computers. We can get the benefit of creation on the computer of our own. For example, some student at the Harvard Business School got an idea of VisiCalc in 1978 that was the unique application software known as an electric spreadsheet right now. It is important that not the specialist in a computer company or the student at computer science, but the student at business school could create such unique software. This is the fruit of open architecture. Now, open architected computers have become white canvas of drawing people's imagination. If personal computer took closed architecture, we might not get any electric spreadsheet like VisiCalc, SuperCalc, Lotus 1-2-3, Excel, and etc.

In this point of view, it would be better to tell conceptual innovation from product innovation. A computer itself has been the result of both product innovation and process innovation. But a few products were really innovative by the concept of design. For example, IBM System/360 was the first "mainframe" computer so that we should check out this System/360 as a conceptual innovative model. Personal computer is also one of those innovative enough to be called as conceptual innovative computer.

It is convivial tools that personal computer introduced to us. This concept, convivial tools, was firstly written by Ivan Illich in 1971. His book, *TOOLS FOR CONVIVIALITY*, got many readers in Bay Area. Mr. Lee Felsenstein, who was a leader of some computer fan club called "Homebrew Computer Club" at Bay Area, says that he designed the new computer named SOL as convivial tools. Convivial computer means not manipulated by computer makers. Cheep enough for the people to buy, open enough to hack. Free software archives may be the best fruit of convivial tools. Every user can install someone's imagination in all over the world. This innovative concept had been traced by the Internet protocol. The Internet protocols are based on RFC documentation. "Request For Comments" means adopting open architecture on building the Internet. Every person can access to any technical documents on the Internet. This architecture obviously introduced such applications like WWW, streaming audio and video, instant messenger, etc.

3. The dilemma of ICT Tools

Using tools is the distinction point between human being and the other beings. And something used by human being for some purpose is called "tools." Each tool stands on society, not alone. Therefore, it has been the political issue that how controls the using tool people from the ancient to today.

Tools should be classified by the relation with ordinary people: isolated, separated, or involved. In our democratic systems, the main political issue has been how control the dangerous tools. Those type of tools, such as missile, fighter, bomb, and tank, etc. are isolated and civilian controlled. Train, airplane, and broadcasting, etc. are separated and regulated by law.

	Tank, Fighter	Train, Bus	Private car
Owner	Nation	Company or Nation	Citizens
Relationship with citizens	Isolated	Separated	Involved with the license and law
Maintenance	by Professionals	by Professionals	by professionals or themselves

Figure 1

Compare with cars, ICT tools are too many to build the license system. It

will take much more cost to maintain the ICT license system than the car license system takes. The best way does not mean the effective way, but means best balanced way between effect and cost. It is very important for us not to forget the benefit point of ICT tools. Giving up the open architecture means loosing conviviality, though it must be the effective way to protect security of ICT tools. Conviviality is the most important point for ICT tools because convivial computing environment enhances the people's imagination.

We have to realize that it become the most important political issue that how control influential social tools involving ordinary people like cars and ICT tools. It is very similar situation in a hundred years ago; convivial cars were produced by Ford. Both cars and ICT tools are owned by personal, widely spread the each people's activities, but bring bad results if the mistake happened or used by wicked person. Each person should be ready for being assailant before driving the car, operating the computer.

While car found the social controlling system of license and maintenance services, personal computer and the Internet have not met the best way to be social controlled. The problem is brought by convivial open architecture. This type of architecture is also very convivial to wicked person so that many viruses attack the computer all over the world through the Internet. And even a goodwill user might relay the viruses widely to the other, might leak important information. In conclusion, it is a problem to find the best social controlling system for ICT tools.

	ICT tools
Owner	Citizens
Relationship with citizens	Deeply involved without the license, law
Maintenance	by themselves

Figure 2

It is true that the personal computers and the Internet are also very much convivial even for evil people so that anyone can make computer virus, the Internet warm, Trojan hose. And if someone's system is infected, then this system becomes an assailant of system crash, information leakage, and etc. Personal computers enhance both the intellectual power and the ability of doing something bad against the socials. In this situation, you cannot protect by yourself because the other person, who is careless enough to execute the virus program, will be a bad person against you. Just the other person accessing your homepage, then the virus infected personal computer spreads the virus mail through your email address.

4. Learning costs and system protection

An organization, like company, has one more problem of learning costs. There are many personal computers in the company and they are all networked locally and globally. This system is difficult enough to make the person be depressed by high learning costs.

There are many hidden costs behind the convivial computing. Learning cost

and recovery cost are much higher than un-convivial computing like mainframe. It seems that we should think this cost as tax of the freedom to use. For example, the best benefit point of convivial computing will be the freedom to install many kind of software. But people have to spend the cost of checking before installing, have to take the time of recovering after installing if necessary.

To avoid increasing the system learning costs, many companies set the entire computer as the same system: using same operating system, same application software. It is prohibited that any employee installs the new software. But this formulary makes the big security hole in a company system. Once one computer is attacked and infected, and then entire system will be down soon after because the other computers have the same security hole.

Though the formulary of the system enables the learning cost to be kept minimum level, it causes two new problems. One is making security hole bigger by uniformity of the system. The same operating system, same applications, uniformed way to operate reduces cost of learning, recovering, but system uniformity is the invitation card of whole system down. If one computer is attacked by the virus, then whole system goes mad, or hangs up. Another problem is the discouragement of users who has the unique imagination. Uniqueness always brings irregular operation that is prohibited by system section. The person who wants to do something new has to spend unnecessary time of writing application form and getting permission. In case of some Japanese big company, employee has to wait more than a week to get

the permission. Then he or she will give up doing something new in the office.

Prohibitions throw conviviality away from using ICT tools.

5. Conclusions

There will be no best system to make a balance between conviviality and security. However the second best system could be some kind of license system for the end users of personnel computers. Minimum social knowledge for using computer should be defined with some kind of authority and should be changed annually. Legal system concerning computer security and privacy should be one of the requirements for this kind of license.

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