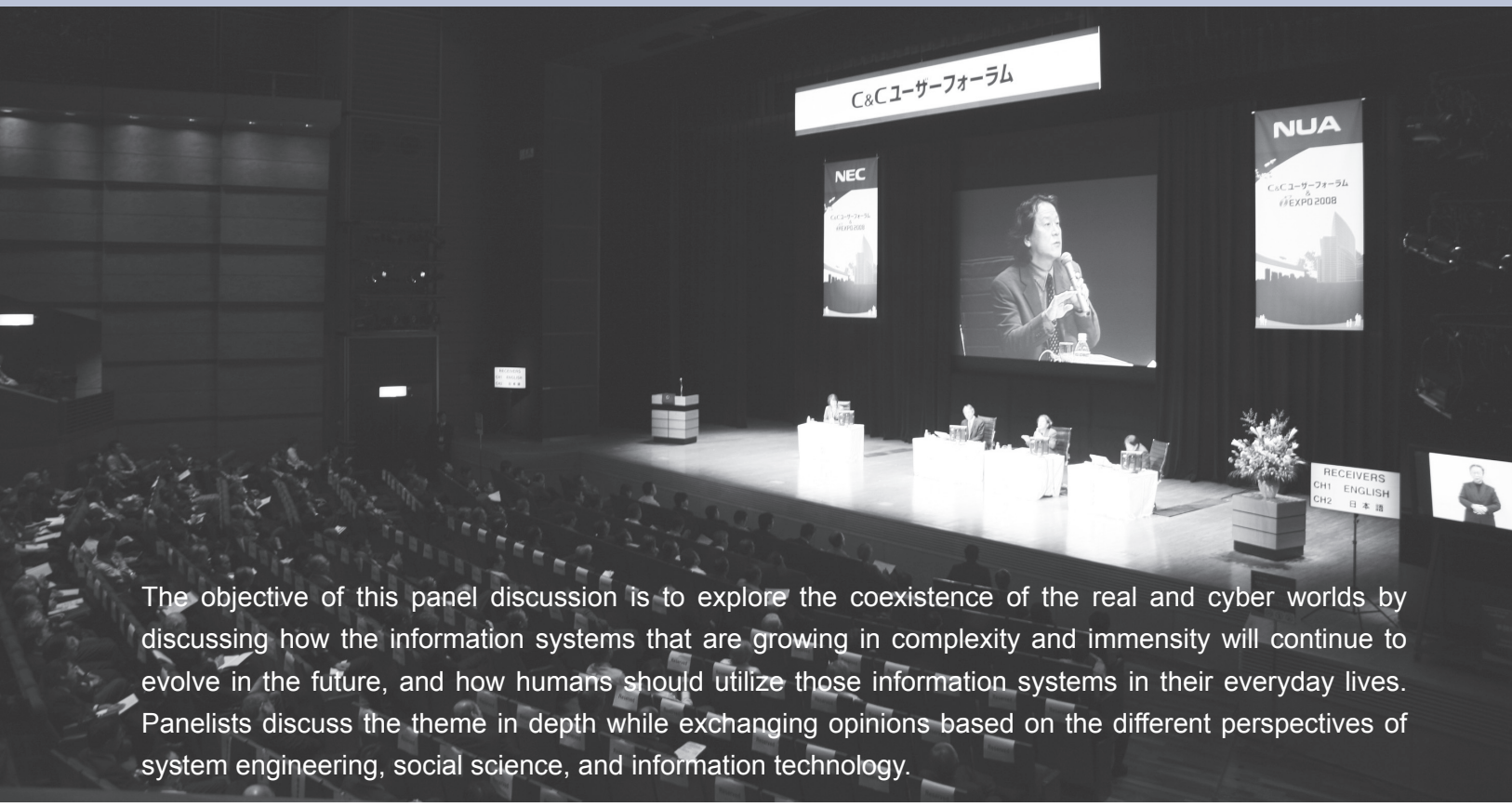
How well can Humans Coexist with the Cyber World?



The objective of this panel discussion is to explore the coexistence of the real and cyber worlds by discussing how the information systems that are growing in complexity and immensity will continue to evolve in the future, and how humans should utilize those information systems in their everyday lives. Panelists discuss the theme in depth while exchanging opinions based on the different perspectives of system engineering, social science, and information technology.

Hirotada Ohashi
Professor, Department of Systems Innovation,
the University of Tokyo

Ikuyo Kaneko
Dean & Professor,
Graduate School of Media and Governance,
Keio University

Takemitsu Kunio
Associate Senior Vice President and Executive General Manager of Central Research Laboratories,
NEC Corporation

IT will evolve along 3 pillars

Moderator: The theme of this discussion is "Human Coexistence with the Cyber World". First, I would like to start by asking your opinions on what sort of changes you think will happen in the future.

Kunio: Having heard some very interesting thoughts of my fellow panelists, I would like to follow-up by offering my views on the technological trends that we might expect in the future. As I mentioned during my opening speech, the IT until now which is epitomized by C&C has evolved along the twin pillars of systemization and digitalization. But from now on, it looks as if we need to consider 3 pillars. The first is "Symbiosis"; the pillar of coexistence and co-creation between humans and IT. The second is "Dependability"; the pillar that protects the safety and security of people. And the third is "Ecology"; the pillar that seeks to balance the advancement of society with protection of

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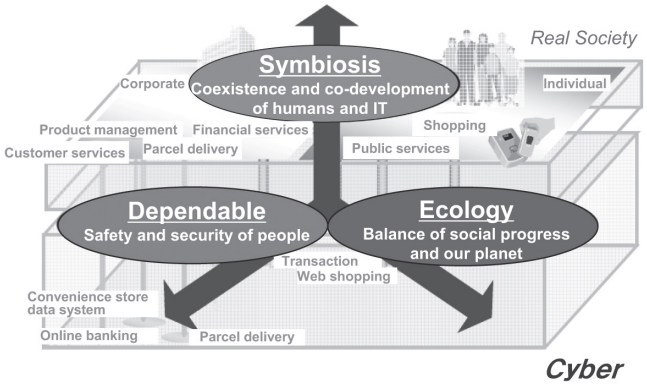

Fig. New directions of Cyber technologies to be implemented.

the global environment and ecosystems. Next, please allow me to elaborate on the activities that NEC has already initiated in these areas.

As an example of "Symbiosis", we are aiming at strengthening our HI (Human Interface) technology. We have also commenced international collaborative research on integrating the fields of natural science and psychology or social science, with the development of HI components at its core. In the next category, "Dependability", developing a robust system framework to avoid service downtime, security technologies to protect personal lives, and management technologies for network autonomous systems will become crucial. And in "Ecology", there is our low power consumption server that won the Minister of Economy, Trade and Industry Award at the "Green IT Awards 2008", as well as our efforts in promoting the use of bioplastics to lessen our dependence on fossil fuels. I believe that when these three factors are joined by a change of people's way of thinking, the birth of "human- and earth-friendly technologies" will begin in earnest.

Mentality and organization that shakes off previous misconceptions

Ohashi: I agree that the coexistence and integration of the real and cyber worlds will progress to a greater extent in the future. Not limited to just technologies, we are seeing that various sectors such as education and medicine which have supported social systems are becoming increasingly borderless. In this trend, new issues have arisen including the consolidation and usage of dispersed knowledge, the most effective distribution of resources, as well as various latent vulnerabilities.

However, are these facts really being understood? I believe that today's intellectuals suffer from several misconceptions. First is the belief that "every problem has an answer". There is no such thing as a "correct answer" or "almighty prescription" for problems such as social security and bullying. Second is the belief that "it is necessary to know all and control all". I've been told a story about an economic bureaucrat during the Soviet Union era that visited a bakery in London, asking in disbelief "how is it that they know how much bread will be consumed per day when nobody is controlling it, and who hands it out when nobody has any plan?" Fact of the matter is, it is impossible to know and to control everything. Yet another misconception is the assumption that "more precise knowledge leads to more accurate belief". The field of physics has what's called the "uncertainty principle". So likewise, in social systems, perhaps the subject may sometimes become more obscured as more knowledge is gained and the perspective of the observer gets called into question.

In order to create 21st century type organizations, it is first necessary to shake off these erroneous misconceptions. Various conditions are changing. For example, interactions within and outside the company are rapidly growing. This mutual functionality then refines and expands innovations. What's more, there arises a need to prepare for a wide variety of uncertainties. Since decision-making must be justified in terms of accountability, it is necessary to rely on more sophisticated processes. And it will be necessary for organizations to be always open and evolvable.

Kaneko: That story about the London bakery was most interesting. I believe it's a type of automatic mechanism that's part of the market. However, as with the recent collapse of the financial system, we've begun to see that market principles are not always versatile enough. In the field of medicine also, it may be possible to accommodate changes at each occurrence, but the overall system starts to break down. Perhaps it's pushing the limits of the autonomous distribution system model in cases where the scale has become too big. Maybe solutions would be possible if it were a system with enhanced robustness?

Ohashi: In the medical services as well as educational fields, today's complex problems cannot be solved by some leader or genius. I think our current times call for all sorts of people to provide diverse ideas, try new things and move them along. It is this type of improvement effort that will eventually yield innovations.

Kunio: I have a question for the two of you. In our current age where systems are becoming ever more complex both in terms of quantity and quality, how should we in the information technology field approach the situation?

Ohashi: I think a good example of a system where robustness functions properly is the human body. It contains self-healing capabilities such as the immune system, and is constantly working to balance itself out. This may not be the only answer, but perhaps if we think of the human body comparing with society, then we can also use similar models when considering information technology and information infrastructures.

Kaneko: In the empirical test project of telemedicine we are engaged in the Co-Mobility Project I mentioned in my lecture, it has been recognized that a monthly 30-minute or so conversations with a doctor followed up regularly by staff members a few times a week, over a teleconference over the internet is quite effective in improving vital data of patients. It is obvious that deepening the mutual trust between doctor and patient has a positive effect. So in the medical field, which had been bound by the traditional doctrine of meeting face to face, new possibilities are arising. In other words, the sound application of information technology can increase the likelihood of social innovations occurring.

Expectations for technology that will raise the human connection to cultural levels

Moderator: Now I would like to change the subject and ask for your thoughts on the relationship between individuals and the cyber world.

Ohashi: There is no doubt that further improvements in the digital infrastructure will increase convenience. Newly anticipated technologies for these improvements may include, for example, making selection among large quantities of unreliable information, clarifying the role and mechanism of social media such as Internet bulletin boards, controlling free riders, and increasing the potential of multiprocessing. I believe that the relationship between these information technologies and the ability of individuals to use information is a "co-evolutionary" one, in which both continue to evolve while acting upon each other.

Kaneko: The relationship between humans and the cyber world has changed dramatically over the last 10 years due to the increased functionality and proliferation of the Internet and mobile phones. To put it simply, it has become easier for people to connect to various information, as well as connecting information to each other. This is convenient, but also risky. So it is important that we fully understand the existence of those risks, and as I pointed out in my speech earlier, develop relationships where people are able to help each other. I consider that "people being connected to each other, and each being aware of that connection" is the linchpin of what Mr. Kunio refers to as "symbiosis". It is said that the evolution of technology brought about an increase in productivity. However, in order to raise the productivity of society in broad terms including social services, it will be necessary to create a framework that allows people to plainly see how their collective efforts result in tangible merits that in turn are distributed throughout society via information technology.

Moderator: Presumably information technology is one method by which things that had been lacking in society in the past have been compensated for. What are your opinions regarding the role of IT in the future?

Kunio: I believe that IT until now had transcended time and space to get where it is today. From now onward, I think what we call "culture" will be enhanced further by IT. So I envision that IT will play a decisive role in connecting diverse cultures throughout the world and enriching society as a result.

Ohashi: The word "culture" is actually etymologically derived from the word "cultivate". In considering culture, I think it will

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become increasingly important to "cultivate" a foundation that will be profitable or advantageous to all parties concerned.

Kaneko: It's also important to create an environment that supports various changes and makes them easier to achieve. For instance, I think IT has a major role to play in terms of who will be absorbing the cost as well as conveying vision to the mass population.

Conditions for coexistence and how we can prepare now

Moderator: In closing, may we have a few words from each of you regarding today's theme.

Ohashi: The issues facing the "coexistence of the real and cyber worlds" are dauntingly numerous. But if I may borrow the slogan of Mr. Obama, I would just like to say "Yes, we can." I believe that we, as well as technologies, will eventually be freed from the shackles of purposefulness - the notion that "we must have objectives" - and we will discover a new freedom. Another merit is that the talent required will not be innate qualities such as height and memory retention, but shift to those qualities that humans acquire within their social relationships such as trust, cooperation, learning and innovation.

Kaneko: Currently Keio University is engaged in a large scale research project called "Emergence of Co-Mobility Society," with several companies including NEC, and we are in the process of developing an electric vehicle with an option of automatic driving which has recently been offered for test rides by general public. The term Co-Mobility was coined as a combination of "community" and "mobility" and it seeks to integrated "community" and "mobility" to stimulate personal interactions, to create a society with high social capital, for the eventual realization of a "co-mobility" society. We hope to deliver the results commensurate with your high expectations.

Kunio: The impression I take home from this discussion is that there is plenty for us involved in cyber technology to do, even starting from now. And although I explained the 3-pillar directional model earlier, let me state that this is not something that NEC can do alone. A crucial precondition is that we shall work in partnership with our customers and promote the creation of open innovations. We therefore hope for your cooperation in the future.

* This report is the NEC Technical Journal Editorial Office's compilation of parts of the Human Life Innovation Symposium panel discussion which took place at the C&C User Forum & iEXPO 2008 on November 11, 2008.