For Further Innovation

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NTT Science and Core Technology Laboratory Group is undertaking the cutting-edge R&D needed to support future ubiquitous and broadband services. R&D activities are being conducted at Atsugi, Musashino, Yokosuka, and Keihanna. While the other two laboratory groups (NTT Cyber Communications Laboratory Group and NTT Information Sharing Laboratory Group) aim to boost NTT business in the near future, we are targeting the more distant future. Most of our research topics are expected to bloom in 5 to 10 years, though the basic research laboratories in our group are aiming to create trends that will be seen in 10 to 20 years.

I consider the mission of the NTT Science and Core Technology Laboratory Group to be "disruptive innovation" through flexible ideas unconstrained by existing networks and services. There are many examples of companies with a long-established tradition and reputation that were hit hard by the emergence of new technologies that were not extensions of existing trends (often referred to as disruptive innovation or disruptive technology). One example is the blue-chip companies that initially underestimated the importance of the personal computer. This kind of trap is called the "Innovator's Dilemma" by Professor Christensen of the Harvard Business School. A typical example in the communication field is the emergence of Internet technology.

Within the NTT Science and Core Technology Laboratory Group, scientists in the Network Innovation Laboratories established Japan's first portal site (the NTT homepage) in the early days of the Internet. But none of them could imagine that the Internet, best-effort communication without guaranteed reliability or metered usage, would develop as far as it has. Some scientists even say that "we should not rely on Internet so much".

When I joined the former NTT Ibaraki Electrical Communication Laboratory in the 1970s, they were about to commence full-scale R&D of optical fiber. I joined the optical fiber research project midway, and put my young heart into developing VAD (vapor phase axial deposition) single-mode optical fiber fabrication technology. The optical fiber arising from that technology is now used not only for the nationwide backbone network but also for local optical access (Fiber-to-the-Home), which gives me great satisfaction as a scientist. Optical fiber, which can be regarded as the ultimate transmission medium invented by human beings, was disruptive toward conventional systems. In combination with Internet technology, it created pressures that have forced the traditional telecommunications carriers, including NTT, to review their overall business strategies.

Some might long for the good old days and say, "optical fiber, the Internet, and mobile phones are the root of all evil". However, the emerging new world is not viable without these inventions. Innovation has a dark side as well as a bright side. Our laboratories are striving to suppress the drawbacks and achieve the full potential of the bright side.

To return to my original theme, NTT Science and Core Technology Laboratory Group is constantly seeking research topics that only NTT can take on and nurturing the seeds of innovative technology. To achieve this, we need to select and narrow down the research topics. The problem is whom we should charge with the duty of providing the "flexible and innovative research touch" (small pilot programs) that will lead to further innovation.

By the way, I heard an interesting story the other evening. An electron can hold optical phase information not only at extremely low temperatures but also at normal temperatures. Is this true? If so, it means that light can be halted, which suggests the possibility of making the long-awaited optical buffer memory. I would prefer to be researching topics such as this than sitting in the Executive Director's chair...