Highlights

Technological seeds that overcome the valley of death (Shinji Yuasa / Head of the Spintronics Group, National Institute of Advanced Industrial Science and Technology)

2009.07.17

Shinji Yuasa / Head of Spintronics Group, National Institute of Advanced Industrial Science and Technology

From the speech of the winner at the 34th Inoue Harunari Prize presentation ceremony (July 15, 2009, sponsored by the Inoue Harunari Prize Committee)

Mr. Shinji Yuasa

The research that received the award began around 2000, when the National Institute of Advanced Industrial Science and Technology (AIST), to which I belong, was just starting out as a new organization. The most important responsibility of the AIST was to translate the results of basic scientific research into commercial products and practical applications, thereby giving something back to society. It is often said that there is a very deep gap between the results of basic scientific research and actual commercialization and industrialization. This is the so-called "valley of death." "Researchers must cross the valley of death" or "jump into the valley of death." That's what Hiroyuki Yoshikawa, the president at the time, would often say to me.

How can someone like me, who has only done basic research, cross the valley of death? I thought I needed to first achieve some groundbreaking research results, so I applied to the Japan Science and Technology Agency's basic research support program, "PRESTO." I started the PRESTO program in early 2002, and by the beginning of 2004, I had achieved some groundbreaking results in basic research.

Now we finally have to cross the valley of death and turn these results into industrialization. Our partner was Canon Anelva, a manufacturing equipment manufacturer. When you think of manufacturing equipment manufacturers, you might think that they only make equipment, but today's manufacturing equipment manufacturers have the extremely important responsibility of developing mass production technology. To translate the results of basic research into mass production technology, various important items must be met, such as production efficiency, production speed, cost, reliability, and yield. This is why it is so difficult to turn the results of basic research into mass production technology.

As a result of working with the extremely talented engineers at Canon Anelva, we were able to link basic research to mass production technology in just one year. Once something like this is achieved as mass production technology, it sets off a huge trend in the industrial world, and just three years after the results of our basic research, we were able to actually commercialize it as a hard disk magnetic head. It took a lot of hard work from the supporters and collaborators

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automatically attract excellent supporters and collaborators. I am grateful for the good fortune and the encounters with such colleagues that led to this result.

Mr. Shinji Yuasa

Profile of Shinji Yuasa

Born in 1968, graduated from the Department of Physics, Faculty of Science and Technology, Keio University in 1991, completed the Master's course at the Graduate School of Science and Technology in 1993, and completed the Doctoral course at the Graduate School of Science and Technology in 1996, receiving his PhD (Science). He was a researcher at the Electrotechnical Laboratory, Agency of Industrial Science and Technology, and a senior researcher at the National Institute of Advanced Industrial Science and Technology in 2001. He has held his current position since 2004. With the support of the Japan Science and Technology Agency's research program "Sakigake," he created a tunnel magnetoresistance (MTJ) element using a single crystal of magnesium oxide as the insulating layer in 2004, and achieved a dramatic increase in the rate of change in electrical resistance (MR ratio). Based on this result, he developed mass production technology for MTJ elements with Canon Anelva Corporation, and Canon Anelva's equipment has been introduced to various hard disk manufacturers and is used in the product development and production of magnetic heads. Together with Canon Anelva Corporation, he received the 34th (2009) Inoue Harunari Prize.

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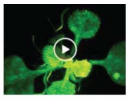

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