Foreword

Quality over Quantity

OYAMA Osamu*

When the recruitment season comes, companies send their publications as reference for recruitment to universities. Such publications usually include articles written by their employees to introduce what they experienced in their work, probably hoping for students to learn what they do. I always read such articles. One day I noticed something. It was that I quite often found expressions like "I completed ○○ in a short time" or "I developed ○○ in a period half the time of the conventional development period" to describe their work. They expressed their satisfaction with their work by referring to time or quantity, rather than the importance or quality of it. I even felt sorry when I could not help but needlessly imagine that they might have been forced to finish with their work within a fixed time limit.

The terms "quantity" and "quality" are often used as a pair. People generally believe that quality is superior to quantity. The terms "you get what you pay for" and "buy cheap goods and you throw your money away" may be the antithesis of mass production or consumption at low prices. I think the feeling of happiness obtained from satisfaction with quantity of things will gradually change to longing for quality of things that cannot be replaced by anything else. I encountered an interesting story on this relationship between quantity and quality. It was "Biological Civilization" (the book I have was published by Shinchosha in 2011) written by Tatsuo Motokawa, who is famous for his book titled "The Elephant's Time and the Mouse's Time". Although being a biologist, he worked for a technical college at the time of writing the book and rolled out bitter criticism against science and technology based on his experience of working for the college in which he was surrounded by straightforward or rational people who were likely to think about everything in a mathematical or physical way. For example, against the fear that one fifth of the species of living organisms on the planet would become extinct and only 20 million species would survive in 30 years, many scientists may think that is no problem because as many as 20 million species will be still on the planet. Motokawa asserts that this way of thinking is thoughtless. Chains of individual species and living organisms support the environment, and none of these species can be replaced by any other. In other words, quality is essential. Scientists generally rely on Elementalism, where everything is decided simply by totalling the elements and concentrating attention to numerical formulas and data solely handling quantity, not trying to consider quality, according to Motokawa.

I do not think I'm qualified to speak out on large scale topics such as science and technology, but it reminds me that I may have something in mind. That is, various events that should be originally expressed in quality are often expressed in quantity or numeric values, and this way of expression is quite normally accepted. Speaking of economics, Gross National Product (GNP), Gross Domestic Product (GDP) and Gross National Income (GNI) are typical examples. These indexes are based on some type of assumption (or modeling) for quantification, but actually get out of control with the assumption itself never being closely examined. The engineering industry also digitizes individual objects with different characteristics and takes it for granted that they are arithmetically evaluated, which may be too strange in an intrinsic sense. For example, performance and cost are digitized, weighted quite at random and summed up together to be used as evaluation functions. What must be essentially evaluated in quality may be (unfairly?) evaluated in quantity.

Still, you may want to argue that science and technology have not solely pursued quantity. One of the first terms that include the word "quality" I remember is "product quality". Certainly digitized data may be widely used as a measure for quality management, but the thing on which prime importance is placed in the field is people's precious experiences, and ideas that can never be digitized. That is the "quality" aspect of the product. What about the hot topic of "artificial intelligence" (AI)? Some may condemn AI that deals with large amounts of data, namely quantity, but AI uses living organisms as a good model. In the process of cementing a fresh idea, it cannot be realized through learning based on large amounts of data if its quality is poor.

Currently AI has gained the spotlight, but they say it temporarily died down for a period a short while ago. In that period, computer-based intelligence was said to have limitations. The number of AI researchers perhaps drastically decreased after many of them gave up. Still, those who continued working with strong belief helped AI research make a come back. I heard that genetic algorithms (GA), which were revitalized a while ago, is what was achieved by a researcher who continued his study without fear, even if the utility could not gain attention. I think this is another stage on which the relationship "quality over quantity" exists.

* Professor, School of Science and Technology, Meiji University