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Cover lead

Modern economics is a wonderful subject that offers many intriguing mathematical equations. One of them is how economic growth can be resolved into its constituent factors, such as labor, capital and technology. The well-known Cobb-Douglas production function is amazingly useful in clarifying that growth rates are the sum of three factors: the labor force growth rate, the capital growth rate and the Total Factor Productivity (TFP) growth rate, which is measured as a residual after the labor and capital growth rates have been subtracted from the total economic growth rate. That is a share of the contribution of technological innovation to overall growth.

The growing economies have generally a strong TFP growth rate. This observation corresponds to our intuition, namely that with technological progress productivity levels would be enhanced and the economic growth rate would rise as well. Today, OECD countries are all facing a fiscal crisis, expanding budget deficits through growing expenditure in response to increasing needs for social welfare due to their aging societies, and the need to restore their economies following the continued recession since the financial crisis in 2008.

Excessive government debt could lead to a lack of public confidence in a government and destabilize the economy through the possible plummeting prices of national bonds. Therefore, governments will need to sustain economic growth without depending so much upon their fiscal expenditure. Innovation in the business sector would thus be a key to achieving robust growth. However, innovation would affect not only the economy but also our daily lives through such effects as less commuting time using new transportation systems, a new working style due to the introduction of robots, or much longer lifespans in an aging society thanks to new medical science.

We should know how our social lives would be transformed by innovation, even though most of us are not science experts. Since we are living in a globalized world, innovation could happen through international links. This means scientists today will need to present the social implications of their future inventions to the public in easily understood language and they will also need to do so in an international context, such as at the venues provided by international organizations such as the OECD. Such international communication between scientists and non-scientists is called "science diplomacy" and is increasingly considered a key to enhancing the impact of technology upon our economies and societies. The interlinkages between the economy, technology and society should therefore be increasingly studied.

The question is whether we are now going through an amazing technological revolution or not. We certainly see some amazing shoots of revolutionary technologies, such as iPS cells and humanoid robots. But whether they will truly blossom and transform our societies and economies in the future is another story. Your view on this may vary depending on whether you are realistic or romantic. You have to be realistic in life to go through various hardships and risks, but at the same time it is true that achievements often come to those who dream about what should not be expected in reality and devote their passion to realizing such dreams. Jules Verne, the 19th century French novelist, is often referred to as the father of Science Fiction, but science in the 20th century continued to evolve beyond his own imaginings.

Our cover story articles in this issue may not necessarily be consistent with realism but may stimulate your own dreams, perhaps being more concrete and closer to reality than Jules Verne's novels. In celebrating our 200th publication of *Japan SPOTLIGHT*, we chose the topic "Innovation – Reality or Dream?" because it reminds us how important it is to have a dream, and dreams about innovation should be a cornerstone for *Japan SPOTLIGHT* at a time when economies and societies in the developed world need a new stimulus for evolution.

We begin with stories on foresight in technology, economy and society and on science diplomacy developed at international venues such as the OECD and APEC. The Japanese Ministry of Education, Culture, Sports, Science and Technology (MEXT) is also today very keen on science diplomacy. We are also privileged to have an opportunity to listen to the views of experts on energy and environment technology, iPS cells, robots and Big Data on each new technology's long-term impact upon the economy and society.

Finally, we have an article by Prof. Yuko Harayama, an executive member of the Council for Science, Technology and Innovation (CSTI), on what policy would be most effective in achieving innovation, and an interview with Dr. Youngah Park, president of the Korea Institute of S&T Evaluation and Planning (KISTEP), a Korean Technology Foresight institute, who discusses the importance of women scientists' contributions to innovation in Asia.

I hope you enjoy reading this issue celebrating our 200th publication.

Naoyuki Haraoka, executive managing director, editor-in-chief of Japan SPOTLIGHT

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