Summary Translation of Question & Answer Session at the R&D Strategy Briefing for Analysts

Date: October 25, 2019
Location: Okada Memorial Hall, Fujitsu Laboratories Ltd.
Presenters: Hidenori Furuta,
Corporate Executive Officer, SEVP, CTO and CIO, Fujitsu Limited, Chairman, Fujitsu Laboratories Ltd.
Hirotaka Hara, CEO, Fujitsu Laboratories Ltd.

Questioner A

Q1: *Please tell us what your current R&D investment is and the number of employees, as well as what the future direction is likely to be.*

A1 (Furuta): The ratio of R&D investment to revenue has not changed, but R&D investment for Fujitsu this fiscal year are 130.0 billion yen, while in fiscal 2018 they were was a little over 180.0 billion yen, so the total amount of R&D investment has fallen somewhat. The reason for this is that Fujitsu has offloaded several businesses, including our device businesses as well as product businesses in our Ubiquitous Solutions segment. As Fujitsu's business portfolio changes, the areas we are investing in are also changing. Fujitsu Laboratories has 900 employees in Japan and 200 outside of Japan.

Questioner B

Q1: *I believe there are a wide range of methods when it comes to quantum computing, but what are your thoughts on the future direction in this area?*

A1 (Hara): In quantum computers, errors caused by noise have been a significant problem. In relation to this, Google announced that it had reduced the noise, thereby reducing the error rate, and operated up to 53 bits. It is a significant result, but I think it is the natural extension of previous innovations. In addition, the problem they solved this time was the extremely specialized problem of generating random numbers, and it is generally recognized that this does not mean they can take this same approach and solve problems with more general applications. In our quantum computing research, our primary focus is on algorithms for quantum computations. We are conducting joint research with Canada's University of Waterloo, which is focused on quantum computing research, on searching for the best algorithms once quantum computing hardware becomes a reality. Of course, we are also conducting basic research with a research institution outside Japan on technology that could produce a breakthrough on issues in quantum computing hardware, itself.

<u>**Questioner C**</u>
Q1: *First, regarding your comment about selling hardware based on Supercomputer"Fugaku" technology, I get the impression that arithmetic processing for HPC and AI has become similar. Will the areas where HPC technology can be used for general purpose applications expand? Second, in your plans to expand the employees in your digital transformation business from 500 to 3,000, how many researchers are included?*

A1 (Furuta): On the first question regarding "Fugaku", we are building it to deliver to Riken so that everyone can use it, but Fujitsu will also be launching commercial versions. As for the synergy between HPC and AI, I think there are tremendous prospects. In the HPC field, it is important to consider which applications will run on which types of architecture, and we are looking closely at AI applications in the next generation of HPC as we move forward in our development work. I think your second question was about the new digital transformation company. It will start with 500 employees, and we plan to expand it to 2,000 employees over three years. All of these employees are on the delivery side. As for researchers focused on digital transformation at Fujitsu Laboratories, I would say that applies to 90% of the researchers or more. I also feel that the researchers at Fujitsu Laboratories has great software development and technological capabilities.

(Hara): In Fujitsu Laboratories, the computing research team in charge of HPC is collaborating with the AI research team, and they are conducting research on how to accelerate AI with HPC, and how the use of AI can make HPC applications run faster. We also want to see Fugaku used for AI applications.