Summary Translation of Question & Answer Session at FY2014 Fujitsu R&D Strategy Briefing

Date and Time:	April 15, 2014, 15:00-16:00
Venue:	Okada Memorial Hall, Fujitsu Laboratories Ltd.
Presenters:	Hideyuki Saso, President, Fujitsu Laboratories Ltd. Shigeru Sasaki, Corporate Senior Vice President, Fujitsu Laboratories Ltd. Kouichi Kumon, Director, Fujitsu Laboratories Ltd. Ei Yano, Director, Fujitsu Laboratories Ltd.

Questioner A

Q1: *In your explanation on open innovation, you mentioned that there are an increasing number of cases in which you take a flexible approach in using capabilities outside of Fujitsu, including capabilities outside Japan. Could you elaborate a bit on your thoughts on open innovation?*

A1 (Saso): As I explained earlier and as outlined in the Fujitsu Laboratories Group framework-related references ("R&D Scheme") of my presentation materials, we engage in various diverse collaborative R&D with external research organizations both in and globally outside of Japan, and for governmental projects in Japan. For example, Fujitsu Laboratories' subsidiary based in Silicon Valley explores technology as seeds for new kinds of innovation. Specific approaches we undertake regarding our frameworks for open innovation vary by each project, but one example is our quantum dot laser technology, which was commercialized inclusive of external investment funding, and spun out of Fujitsu Laboratories.

Questioner B

Q1: *In the area of ubiquitous front-end interfaces, the Fujitsu Group continues to maintain its mobile phone business, but in light of your past experience, are you implementing any changes in the approach you take to R&D?*

A1 (Saso): In regards to Fujitsu's mobile phone business, for example, our Raku-Raku (meaning "easy-to-use" in Japanese) Phone features functionalities that employ technologies from Fujitsu Laboratories, for interfaces related to sight, sound, and voice communications. Our YUKKURI VOICE (translated as "slow voice") mobile phone function can alter the speed of speech, while our HAKKIRI VOICE (translated as "clear voice") function features noise cancellation of ambient noise during calls, and automatic adjustments for optimal frequencies during use. As in this example, in this way Fujitsu Laboratories' technologies are being leveraged for products for Fujitsu's Ubiquitous Solutions business. From the perspective of whether Fujitsu Laboratories' Ubiquitous Solutions-related technologies are being successfully commercialized, although on this occasion we are unable to share a Fujitsu Laboratories-only independent example of our technology being commercialized as a business entirely driven by our laboratories alone, we continue to explore business models based on Fujitsu-funded embedding of our laboratories' technologies in Fujitsu products.

Questioner C

Q1: *This year, marking 30 years since NTT was privatized, is a significant milestone: how would you sum up the 30 years since NTT was privatized? Has it, in a sense, been good for the development of ICT, or has it left behind some significant social issues?*

A1 (Saso): I recall that back in 1985, at the time, our share of the telecommunications business in Japan was not large. Given that background, I think the fact that we were able to leverage our profits from our telecommunications business, and successfully reinvest such profits for our computers' business was a significant achievement. In regards to our relationship with NTT, the type of capital expenditure involved has been changing. For the telecommunications field, as Fujitsu Laboratories we would like to consider directionalities in accordance with developments in future technological innovation. In cloud computing, we undertake integration of information equipment (servers, etc.). Hereon, we foresee that virtualization of networks will progress, and we plan to engage in related business in concert with NTT.

Questioner D

Q1: *I would like to ask some questions regarding your presentation materials. In the "Research Theme Categorization" references on page 8, do you have any set periods of time by which you expect to recoup the amounts budgeted, respectively, for "Research for near-term commercialization," "Advanced research," and "Seeds-oriented research"? Also, on the roadmap on pages 14 and 15, does the length of the boxes signify anything in particular? For example, does it represent the period for recouping the investment, or does it represent the period of time to produce research results for the business units?*

A1 (Saso): In response to your first question, in regards to evaluation of return on investment (ROI), at Fujitsu Laboratories we do not measure such ROI. Although Fujitsu Laboratories is an independent entity, we receive a R&D investment budget from the Fujitsu Group, and in return, we share the output of our R&D achievements with the Fujitsu Group. For example, intellectual property (IP) such as patents involving Fujitsu Laboratories' technologies are shared free of charge with the Fujitsu Group. In other words, ROI related to our labs' R&D is evaluated as part of profit and loss of the Fujitsu Group. Furthermore, although it is undisclosed, Fujitsu Laboratories also has IP-related research income we receive from sources external to the Fujitsu Group, which also is included in the overall profits of the Fujitsu Group – thus, we do not evaluate such ROI for Fujitsu Laboratories individually.

(Sasaki): In respect to the second question pertaining to whether there is any significance regarding the length of the boxes in our FY2014 roadmap, we are forecasting that the period coinciding with roughly the center of each box is approximately when that technology will emerge in general in the industry as a commercialized business. The overall length of each box is merely correlated to total word length within each box, and has no particular significance.

Questioner E

Q1: *In the communications industry, software-defined networking (SDN) is receiving significant attention, but I do not get the feeling that Fujitsu has a significant presence in this area of next-generation core networks. What initiatives does Fujitsu Laboratories have in this area?*

A1 (Saso): For Fujitsu's networks business, Fujitsu Laboratories and Fujitsu's network business-related business units work together as one. In May last year, we announced our FUJITSU Intelligent Networking and Computing Architecture (FINCA), in view of the coming era of Network Function Virtualization (NFV), to support all ISO layers as a whole, from the lowest to highest layers. However, as you mentioned, indeed it can be said that our promotional exposure of such efforts could be stronger. In regards to our efforts for sharing Fujitsu's vision and related concepts more effectively, the Fujitsu Technology and Service Vision 2014 was released by Fujitsu on April 4, and Fujitsu will further showcase and introduce in detail such concepts underlying its vision at Fujitsu Forum 2014 to be held next month in May in Tokyo.

Q2: *We seem to be reaching the limits of miniaturization in semiconductor devices, and if the "von Neumann approach" pursued to date will no longer work well in the future, as the R&D arm of Fujitsu, which is strong in software, what are your initiatives in the field of computing?*

A2 (Saso): I think this matter can be viewed from two key aspects – the configuration of computing architecture and advanced technologies to support such computing architecture. Although on this occasion we are unable to share much detail, our Directors who directly oversee our R&D in these fields, Kouichi Kumon and Ei Yano, will elaborate.

(Kumon): In regards to quantum computing, although our understanding is that quantum computing will not fully replace what we recognize as conventional computing, we do believe quantum computing possesses an entirely new kind of potential. At Fujitsu Laboratories, we have begun exploring ways in which useful systems can be built, rather than focusing merely on related devices. On a related point, it was mentioned that the leveraging of devices for use with servers does not seem to have progressed well – in today's world, we can observe that conventional computing is prominently and widely in use, and although some may feel that there is a lack of remarkable growth and progress in the field, we do not think conventional computing will become obsolete. When we consider how conventional computing can be leveraged in more human-centric ways which we have been calling for, specifically, although in the past although in the past the full breadth of computers' operational functionalities were often not easily visible to general users, hereafter we will conduct R&D in this field with an aim to offer related advice more proactively to users, for user benefit.

(Yano): In regards to hardware aspects, as a driver for advanced technologies, we will definitely proceed with development of related technologies. In addition, for example, while leveraging our technological involvement in governmental projects in Japan, we are also determining which proprietary related technologies can be utilized internally to benefit the Fujitsu Group.

Q3: *My understanding is that you are also working on next-generation supercomputers, but it is true that you are working in collaboration with a government project that seeks to increase performance levels by 100-fold?*

A3 (Saso): As the Fujitsu Group, in concert with the government of Japan, we are conducting feasibility studies in regards to our supercomputer-related future initiatives, and together we are in the process of setting out specific target dates.

Q4: *Unfortunately, two years ago there was a bug in Fujitsu's smartphones, and recently, in another industry, there was a large-scale recall of automobiles: it appears that it was largely the result of a problem in the control software. I have the impression that control software is getting more difficult — as a company that is strong in software, what is Fujitsu doing to ensure quality in software as well as in hardware manufacturing?*

A4 (Saso): Fujitsu Laboratories continues to conduct R&D for various technology tools related to quality control, and in this way we contribute from a technological aspect to Fujitsu's quality control. Although overall quality control of Fujitsu's mobile phones is not within the realm of Fujitsu Laboratories' direct oversight, my understanding is that Fujitsu's mobile phone-related divisions are undertaking assertive initiatives and measures pertaining to quality control and quality enhancement.