The 12th U.K.–Japan High–Tech Industry Forum

By Louis Turner

The Twelfth United Kingdom–Japan High Technology Industry Forum was held in Kobe—a city with British connections going back to the 1860s.

Reflecting the fact that the two delegations now know each other well, the discussions ranged widely. In the course of two days, over 40 papers were given, covering both the microscopic (the creation of new proteins) to the wide–ranging future (visions of human future to the year 2050); ranging from the ways Hyogo Prefecture and the wider Kinki region have been rebuilding for the next century, to the prospects for laser communications between satellites; and from speculation about the future for multimedia to discussions about the best way to manage global research networks.

As usual, the conference started with speeches from two senior officials from the two countries. The Department of Trade and Industry's David Durie started by stressing that the first overseas visit of his new minister, the Right Honourable Margaret Beckett, had been to Japan. He gave examples of collaboration between our two countries, which now include MITI officials being seconded to his department. He described the ambitious *Foresight* exercise that Britain has gone through over the last few years, and he laid emphasis on the growing numbers of small, high–tech companies which are now starting to spin out of British universities.

Dr. Sato Takeo, Secretary of the Agency of Industrial Science and Technology, described how Japanese policy was adjusting to the new realities. There was realization that basic research must be increased to overcome problems such as an ageing society and industrial hollowing–out. He described the Science and Technology Basic Plan, and explained how 15 new priority areas had been identified. He stressed the importance of deregulation and the need to internationalize. In this context, he mentioned that the U.K. is the world's leading nation in the degree to which the country's research and development is funded from abroad (15.4%). He implied that Japan could learn from this openness.

There were several places in the subsequent conference where the consequences of globalization were discussed. The major occasion for such debate was a morning session on "The Management of Alliances and Networks." Sato Masumi of Kobe Steel and Dr. Tomita Shuji of NTT Europe described the current situation at their respective companies. The former followed its customers abroad and has created global partnerships with USX (formerly U.S. Steel) and Alcoa to develop global supply capabilities; in addition, it has formed an alliance with Texas Instruments, which has allowed Kobe Steel to diversify into electronics. The company has also been a pioneer in "tri–polar" research, by putting research operations down both in the United States and the U.K., in addition to those back in Japan. Although maintaining global relations with lead customers was a factor in these R&D initiatives, Kobe Steel has also viewed them as an important way of promoting creative R&D and developing a multi–cultural awareness among research staff.

The NTT case has been different because, until the 1997 revision of the Japanese Telecom Act, the company was legally banned from entering into investments overseas— which explains why companies like Singapore Telecom have beaten NTT into the liberalized British telecommunications market. Like Kobe Steel, it now needs to go international in order to provide its major clients with a One–Stop and Global End–to–End Communications Service.

Microscopic to future planning: the 12th High–Tech forum saw wide–ranging discussions

In addition, it is under great pressure to internationalize its R&D in order to play its full part in international standard setting, and to develop products and services for the distinctive markets developing within the major regions. Later on in the conference, Dr. Sano Reiji of Matsushita Electric Industrial explained why his company had to develop global projects in related areas such as mobile communications, multimedia and multi-language processing.

A number of other speakers discussed similar issues, notably Dr. David Parker of ICI, Dr. Tim Minshall of Cambridge University, Gary Shorthouse of AEA Technology, Nakatsuka Haruo of Toshiba and Mike Pilbeam of AEA Technology. Dr. Minshall argued forcefully that companies must now develop integrated international manufacturing strategies which treat plants as being part of a wider network. He pointed to the growing use of alliances within such international networks, and demonstrated the way in which "complex" alliances could be used to transfer best practices within such global networks.

Dr. Parker drew on ICI's experience to show how corporate restructuring on a global basis (which, in his company's case, has involved acquisitions and one major de-merger) is posing major problems for research strategy. What does one do if one's company acquires a major research laboratory as a going concern? How does one react if one is left with a laboratory which has, through a shuffling of portfolios, lost a lot of the businesses into which it has traditionally fed? In a separate paper, Dr. Parker described how and why ICI had been setting up research operations in China. He went into some detail about how his company had been creating links with the Chinese academic scene.

Other speakers focussed on various aspects of the internationalization of R&D. Dr. Sano described how Matsushita, when deciding where to locate research, tended to choose sites which were within large markets, were in regions or cities with high GDP, and where there was a high concentration of researchers and universities. Pilbeam talked about the circumstances in which research might be out-sourced, either through alliances with competitors, or through a sub-contracting arrangement with universities or independent research companies. He looked at the argument that such alliances might lead to loss of control over intellectual property. He suggested that the speedy development of products might ultimately be the best way of protecting one's position, and that, though they appeared risky, alliances with competitors were often the fastest way to get one's intellectual property exploited.

The second major session in the conference focussed on "Society and Technology in the Year 2020." The most wide-ranging presentation was given by Sumitomo Electric's Dr. Nakahara Tsuneo, who summarized and expanded on the 1996 National Institute of Science and Technology Policy's *Delphi* exercise, which looked at likely technological developments over the next 30 years. He paid quite a lot of attention to likely developments in area of multimedia (including broadcasting and computing) and Intelligent Transportation Systems. The final section of his talk ranged more widely, looking at the relationship of human beings with the earth as a system. Here, he touched on growing population pressures, energy shortages and climactic change. At this point he focussed on developments in the life sciences, where cloning work in the U.K. ("Dolly," the famous cloned sheep) had dramatized the pace at which development was taking place throughout this area of science. While "Dolly" (and subsequent U.S. work on cloned monkeys) raises the possibility of cloned humans, other developments point to the growing significance of bio-reactors, cloned organs and the production of bio-foods.

Professor Mark Ferguson of Manchester University took up this theme in more depth. Being deeply involved in the relevant part of Britain's *Foresight* exercise, he gave an overview of British policy, stressing the importance of getting legislation right, so that safety is achieved without stifling the necessary creativity. He described some of the excitement within integrative biology, whereby rapid scientific strides are being taken simultaneously at the levels of the gene, the cell, animal biology, human biology and of whole populations. In areas like neuroscience, cognitive scientists are starting to link processes like memory and ageing to developments at the molecular level. He talked about likely developments in areas such as "tele-medicine" and "pharming" in which plants could be modified to produce, amongst other things, products like insulin.

He stressed the importance of "bio-informatics"—the application of advanced computing to the life sciences, and there was a parallel session within the conference which focussed precisely on this topic, in which Zeneca's Dr. Pioli gave the key overview. The Human Genome Project would be impossible without advanced computational power. Between them, Professor Ferguson and Dr. Pioli mentioned things like the importance of computational science in areas such as modelling genes and molecules; data-mining to trace links between health records at the population level with biomedical treatments; and the use of artificial intelligence.

Looking to the future, this seems to be an area in which the U.K. (with its genuine strengths in biological science) and Japan (with its electronic strengths) should be able to collaborate fruitfully.

The other presentations in this futurology session focussed more narrowly on aerospace (Professor Knibb from British Aerospace) and "Technologies for Mobility" (Nissan's Taniguchi). Aerospace is clearly a distinctive area, involving a certain amount of applied research, followed by a longer period of technology demonstration, culminating in a lengthy, expensive period of product development (which takes about 80% of a typical spend profile for a new aircraft). Professor Knibb discussed the need to develop a National Technology Demonstrator Program, which would plug the gap between research and development. What came out of his talk, though, was

Intellectual exchange: new concepts and technologies were introduced in parallel sessions

the impression that the nature of air transport is unlikely to change dramatically in the coming 30 years. A totally automatic aircraft will be conceivable, with automatic landings in any condition becoming possible. Some significant developments can be expected in air traffic management systems, which will be based on satellite–dependent large neural networks. He did see some financial problems for established airlines, as improved video–conferencing technology significantly starts to reduce the amount of short duration, premium–priced business travel.

Taniguchi's presentation also touched upon this question of how information technology might substitute for automotive travel, coming to much the same conclusion that it would substitute for some of the more routine, work–oriented travel. He saw challenges coming from an increase in the number of older drivers (who will need sophisticated driver support), the penetration of non–polluting electric vehicles, and an increase in road–transport efficiency as ITS technologies start to make an impact. Ultimately, though, he acknowledged that society has some hard

choices ahead as social systems react to the realities of 21st century travel. What kinds of travel should be given priority? How will communities and patterns of work and leisure have to change?

Elsewhere in the conference, there was a parallel session on "space systems" which touched on some of the air traffic issues raised by Professor Knibb. Dr. Hansson of the European Institute of Quantum Computation and NTT's Dr. Morihiro Yoshiteru both threw out ideas on how communications between satellites, and between satellites, aircraft and the ground might develop. Norris of Logica made a plea that Japanese authorities should liaise with the British and other Europeans to ensure that next–generation air–traffic navigation systems should be integrated.

In focussing on a limited number of sessions from this conference, I am downplaying others of equal importance, and I cannot go into detail about the very active visits program which was laid on during the days on either side of the conference. I would certainly have liked to be giving more space to a parallel session on "The Role of

High Technology in Regional Development," which gave regional representatives a chance to explain their strategy for revitalizing the region in the aftermath of the Great Hanshin Earthquake. The Japanese speakers were Hinoki Toshihide (MITI's Kansai Bureau), Honjo Takashi (Hyogo Prefectural Government) and Dr. Matsui Shigetomo (Kawasaki Heavy Industries and the New Industry Research Organization (NIRO)). The ambitious scope of the reconstruction plans, with the heavy emphasis on creating new industries for the 21st century, impressed the British delegation, whose regional specialists (Jim Porter from Scotland, Bob Fluellen from Devon and Cornwall, and Dr. David Ray from Oxford) took a slightly different approach, putting emphasis on the nurturing of clusters of mutually supportive industries. By this, they meant industries or groups of industries in a particular geographical area in which the close links between customers, competitors, suppliers and academic institutions produce an environment in which entrepreneurship thrives.

Neither is there sufficient space to cover the sessions on "Commercial Prospects for the Multimedia World," "The Enhancement of British and Japanese R&D Collaboration," or the visits to laboratories, factories and other research facilities (including the Spring–8 Synchrotron in Harima Science Garden City). All I can say is that the four days of the conference and related visits were extremely busy and stimulating. The quality of the two delegations was the highest yet.

And on top of the conference's intellectual content, the British delegation will always remember the warm hospitality extended by Kobe's officials and citizens.

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